Religious Diversity in the Southeastern United States: An Exercise in Mapping
Religious Diversity in the Region from 1980-2010

A thesis presented to
the faculty of
the College of Arts and Sciences of Ohio University

In partial fulfillment
of the requirements for the degree

Master of Arts

Richard Royce Greene, Jr.
May 2014

© 2014 Richard R. Greene, Jr. All Rights Reserved.
This thesis titled
Religious Diversity in the Southeastern United States: An Exercise in Mapping
Religious Diversity in the Region from 1980-2010

By
RICHARD ROYCE GREENE, JR.

has been approved for
the Department of Geography
and the College of Arts and Sciences by

Timothy G. Anderson
Associate Professor of Geography

Robert Frank
Dean, the College of Arts and Sciences
ABSTRACT

GREENE JR., RICHARD ROYCE, M.A., May 2014, Geography

Religious Diversity in the Southeastern United States: An Exercise in Mapping

Religious Diversity in the Region from 1980-2010

Director of Thesis: Timothy G. Anderson

Geographers have traditionally delimited and mapped religious adherence at the national or international scales through the use of small-scale choropleth maps depicting national or international distributions. Because such maps engender a number of shortcomings this study employs publically available county-level data on religious adherence from the Digital Atlas of American Religion, a web-based GIS site that enables researchers using spatially referenced data, to make complex and visually dynamic maps that can be easily interpreted. The analysis employs measures of diversity and isolation drawn from the fields of statistics and biology to develop diversity and isolation indices that will then be mapped employing a GIS in order to produce a more accurate interpretation of religious diversity in the southeastern United States. The study argues that the indices of relative “strength” derived from the methodologies employed in this study will produce a more accurate assessment of religious diversity.
DEDICATION

To my grandparents, Richard and Sara Greene, Arne and Astrid Ege, and to my late aunt, Elaine “Bimbi” Greene
ACKNOWLEDGMENTS

I am extremely grateful to the Department of Geography at Ohio University for admitting me into their Graduate Program with a fully-funded teaching assistantship. Without such opportunity and financial assistance from the department, this thesis and my master’s degree would not have been possible. The Graduate Program in Geography at Ohio University is a tightknit group comprised of researchers, educators, mentors, and most of all, friends who all work as a cohesive group dedicated to the advancement of geographic research. I want to thank all of the professors in this fine department because their knowledge and feedback attributed to the student I have become today.

I would also like to extend my thankfulness to my thesis director Dr. Tim Anderson for his role in my graduate-level accomplishments. Dr. Anderson far surpassed any expectations I had for an advising professor. I am truly indebted to Tim because without his foresight and willingness to guide me through this arduous journey of writing a thesis, I wouldn’t be in the position I am in today.

Another person who I am extremely grateful for having known throughout this process is Dr. Toni Alexander. Toni is an Associate Professor of Geography at Auburn University and was instrumental in my pursuit of a career in academia. Her unwavering dedication and belief in me while I was an undergraduate student contributed to my decision to continue on with my education at the master’s level.
Toni has and always will have an influence in my academic career as well as a place in my heart.

In addition, I would like to thank Ohio University professors Harold Perkins and Gaurav Sinha for their time and dedication as thesis committee members. Both Harold and Gaurav, without hesitation, took time out of their busy schedules to quickly answer any questions or issues that arose during the research and writing process of my thesis. For that, I am forever grateful.

Finally, and most importantly, I want to thank each and every one of my family members. Their constant interests and praise throughout this process was extremely appreciated as it served as a great source of motivation. In particular, I thank my mother, father, and sister. To my mother, Karin Greene, I want to thank you from the bottom of my heart for everything you have done for me throughout this process and in life. Words will never express how special and important you are to me, you’re my rock and I love you. To my father, Rick Greene, your support throughout this process was amazing. Our daily phone calls were sometimes the only thing that got me through the day. Your positivity in the conversations we had was extremely beneficial to this research when times were low. To my lovely sister, Sara Spradlin, you are the best big sister a little brother can ever have, even though I am taller than you. I want you to know that you too were very instrumental in my accomplishments throughout all of my academic endeavors. You are one of the strongest women I know and my niece and nephew could not ask for a better mother.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>3</td>
</tr>
<tr>
<td>Dedication</td>
<td>4</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>5</td>
</tr>
<tr>
<td>List of Figures</td>
<td>8</td>
</tr>
<tr>
<td><strong>Chapter 1: Introduction</strong></td>
<td>10</td>
</tr>
<tr>
<td>1.1 Introduction</td>
<td></td>
</tr>
<tr>
<td>1.2 Research Questions</td>
<td>12</td>
</tr>
<tr>
<td>1.3 Significance</td>
<td>13</td>
</tr>
<tr>
<td><strong>Chapter 2: Literature Review</strong></td>
<td>15</td>
</tr>
<tr>
<td>2.1 Introduction</td>
<td>15</td>
</tr>
<tr>
<td>2.2 The National Scale Approach</td>
<td>18</td>
</tr>
<tr>
<td>2.3 The Sacred Place Approach</td>
<td>20</td>
</tr>
<tr>
<td>2.4 Textbooks</td>
<td>24</td>
</tr>
<tr>
<td>2.5 Mapping</td>
<td>30</td>
</tr>
<tr>
<td><strong>Chapter 3: Methodology</strong></td>
<td>39</td>
</tr>
<tr>
<td><strong>Chapter 4: Results and Discussion</strong></td>
<td>52</td>
</tr>
<tr>
<td>4.1 Introduction</td>
<td>52</td>
</tr>
<tr>
<td>4.2 Percent Adherence Results and Discussion</td>
<td>53</td>
</tr>
<tr>
<td>4.3 Herfindahl Index Results and Discussion</td>
<td>65</td>
</tr>
<tr>
<td>4.4 Simpson Reciprocal Index Results and Discussion</td>
<td>76</td>
</tr>
<tr>
<td><strong>Chapter 5: Conclusion</strong></td>
<td>86</td>
</tr>
<tr>
<td>Work Cited</td>
<td>90</td>
</tr>
</tbody>
</table>
**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Glenmary Research Center Map of Major Religious Families</td>
<td>11</td>
</tr>
<tr>
<td>Figure 2</td>
<td>County-Level Rates of Adherence Map, 1980</td>
<td>54</td>
</tr>
<tr>
<td>Figure 3</td>
<td>County-Level Rates of Adherence Map, 1990</td>
<td>55</td>
</tr>
<tr>
<td>Figure 4</td>
<td>County-Level Rates of Adherence Map, 2000</td>
<td>56</td>
</tr>
<tr>
<td>Figure 5</td>
<td>County-Level Rates of Adherence Map, 2010</td>
<td>57</td>
</tr>
<tr>
<td>Figure 6</td>
<td>County-Level Rates of Adherence Map for All Years</td>
<td>58</td>
</tr>
<tr>
<td>Figure 7</td>
<td>1980 Histogram of County-Level Rates of Adherence</td>
<td>59</td>
</tr>
<tr>
<td>Figure 8</td>
<td>1990 Histogram of County-Level Rates of Adherence</td>
<td>59</td>
</tr>
<tr>
<td>Figure 9</td>
<td>2000 Histogram of County-Level Rates of Adherence</td>
<td>60</td>
</tr>
<tr>
<td>Figure 10</td>
<td>2010 Histogram of County-Level Rates of Adherence</td>
<td>60</td>
</tr>
<tr>
<td>Figure 11</td>
<td>1980 Map Employing the Herfindahl Index</td>
<td>66</td>
</tr>
<tr>
<td>Figure 12</td>
<td>1990 Map Employing the Herfindahl Index</td>
<td>67</td>
</tr>
<tr>
<td>Figure 13</td>
<td>2000 Map Employing the Herfindahl Index</td>
<td>68</td>
</tr>
<tr>
<td>Figure 14</td>
<td>2010 Map Employing the Herfindahl Index</td>
<td>69</td>
</tr>
<tr>
<td>Figure 15</td>
<td>Herfindahl Index Combined Map for All Years</td>
<td>70</td>
</tr>
<tr>
<td>Figure 16</td>
<td>1980 Herfindahl Index Histogram</td>
<td>71</td>
</tr>
<tr>
<td>Figure 17</td>
<td>1990 Herfindahl Index Histogram</td>
<td>71</td>
</tr>
<tr>
<td>Figure 18</td>
<td>2000 Herfindahl Index Histogram</td>
<td>72</td>
</tr>
<tr>
<td>Figure 19</td>
<td>2010 Herfindahl Index Histogram</td>
<td>72</td>
</tr>
<tr>
<td>Figure 20</td>
<td>1980 Map Employing the Simpson Reciprocal Index</td>
<td>77</td>
</tr>
</tbody>
</table>
Figure 21: 1990 Map Employing the Simpson Reciprocal Index.........................78
Figure 22: 2000 Map Employing the Simpson Reciprocal Index.........................79
Figure 23: 2010 Map Employing the Simpson Reciprocal Index.........................80
Figure 24: Simpson Reciprocal Index Combined Map for All Years.....................81
Figure 25: 1980 Simpson Reciprocal Index Histogram........................................82
Figure 26: 1990 Simpson Reciprocal Index Histogram........................................82
Figure 27: 2000 Simpson Reciprocal Index Histogram........................................83
Figure 28: 2010 Simpson Reciprocal Index Histogram........................................83
CHAPTER 1: INTRODUCTION

1.1 Introduction

In geography, religion has traditionally been approached in four primary ways. These approaches include mapping distributions of religions at the national or international scale, studies focusing on the cultural landscapes of sacred places (especially pilgrimage landscapes), generalized treatments of the subject that more often than not take the form of college textbooks, and the development of new mapping techniques that employ religious diversity data in non-traditional ways. The first approach – delimiting and mapping the distribution of religious adherence at national or international scales – engenders a number of shortcomings, not the least of which is the fact that small-scale choropleth maps depicting national or global distributions tend to mask variability at the regional and local level. For instance, maps employing county-level data tend to be misleading because when they cover large areas, such as the entire United States, they often neglect to account for the finite details that can prove to be an important aspect of religious distributions in a particular area. A prime example of the types of maps depicting large regions without accounting for small and important details is the Glenmary Research Center's 2010 map of major religious bodies in the United States (Figure 1).
While it displays clustering of the major religious denominations, it does not reveal those smaller scale patterns or the degree to which one denomination dominates over another and therefore, its simplicity tends to mask local and regional variability. For example, in Figure 1, the entire state of Utah is depicted as a homogenous region of Latter Day Saints adherence. This is somewhat misleading, however, because it suggests to the reader that the entire population of the state is uniformly Mormon. Although Utah is without a doubt predominantly Mormon, it is not the only religion to which people in the state belong. Another challenge that arises when using this type of map is the possible rejection of data by the reader based on his or her personal knowledge of the area. An example of this would be a
Catholic living in northern Utah: knowing that his or her region is not entirely Mormon calls into question the accuracy of these types of choropleth maps. At the county level, these types of maps rarely depict finite details, which, in their own right, hold value and relevance to such studies. The goal of this thesis, then, is to explore new ways of mapping religious patterns in the United States that take into account and more clearly depict local and regional variability.

1.2 Research Questions

As mentioned, the goal of this thesis is to explore new ways of mapping religious patterns in the United States that take into account and more clearly depict local and regional variability. With that in mind, this thesis will address the following research questions:

• How can religious diversity in the southeastern United States be more accurately measured and mapped?

• What statistical indices best measure and illustrate religious diversity in the study region?

• Will the employment of statistical indices in the evaluation of religious diversity lead to more nuanced approaches to studying religious diversity?
1.3 Significance

Curiously, religion has historically not occupied a central role in the field of cultural geography. Not surprisingly, most studies by cultural geographers have focused on the interpretation of religious cultural landscapes and the delimitation of broad, generalized religious “culture” regions. On the other hand, the study of religion and aspects surrounding it, both social and societal in nature, has been of prime importance in other fields such as sociology and religious studies. For instance, sociologists are concerned with studies that “examine the religious impact of urbanization in the United States” in order to assess links between the religious pluralism of communities and their degree of religious mobilization (Finke 1988, 2). In religious studies, the history of religion is being studied intensively through a lens that examines “questions of spatiality and locality” (Henkel 2005, 1). Although the study of religion historically has not been a primary theme in geographical research, it has recently begun to attract considerable attention from a number of cultural geographers (Crawford 2005). For these geographers, the “desire to describe and understand how culture varies over space and time,” is the driving force behind recent attention towards developing a more nuanced understanding of American religious regions (Crawford 2005, 51). Religion remains a fundamental component of contemporary life and, according to Bauer, “religion continues to play an important role in the public and private lives of Americans” (Bauer 2012). Also, according to Proctor “the prominence of religion in the contemporary American
cultural and political landscape is staggering” (Proctor 2006, 165). This is especially the case for this study's research area, the southeastern United States. Brunn et al. suggest that, “religion is a key identifier of southern culture and is a feature that remains whether one resides in a Baptist dominated city or in a suburb” (Brunn et al. 2011, 515). This being said, geographers have rarely studied the distribution of religious adherence at anything other than the national scale. Because this study’s unit of analysis is the county, this study and the maps produced in it will shed light on, and lead to a better understanding of, religious adherence patterns at the sub-national scale. Also, the methodologies employed in this research are somewhat new to cultural geography and by incorporating them into research, cultural geographers can add to the study of religion in geography by deepening our understanding of such interactions.
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Religion has been studied by a wide array of scholars from a large variety of academic disciplines:

“Religion is not subject to being appropriated by a single academic discipline. This fact was evident from the participation of scholars representing various disciplines in the International Conference, ‘Pilgrimage: The Human Quest,’ held at the University of Pittsburgh in 1981. Subsequent research has amply borne out the multidisciplinary character of pilgrimage as a religious phenomenon. Nevertheless, each discipline has a view that adds further understanding about various phenomena, including religion” (Bhardwaj 1997, 2).

The two most prominent academic disciplines at the forefront of the analysis of religion in the United States are sociology and American religious studies. In sociology, the study of religion has had a “long-standing emphasis on meaning, identification, and moral order” (Edgell 2012, 248). In the early 20th century, over a hundred years ago, two key publications regarding the study of religion in the field of sociology were published (Davtdsen 2012). Les Formes élémentaires de la vie religieuse (Elementary Forms of Religious Life) was published by Emile Durkheim in 1912. That same year, Ernst Troeltsch published Die Soziallehren der christlichen Kirchen und Gruppe (Social Teachings of Christian Churches and Groups). These two books emphasized the role and direction of religion in sociology by focusing on religion and its relation to society and morality by asserting that this relationship
was important to the research being conducted in the field at the time (Davtdsen 2012). From these two classics, Davtdsen believes that, “since its inception the sociology of religion has been interested primarily in religion at the level of society rather than at the individual level, and in religion in its official and institutional forms rather than its non-institutional, spontaneous, and liquid forms” (Davtdsen 2012, 554). The study of religion within the field of sociology, over the past few decades, has seen, “... the sociological study of religion... re-shaped by a promising new body of work that takes a cultural approach” (Edgell 2012, 248). According to Edgell, “the renewed emphasis on cultural analysis stems in part from the dissatisfaction with market and secularization approaches to religion, and with the debate between them, a debate that has had a formative influence on recent scholarship in ways that are proving unhelpful for explaining important contemporary developments” (Edgell 2012, 248). Edgell is not alone in his awareness regarding the instability of sociology following the secular approach when evaluating religion in the field. Agreeing with Edgell’s viewpoints, Cadge et al. observe that, “in the last 50 years, sociological studies of religion have shifted from their focus on secularization to the widespread influence of the new paradigm and rational choice” (Cadge et al. 2014, 437).

In American religious studies, at least prior to the 1970’s and 1980’s, the normative research agenda was traditionally only concerned with white men with Protestant backgrounds (Fessenden 2012). This, however, is not typical of today’s American religious studies. In fact, Fessenden believes that the lack of a normative
agenda, “is also what distinguishes us from our divinity-school forbears, the strict erstwhile custodians of religion in the academy who may have bequeathed us their university lease but from whose halls most of us have long since decamped, in our methods, aims, and orientation if not in our campus address” (Fessenden 2012, 373-374). Further, it is important to note that there is a difference between theology and religious studies. According to Bird and Smith (2009), theology typically studies one religion with a focus on the viewpoints of that particular religion whereas Religious Studies focuses on all religions while withholding a bias on doctrine (Bird and Smith 2009).

Within the discipline of Geography, scholars have approached the topic of religion from four primary points of view. First, religious distributions have been studied at the national scale under the assumption that religious distributions in the U.S. can be interpreted as a proxy for the delimitation of culture regions. Second, the study of various spatial components of sacred places, especially with regard to pilgrimage sites, has been a dominant theme. Third, a number of comprehensive treatments of the geography of religion as a whole have appeared in textbook form over the past thirty years. Finally, statistical methods used in sub-disciplines such as biogeography have been employed to develop different ways of analyzing and mapping religious diversity.
2.2 The National Scale Approach

Religion has played a pivotal and continuing role in defining and redefining American culture, so much so that the United States is often cited as the most religiously diverse country in the world (Bauer 2012). James Shortridge (1976) has argued that religious values play a key role in shaping human values and customs. As such, religious regions, according to Shortridge, tend to mirror culture regions. In an earlier treatment of the topic, David Sopher (1973, 107) wrote that “...[the] role of contemporary quasi-religious systems of political faith should be considered. These can displace traditional religions as a social guiding force, although they do not always do so overtly.” Given this, scholars such as these argue that a comprehensive understanding of religious adherence patterns and the processes behind them is necessary to develop a foundation for further research into the diversity of American cultural landscapes.

Geographers have often approached religion by studying religious systems at the national scale. In a recent article in the Journal of Cultural Geography, Crawford (2005, 81) does a fine job of “adding to cultural geography's spatial tradition concerning religion by addressing some fundamental questions regarding spatial patterns and shifts of aggregate descriptors of religious adherent population for a set of large, U.S Christian religious groups during the period from 1980 to 2000,” but neglects to detail local and regional variability. Although this can be an appropriate approach, in some instances it can create problems with proper geographical
analysis. According to Sopher, “data about religious fidelity are mostly qualitative and impressionistic, often providing only superficial indices such as the degree of observance of food taboos” (Sopher 1973, 107). This was echoed by Buttimer (2006), who describes some of the aims of research with regard to religion in geography. Buttimer highlights research showing “ways in which religion dictated certain taboos with respect to livelihood and food and influenced political and economic life” (Buttimer 2006, 197). So too, patterns at the national scale tend to hide local and regional variability in religious adherence. Further, Buttimer describes how previous generations saw the geography of religion as “[involving] primarily the study of global patterns of world religions, their spatial diffusion, boundaries, and imprints on the cultural landscape” (Buttimer 2006, 197).

In regards to mapping religion at the national scale, geographers have typically spent most of their time and effort focusing on the distribution of religions and church membership (Park 1994, 89). Although this is not necessarily an “improper” approach, it does engender several shortcomings. For instance, “hardly any research has been done on the unchurched (people who are neither members nor involved in any religious institutions), who thus remain a largely overlooked segment of the region’s social fabric” (Park 1994, 89). Geographers Barney Warf and Mort Winsberg, in their article “The Geography of Religious Diversity in the United States,” describe another blemish found within this approach (Warf and Winsberg 2008). Up to this point, the most reliable data on church denominational membership came from the Glenmary Research Center. However, Warf and
Winsberg address the flaws found in the Glenmary data by identifying the fact that the Glenmary data do not account for some predominantly African American congregations and that "some large denominations such as the Jehovah’s Witnesses refused to participate" (Warf and Winsberg 2008, 416). This is a notable shortcoming because African Americans "make up 12 percent of the country's population and are heavily represented in specific regions and in specific denominations" (Warf and Winsberg 2008, 416). In order to address these errors, Warf and Winsberg adopt a dataset that has taken into account and fixed the weaknesses in the Glenmary Research Center data by "including the number of non-adherents by county as well as an estimate of the number of African American adherents" (Warf and Winsberg 2008, 416). This neglect by geographers to recognize other factors that have substantial relevance to the study of religion, especially the distribution of religion, is a matter that should not go unaddressed. Recent geographic literature, such as the work published by Warf and Winsberg, is beginning to tackle these issues.

2.3 The Sacred Place and Space Approach

Sacred places are one of the most pervasive elements of religious landscapes around the world. Because they are so ubiquitous and such a “visible” part of religious cultural landscapes, geographers studying religion have focused much of their scholarly attention on such places and the meaning and ideals embodied in
them (Morinis and Stoddard 1997). It is important to define what places geographers consider to be “sacred.” In Geography, sacred places or spaces “are not categories, such as heaven, earth and hell, but hierarchical power relations of domination and subordination, inclusion and exclusion, appropriation and dispossession” (Kong 2001, 213). That is, they are actual places that can be inhabited physically. Therefore, it is important “to interrogate the entrepreneurial, social, political and other ‘profane’ forces that constitute the construction of sacred space, which often entail the cultural labor of ritual, in specific historical situations, involving the hard work of attention, memory, design, construction, and control of place” (Kong 2001, 213).

The study of religion and the sacred is beginning to experience a revival of sorts within the social sciences, as well as in human geography (della Dora 2011). Many are quick to assume that this renewed interest is born out of such tragic events such as 9/11. Whether that is the case or not, “the sacred has increasingly come to permeate human geography debates about identity” (della Dora 2011, 163). Although this last paragraph introduces the meaning of sacred place and space adopted by geographers, it is important to note that the scope, for which the meaning of sacred place and space is defined, is “by no means a matter of general agreement” (Williams 2002, 595). In his article published in the Journal of the American Academy of Religion, Williams (2002) surveys literature that discusses the subject of sacred place and space in the context of North America. To do so, he investigates theoretical issues on the topic as well as more empirical areas of
investigation, such as institutional, ethnic, public, and domestic place and space. With that being said, not having a generally accepted definition and understanding of what is deemed to be sacred place and space is an important issue in these academic dialogues.

Pilgrimage landscapes have been especially fertile ground for geographers because they involve movements of populations (a dominant theme in human geography) and because they are places that are “set apart” from others. Moreover, “because of its integrative nature, geography provides an important framework for studying the complex phenomenon of pilgrimages” (Morinis and Stoddard 1997, ix). In a review of Morinis and Stoddard’s work, Sacred Spaces, Sacred Places: The Geography of Pilgrimages, Wil Gesler reiterates the idea that the study of pilgrimage is perfectly suited for geographical analysis. Gesler states that “there are several geographic considerations and philosophical contexts that can be useful to pilgrimage researchers” and that “pilgrimage lends itself easily to geographic study” (Gesler 1998, 535). The book by Morinis and Stoddard is a consortium of several academic articles that cover topics ranging from pilgrimages in the Christian tradition to the role of pilgrimages in general (Morinis and Stoddard 1997). The articles found within this particular text offer the “basic building blocks for the geographic study of pilgrimage, especially when complemented by careful and detailed field work in the best geographic tradition” (Gesler 1998, 535). Also, these articles deliver new and more up-to-date approaches to studying pilgrimage while at the same time identifying the changing transition to the study of this particular
topic. An example of this, according to Gesler (1998), can be found in the introductory chapter of Morinis and Stoddard’s (1997) book. In the introductory chapter, Surinder M. Bhardwaj notes “a move from descriptive frameworks to more empirical, analytical, and integrative work in pilgrimage studies” (Gesler 1998, 535).

Within the past thirty to forty years, the geographic study of sacred places has undergone comprehensive change. In particular, “geographers have demonstrated a more adequate comprehension of this complex and dynamic religious circulation” (Bhardwaj 1997, 1). Moving away from an earlier framework that was highly descriptive in nature, “subsequent pilgrimage research in the last three decades has begun increasingly to utilize endogenous cultural motives, symbols, and perceptions” (Bhardwaj 1997, 1). Another development in the geographic study of sacred places is suggested by Holloway in the article, “Enchanted Spaces: The Séance, Affect, and Geographies of Religion,” in which the author suggests that students of the geography of religion should focus their attention toward “the effect, the embodiment, and the performance of spiritually infused or sacred places” (Holloway 2006, 182). Even though there have been changes to the sacred place approach in geographical studies, these changes “do not concern themselves with new directions (of spirituality, cultural politics, personal experience, symbolism, for example), remaining extremely competent in dealing with traditional concerns, for example, of distribution, diffusion and dynamics of religion, and the relationship between religion, demography and development” (Kong 2001, 212).
In order to develop a more complex and nuanced analysis of sacred places, geographers must pay much more attention to “affectual relations and forms of embodiment that produce religious-spiritual space” (Holloway 2006, 186). However, geographers still seem to neglect the spiritual nature of religiously meaningful places. Sacred spaces are an integral part of religion; therefore, the study of religion should not neglect the “transcendent quality, which can elicit powerful emotional responses. They are geographical locations that instill and perpetuate a variety of feelings that affect human experiences and activities” (Finlayson 2012, 1763). Geography can clearly contribute to past and current research related to religion, however:

“In light of the eclecticism of method, theory and subject matter, together with the elusive nature of ‘religious geography’, it is vital to retain a focus on religion as an analytical category and to sketch out the ground over which the discipline of geography can engage with religion, where a geographical sensibility may help in our understanding, and the terrain over which geographers can converse with historians, sociologist, anthropologists and theologians in a mutually beneficial light” (Brace et al. 2006, 38).

2.4 Textbooks

Beginning with David Sopher’s (1967) Geography of Religion, a number of textbooks written by geographers have approached the topic in a variety of ways. Sopher focused on the spatial distribution of world religions, illustrated with global-scale maps. In his seminal work The Cultural Geography of the United States, Zelinsky (1973) paid particular attention to delimiting religious regions as “proxies” for
culture regions. Later textbooks, such as Roger Stump's *The Geography of Religion* (2000) and Chris Park's *Sacred Worlds: An Introduction to Geography and Religion* (1994) have modified these traditional approaches by including references to such topics as religious fundamentalism and social justice viewed within the context of social and literary theory.

Earlier geographers studying religion often limited geographical analysis of this topic to theological and philosophical content (Sopher 1973). Sopher recognized this and stressed the importance of labeling and classifying religious systems, as well as the difficulty of doing so. He stresses that "... [we] must first select, sort, and classify the data of religion within a suitable geographic framework, but the labeling of religious systems itself presents a number of difficulties" (Sopher 1973, 2). Within these same lines, prominent religious scholar and founding director of the Institute for the Study of American Religion J. Gordon Melton identifies and defines primary religious "families" in his *Encyclopedia of American Religions* (Melton 2009). Now in its eighth edition, the book covers close to 3,000 North American religious groups and incorporates profiles of individual denominations ranging from nearly all permutations of Christianity to flying-saucer cults (Osburn 2009). The importance of this book in the context of geographical studies, in particular cultural geography, is Melton’s classification of the numerous North American religions into 24 "family" groups. By organizing these religions into "families,” Melton’s classification system enhances our understanding of theological
similarities and differences among a wide array of religious traditions. Aside from the comprehensive and detailed analysis of religions in North America, the eighth edition of the *Encyclopedia of American Religions* sets itself apart from the earlier editions by incorporating new and more visually appealing aspects. For instance, unlike the earlier editions, the eighth edition incorporates graphics such as maps. Additionally, there were “more than 200 newly formed groups needing space” and “to accommodate them, all defunct religious bodies were removed from the main text and relegated to an appendix” (Osburn 2009, 78).

Although Melton’s book serves as the most comprehensive directory of North American religions, it is not the only source of its kind. *The Directory of Religious Organizations in the United States* is a directory that “describes 1,628 organizations active in the field of religion” (Directory of Religious Organizations 1982, 1). This directory only describes the general religious organizations in the United States, which means that it “describes certain departments of national churches” but “does not describe religious bodies such as the Catholic Church”(Directory of Religious Organizations 1982, 1). Differing from the alphabetized directory found in the above book, *Religious Congregations and Membership in the United States* contains statistics for 236 religious bodies, providing information on the number of congregations within each region, state, and county of the United States” (Association of Statisticians of American Religious Bodies 2010). Data from the Association of Statisticians of American Religious Bodies (ASARB) supplemented the statistics of the religious bodies used in this book. Even though this book is an important source
of congregational membership data, it is not without limitations. Similar to the noteworthy flaws elucidated by Warf and Winsberg (2008) in their research, the methodology employed in this research fails to account for a number of different religious groups, although the authors allude to these limitations throughout the text.

Through the incorporation of references that are not traditionally a part of religious geography, geographers such as Roger Stump and Chris Park, as well as the noted religious scholar Huston Smith, have begun to modify traditional approaches to religion. For example, in Smith’s book, *The World’s Religions*, readers are introduced to topics regarding several religious facts from around the world, such as “Confucius’ ideal of the true gentleman, what the yin/yang symbol signifies, the literal meaning of Islam, what the Exodus means to the Jews, what was the ‘good news’ that excited the early Christians, and so on” (Smith 1991, 384). He then develops three questions, which are not typically asked by geographers, which he describes as being either “new questions that may have emerged in the introduction of his topics or old ones assuming new urgency” (Smith 1991, 384). These questions include: “how are we to pattern religions, do religions have anything to say collectively to the world at large, and how should we comport ourselves in a world that is religiously pluralistic where it is religious at all?” (Smith 1991, 384).

Although the study of religion in geography has typically been marginalized, there has been an increased emphasis on the subject in the past few years. In fact, if one were to look at religion from the viewpoint of teaching the topic, one would
quickly see that "religion seems to enjoy a secure foothold in the discipline" (Proctor 2006, 165). Contradicting the suggestion that religion is not a prioritized focus of study within geography, Kong (2001) explains that religion has “attracted significant attention in the last decade within geography" (Kong 2001, 211).

According to Yorgason,

“While we may still be far from the prominence accorded to religion by the popular press, as James Proctor noted in the introduction to a recent forum, claims about religion’s marginality seem to have been increasingly challenged over the past few years. As a direct consequence of 9/11, or perhaps as part of a new interest within the social sciences in ‘more-than-representational’ aspect of life, such as the spiritual and the numinous, religion has been revisited in multiple and often very sophisticated ways by an increasing number of human geographers who in the past paid little or no attention at all to it (Yorgason 2009, 629-630).”

Accordingly, the study of religion in geography is beginning to experience a resurgence, which is evident in some of the books mentioned above; however, it has by no means reached the level of attention that other foci of study in geography have. Venturing outside the small cadre of geographers who are actually conducting research on religion in geography, there is not much evidence suggesting that religion is yet well-defined focus of geographical research. Recently, Nigel Thrift, who writes favorably about the increased relevance and notoriety of geography in his 2002 article, “fails to mention religion even in the context in which it has achieve considerable notoriety” (Proctor 2006, 166). In his article, “The Future of Geography,” Thrift suggests that,

“If nothing else, the events of September 11 and after have made clear that ignorance of the world is no excuse. Geographical knowledge is crucial. But
the argument goes farther than simply knowing more about the world. These events have also underlined the need for producing new forms of ethic that will allow for peaceful co-existence on equal terms. And the literature on post-colonialism – which geographers have contributed so much to – is particularly useful here, seen as a series of meditations on what kinds of identities might be able to both assert their existence and reach out to others in a world in which crossing cultures has become normal and in which, as a result, very few cultures are therefore able to be described as separate, bounded and uniform. In particular, this literature, in its constant de-privileging of the perspective of the metropolitan subject, has developed a remarkable emphasis on the inter weavings of geography as central to the decentralized world it is trying to conjure into existence (Thrift 2002, 294).

2.5 Mapping

Mapping is an essential aspect of geography. In this particular area of geography, the “academic study of the relationships between geography and religion constitutes a long established sub-field” (Pacione 2009, 370). It is important to note, however, that the study of religion in Geography can be broken down into two separate and different approaches: religious geography and the geography of religions (Pacione 2009). The first approach, religious geography, “focuses on the role of religion in shaping human perceptions of the world and of humanity’s place within it” (Stump 1986, 1). The geography of religions “is concerned less with religion per se than with its social, cultural and environmental associations and effects” (Stump 1986, 1). The latter approach places heavy emphasis on analysis of the spatial perspective of religions. According to Park, “the study of the distribution of religion at different scales is the most logical link between geography and
religion, lends itself most readily to geographical analysis and interpretation, and is an area largely neglected by other disciplines" (Park 1994, 56).

Approaches to mapping religious diversity in the United States have undergone major changes within the past three decades. These changes vary from using simple univariate analysis to incorporating multivariate analysis employing complex statistical procedures (Pacione 2009). In 1961, Wilbur Zelinsky used the simple univariate analysis approach to map religious regions in the United States by producing a series of twenty-five maps that mapped “the distributions of absolute numbers of reported members of the various denominations on the grounds that data limitations precluded a measure of the relative strength of different groups” (Pacione 2009, 372). Although this approach to mapping religious diversity has its limitations, such as displaying only one aspect of many that are associated with painting an accurate picture of religious regions in the U.S., it is still acknowledged to be a valuable, early interpretation by many scholars. For example, Pacione quotes Sopher as saying, “for a clear and comprehensive picture of America’s denominational geography, Zelinsky’s work is irreplaceable” (Pacione 2009, 372).

Earlier approaches to mapping religious diversity using univariate maps were problematic and are subject to much criticism within the field of geography. For many, they were nothing more than simply-constructed maps that merely provided small amounts of information regarding patterns of religious distributions in the United States. According to Pacione, “univariate maps illuminate only a single
dimension of the complex religio-spatial mosaic, portraying, for example, only the
dominant religion in an area with no indication of the degree of religious pluralism”
(Pacione 2009. 373). This is also echoed by James Shortridge in “Patterns of Religion
in the United States," in which he argues that earlier studies that mapped religion
were preoccupied with mapping particular religious denominations (Shortridge
1976). Although patterns of denominational distributions can be applicable to
describing some aspects of the religious geography in the United States, Shortridge
argues that methods to mapping religion will need to become more advanced in
order to accurately assess this dimension of the American cultural landscape.

The methods for mapping religious geographies underwent another change
in the late 1970’s when James Shortridge began to shift cultural geographers away
from univariate mapping towards efforts to focus on spatial variations (Shortridge
1976). The use of a multivariate statistical cluster analysis by Shortridge was the
first of its kind and was distinctive because it divided counties into regions based on
diversity and intensity of religions in a given area (Bauer 2012). The spatial
variations which Shortridge highlighted in his maps were, “the relative proportions
of liberal and conservative Protestantism, the degree of local numerical dominance
by a given religious body, a factor here termed religious diversity; and the level of
religious commitment or intensity, as measured by the ratio of church members to
total population” (Shortridge 1976, 420). This study was the first to employ data
from the National Council of the Churches of Christ in the U.S.A. in 1974, which, at
the time, was the only legitimate source for which data on current distributions
existed (Shortridge 1976). Such early attempts to map religious diversity were limited due to the fact that the data source was from 1952 and thus was not current. Another groundbreaking aspect of Shortridge’s use of the National Council of the Churches of Christ in the U.S.A. data was that it also contained county level data of church membership that accounted for nearly eighty percent of the Christian church members in the United States (Shortridge 1976).

By incorporating maps into the study of religion in cultural geography, Wilbur Zelinsky (1961) and James Shortridge (1976) became pioneers in the subfield of the geography of religion. Indeed, Jordan (2007) emphasizes that, “a few cultural geographers (Zelinsky and Shortridge) have pioneered efforts to map and analyze spatial patterns of religion in the United States” (Jordan 2007, 6). Both Zelinsky and Shortridge argue, through their maps, that religious regions tend to mirror cultural regions in the United States. Even though these approaches to mapping religious regions have stood the test of time, they are not without shortcomings. One of the most common criticisms of these early studies was their failure to link patterns of religious adherence to broader social and geographical contexts. Lisa Marie Jordan reiterates this criticism in her article, “Religious Adherence and Diversity in the United States: A Geographic Analysis,” in which she argues, “it also remains important to consider why understanding religious culture in a geographic context matters to social science research more broadly” (Jordan 2007, 3).
Major changes in how geographers approached the mapping of religious diversity and the analysis of patterns of distributions did not emerge until nearly three decades after the pioneering work of Zelinsky and Shortridge. However, some minor changes did occur shortly after their work. According to Jordan (2012), “Newman and Halvorson (1978; 1980) reviewed the work by Shortridge (1976) and Zelinsky (1961) and compared changes in adherence over time, between 1952 and 1971” (Jordan 2007, 7). In their work, Newman and Halvorson (1980), try to advance the approaches used by Zelinsky and Shortridge in their research by quantifying and enumerating the cohesion of various denominations (Newman and Halvorson 1980). They employ sophisticated statistics such as measuring diversity by “number of denominations per county and by an entropy index” (Jordan 2007, 7). This new approach added to the study of American organized religion (Bibby 1981). In his review of Newman and Halverson’s (1980) book, Bibby (1981) argues that by determining that “participation and commitment are precariously related to religious affiliation,” Newman and Halvorson (1980) validate that past approaches to mapping religious distributions patterns mask dynamics associated with religion in America (Bibby 1981, 80).

The mapping of religious diversity by geographers saw no new profound developments for a few decades following the work of Zelinsky (1961) and Shortridge (1976) as well as Newman and Halverson (1980) until the more recent work of geographers Barney Warf (2008) and John T. Bauer (2011). Beginning with Warf, the geographical analysis of religious diversity in the United States and the
incorporation of the results via maps began to undergo a dramatic change. In their groundbreaking article, “The Geography of Religious Diversity in the United States” Barney Warf and Mort Winsberg (2008) sought to address the common criticisms of traditional approaches to mapping religious distribution patterns and diversity by geographers who neglected to address the notion of spatiality within the context of mapping religious diversity in the United States. They do so by using four diversity indexes that employ data from both the Glenmary Research Center and the Polis Center to create choropleth maps and Dorling cartograms (Warf and Winsberg 2008). The choropleth maps employed by Warf and Winsberg were incorporated into their study in part to show the weak and disadvantaged perspective of using such maps when attempting to present results of religious diversity. According to Warf and Winsberg, traditional maps of religious adherence overstate the importance of large counties in comparison to small counties, which can lead to some patterns going unnoticed, such as “high values of the variable” (Warf and Winsberg 2008). Warf and Winsberg supplement this mapping perspective through the integration of Dorling cartograms into their study. Dorling cartograms represent a cartographic method that “... preserves neither shape nor region centroid. It uses a simple symbol, usually a circle although a rectangle is also in use, to replace the region with a complex shape” (Hui and Zhilin 2010, 14). These types of maps are complementary to the choropleth maps because they reduce the possible problems that tend to shadow the simple mapping representations found within standard choropleth maps (Warf and Winsberg 2008).
Along with Barney Warf and Mort Winsberg, John T. Bauer is also at the forefront of the more recent work within the field of geography that employs religious diversity data to produce more complex maps. In his study, "U.S. Religious Regions Revisited," Bauer (2012) reexamines the religious regions of the United States by comparing the new regionalization approach to the earlier attempts by geographers such as Zelinsky and Shortridge. Similar to the multivariate cluster analysis first employed by Shortridge (1976), Bauer also employs multivariate cluster analysis to more clearly articulate and delimit US religious regions.

Most recently, in the October 2013 edition of the *Professional Geographer*, geographers Candice R. Luebbering, Korine N. Kolivras, and Stephen P. Prisley, use the Greenberg A-index to develop cartographic representations of linguistic diversity in the Washington, DC, area (Luebbering et al. 2013). The similarity between the Greenberg A-index and other commonly used indexes of diversity played a key role in the decision to use this particular index. In fact, according to Luebbering et al. the Greenberg A-index is “almost identical to the commonly used Simpson’s index for ecological diversity” (Luebbering et al. 2103, 585). The choice by the authors to use this particular index also came from a lengthy evaluation of the different language mapping strategies available that attempt to show linguistic diversity (Luebbering et al. 2013). As the authors explain, these strategies tend to, “fall short in providing a holistic summary of an area’s linguistic diversity,” and even though these maps do show certain facets of diversity, they “do not offer a quantification of linguistic diversity that allows viewers to readily see which places
are more diverse than others.” (Luebbering et al. 2013, 585). To fill the gap associated with adopting one of the simple language mapping strategies, Luebbering et al. had to employ a linguistic diversity index, in particular, the Greenberg A-index. This index, simply put, assesses the probability that any two people in a given area, when picked at random, will speak a different language. This index “is the sum of the squared proportions of speakers of individual languages relative to the entire population subtracted from one” and by subtracting the sum, “the index is arranged so that a higher value equals greater diversity” (Luebbering et al. 2013, 586).

The Simpson index of ecological diversity mentioned above has long been employed by physical geographers, particularly in the subfield of biogeography. A longstanding research focus in biogeography is the analysis of species distribution across space, and the use of diversity indexes (such as the Simpson index) in the subfield is well established. Although the Simpson index has traditionally been used within the subfield of physical geography, it has recently begun to be employed in other branches of geography. For instance, cultural geographers such as Barney Warf and Mort Winsberg include the Simpson index as one of the four empirical measures of religious diversity drawn from other academic disciplines and implemented in their research that explores “the spatiality of religious diversity in the United States” (Warf and Winsberg 2008, 413). According to Warf and Winsberg, the Simpson index “assesses the probability that two individuals drawn at random will fall in the same denomination” (Warf and Winsberg 2008, 418). Another example of diversity indexes used in geographic research and in particular,
religious diversity research, can be found in the article, “Religious Adherence and Diversity in the United States: A Geographic Analysis,” by Lisa Marie Jordan (2007). In this article, Jordan uses the Lieberson isolation index to compute and map patterns of religious adherence and diversity based on 2000 data from the Religious Congregation and Membership Survey.

The use of these indices is useless to researchers without data. Data on religious adherence can be attained from a multiple array of sources, but determining which source is appropriate is dependent upon what religion or religions are being studied and the study area itself. Many of the classical religions have been documented in datasets that are readily available from a range of publicly available websites. However, adherence data for religions that are not as numerically prevalent as well as religions and their adherents in parts of the developing world are not nearly as readily available. A case in point is the recent article, “Mapping Chinese Folk Religion in Mainland China and Taiwan,” in which Yang and Hu (2012) attempt, for the first time, to “draw the contours of Chinese folk religion” (Yang and Hu 2012, 505). Yang and Hu (2012) base their work off of three surveys that were conducted in China and Taiwan. The three surveys include, The Chinese Spiritual Life Survey, Taiwan Social Change Survey, and Religious Experience Survey of Taiwan (Yang and Hu 2012). Though these datasets are based off of surveys that incorporate questions regarding religious gods, sectarian, and individual folk religion, they are beginning to become readily and publicly available. In fact, “The Chinese Spiritual Life Survey (CSLS 2007) was carried out by Horizon
Research Consultancy Group, one of China’s largest and most respected polling firms. The dataset has become publicly available at the Association of Religion Data Archives (The Association of American Religion 2014)” (Yang and Hu 2012, 511).

Through a detailed analysis of how geographers have approached the mapping of religious diversity in the United States, it is clear that the historical tendency has been for geographers to present their data employing simple choropleth maps. However, the simplicity of these types of maps tends to mask local and regional patterns of religious diversity. As a result, more recently, geographers have begun to rethink the geographic distribution of religion by incorporating more detailed analysis such as subjecting the data to mathematical algorithms. Moreover, instead of presenting results through simple choropleth maps, geographers are beginning to employ new styles of maps such as area cartograms, which “distort the size of regions in proportion to data value in the regions” (Hui and Zhilin 2010, 12).

The section above has shown that there are clear incongruences between the mapping trends of cultural geographers in regards to diversity, and that in most cases the results that end up being mapped tend to reflect the dominance of the particular entity being examined rather than more nuanced patterns of diversity. This thesis will explore different avenues by which cultural geographers can employ statistical analysis into their research. In particular, this research will investigate different mathematical algorithms to develop maps that more properly depict religious diversity in the southeastern United States. By applying statistical analysis,
cultural geographers can begin to incorporate newer forms of analyses into traditional empirical research traditions and methodologies.
CHAPTER 3: METHODOLOGY

The goal of this study is to produce a series of maps assessing and depicting the relative strength or “control” of specific religious bodies in each county in the American Southeast by measuring the diversity of religious adherence over time between 1980 and 2010. The maps will be created employing statistical indices that measure diversity and dissimilarity, drawn from the academic disciplines of biology and economics. Additionally, a set of maps spanning the study’s timespan will be made in order to illustrate rates of denominational adherence for a given county. In order to facilitate such a study and to create the associated maps, the collection of church adherence data as well as county population data was necessary. County population data were collected from the United States Census Bureau. The collection of church adherence data had to be carefully conducted because a number of such public datasets are available. In the end, it was determined that only a few church adherence datasets are both readily available and known to be statistically reliable. As such, two of these datasets – the Glenmary Research Center data and the Digital Atlas of American Religion – were chosen as the primary sources of data for the study.

The Glenmary Research Center “operates under a mandate from the Glenmary Executive Council,” and contributes and supports the Glenmary Home Missioners, which is a “Catholic society of priests and brothers who, along with coworkers, are dedicated to establishing a Catholic presence in rural areas and small
towns of the United States where the Catholic Church is not yet effectively present” (Glenmary Home Missioners 2014). The Glenmary Research Center, or GRC, is generally regarded as being the most dependable and consistent dataset for church adherence data, but it is not without flaws (Warf and Winsberg 2008, 416). For instance, some denominations (such as the Jehovah’s Witnesses) elect not to participate in the GRC’s study and therefore are not accounted for in the dataset. The most significant flaw in the GRC data, noted by Warf and Winsberg (2008), is the fact that some predominantly African-American denominations were not accounted for in the 2000 study.

Given these shortcomings in the Glenmary Research Center’s data, especially the 2000 dataset, this study will draw upon the data collection of the Digital Atlas of American Religion, a subset of the Polis Center. The Digital Atlas of American Religion “is a product of the Virtual Center for Spatial Humanities, a collaboration among the Polis Center at Indiana University Purdue University-Indianapolis (IUPUI), Florida State University, and West Virginia University” (Virtual Center for Spatial Humanities 2014). With funding from the National Endowment for the Humanities, the Virtual Center for Spatial Humanities was able to create the Digital Atlas of American Religion “by expanding the ease and use of the North American Religion Atlas, a web-based GIS site developed by the Polis Center in 2001” (Virtual Center for Spatial Humanities 2014).

The Polis Center compiled its data on religious adherence, membership, and congregation size from the Association of Religion Data Archives, an archive
comprised of religious data from prominent religious scholars as well as the leading religious research centers from around the world. The Association of Religion Data Archives is administered by the Department of Sociology at Pennsylvania State University (The Association of Religion Data Archives 2014). Tabular religion data downloaded from the Association of Religion Data Archives by the Digital Atlas of American Religion covered all years but 2000. To counteract the absence of 2000 data, which was done to offset the flaws originally exposed within the Glenmary Research Centers dataset of religious adherence, “the Polis Center at IUPUI collected the year 2000 data from Religious Congregations and Membership Survey (RCMS) and supplemented its data with estimates for some denominations that were under-represented in the original data, including historically African American denominations” (Virtual Center for Spatial Humanities 2014). The classification of “counts and percentages by state and county for each religion, family, and year” stems from a classification scheme developed by the Department of Religion at Florida State University (Virtual Center for Spatial Humanities 2014). It is important to note that for each state and county found in the Polis Center’s dataset, religious families are ranked in order based on the number of adherents. With that being said, “the Digital Atlas of American Religion displays only the top nine families based on these rankings; the counts or percentages for the remaining families are grouped into a category called other” (Virtual Center for Spatial Humanities 2014). Basically, the Digital Atlas of American Religion allows its users to determine which denominational family claimed the most adherents for a particular year, county,
state, or region. Because the Digital Atlas of American Religion provides users with the most reliable data on religious adherence data and covers the years 1890-2010, it proved to be the best source for this study’s religious adherence data. It is important to note, however, that even though this particular organization has religious adherence data spanning some one hundred years, this study will only focus on the years 1980, 1990, 2000, and 2010. The restriction of these particular years in this study was necessary for the development of the most accurate data for mapping. Because adherence data were not collected until the 1970’s, earlier years were unavailable for examination. Therefore, it was decided that in order to develop the most accurate and up-to-date maps regarding religious adherence in the southeastern United States, and for any region of the United States for that matter, the earliest year of choice for research would be 1980. While there may be some partial religious adherence data available for years since 2010, the county population data, which is necessary for proper analysis and employment of the indices chosen, is gathered from the United States Census Bureau and the latest Census data are from the year 2010. Thus, this study’s years of focus will be each decade between and including 1980 and 2010.

For this study, I have selected the southeastern United States as the region of research. I chose the southeastern region of the United States because this area has experienced a marked increase in migration from outside the region over the past two decades. According to Levine and Lenbaron, “by the 1990’s, many southern states found themselves suddenly receiving unprecedented numbers of newcomers,
and by the end of the twentieth century the region was attracting growing numbers of immigrants from many parts of the world” (Levine and Lenbaron 2011, 6). Because the southeastern United States has witnessed an increase in both the number of migrants from within the United States, as well as the number of immigrants from other countries, the region is beginning to experience considerable changes in its religious landscape. For these reasons, this region of the United States is an appropriate region in which to undertake this type of analysis.

The United States is often characterized as one of the most religiously diverse countries in the world (Bauer 2012). Given that the number of individual religious congregations in the United States is so large, for statistical purposes each congregation in each county will be grouped into one of six major religious bodies (“families") according to the methodology developed by J. Gordon Melton, a noted scholar of American religions who founded the Institute for the Study of American Religions (Melton 2009). The six religious bodies, or “families,” are as follows:

- Baptist Family
- Latter Day Saints Family
- Lutheran Family
- Methodist Family
- Pentecostal Family
- Roman Catholic Family
Choosing six religious families as the focus of analysis for this study was undertaken for statistical purposes; it is important to note the reasoning behind choosing these six religions in particular. First, at the national scale, these are numerically the six largest denominational families in the United States. Second, and more important to this specific study, at the regional scale these six also account for the vast majority of adherents. The southeastern region of the United States has long been known as the “Bible Belt.” First coined by H.L. Mencken in his coverage of the 1925 Scopes “monkey” trial in Dayton, Tennessee, the term “Bible Belt” continues to be employed to describe the religious landscape of the South (Brunn et al. 2011). To facilitate an accurate analysis, it was determined that a focus on these six religious bodies would account for the vast majority of religious adherents in the region.

As mentioned earlier, geographers have traditionally delimited and mapped religious adherence patterns through maps that show either national or international scale changes, which tend to mask local and regional variability. To produce maps that more accurately represent religious diversity, this study focuses on one particular region, the southeastern United States. Once county-level data on religious adherence from each one of these religious bodies in this particular region were collected for the years 1980, 1990, 2000, and 2010, the decision as to which statistical formulas would be employed had to be determined. While there are a plethora of statistical indices from across the academic spectrum that can be employed in this research, this study will only focus on employing indices from the
The Herfindahl index, also known as the Herfindahl-Hirschman Index or HHI, “is one of the most commonly used indicators to detect anticompetitive behavior in industries” (Matsumoto et al. 2012, 181). When evaluating which economic index to use, the choice was narrowed down to two particular indices: the Herfindahl Index and the Hannah-Kay Index. The decision, however, to use the Herfindahl index was decided based upon the factors and advantages revealed in a paper entitled, “Bank Recapitalization and Market Concentration in Ghana’s Banking Industry: A Herfindahl-Hirschman Index Analysis,” (Yaw Akomea et al. 2013). In this paper, Yaw Akomea et al., suggest “ever since the United States Department of Justice adopted the Herfindahl-Hirschman Index as part of its merger guidelines, the use of Hannah-Kay has been rare” (Yaw Akomea et al. 2013, 33). Also, according to Akomea et al., a major advantage of the Herfindahl-Hirschman Index, at least when compared to other possible ways of measuring the size of firms in relation to industry, is the “inclusion of all actors in the market for analysis” (Yaw Akomea et al. 2013, 34).

Even though it is simplistic in nature, the Herfindahl Index calculates the amount of competition in a given market with relative ease and fluidity. The formula for the Herfindahl Index is as follows:

$$H = \sum_{i=1}^{N} S_i^2$$
In this formula, $s_i$ represents the market share of the firm $i$, and $N$ represents the number of firms. The Herfindahl Index calculation takes into account all of the above and will “approach zero when a market consists of a large number of firms of relatively equal size” (Yaw Akomea et al. 2013, 34). The range of this index is between 0 and 1.0. When the formula results in a number closer to 0.01, it reveals a market in which competition is high and therefore indicates a decrease in market power for any given competitor. At the other extreme, when the formula results in a number above 0.25, it suggests a higher concentration of one particular firm, which in economics typically suggests monopolistic production. So, in regards to this thesis, the implementation of this formula was quite simple. This study substituted the number of firms with the number of religious adherents and substituted each county in the southeastern United States study region for the market. The formula was then retrofitted for use in an Excel spreadsheet that was assembled to store all of the religious adherence data downloaded from the Digital Atlas of American Religion, as well as county population data and FIPS codes from the United States Census Bureau.

The second index employed to produce maps that more accurately represent religious diversity in the southeastern United States stems from the Simpson Diversity Index. This particular index has its origins in both biology and ecology where, “it is often used to quantify the biodiversity of a habitat” (Offwell Woodland & Wildlife Trust 2000). For instance, this index “has been used as an index of the ‘concentration’ or ‘dominance’ of a many-species community” (Pielou 1975, 9). It
measures the probability that two individuals, when randomly selected from a sample, will belong to the same species. The formula for the Simpson Diversity Index (1-D) is as follows:

\[ D = 1 - \frac{\sum n(n - 1)}{N(N - 1)} \]

In this formula, \( n \) represents the total number of organisms of a particular species and \( N \) represents the total number of organisms of all species. The resulting number upon using this formula will equal \( D \), or the diversity. Diversity (\( D \)) is then subtracted by 1 to arrive at a resulting number that will be no higher than one or lower than 0. When the resulting number is closer to 1, it suggests greater diversity whereas when the number is closer to 0, it suggests the opposite. For this study, the total population of each county will be substituted for \( N \) (total number of organisms of all species) and the total number of adherents will be substituted for \( n \) (total number of organisms of a particular species).

Although the Simpson Diversity Index is more commonly employed in ecological and biological research, another version of this index is known as the Simpson Reciprocal Index. Similar to the Simpson Diversity Index, the Simpson Reciprocal Index uses the same formula to measure the probability that two individuals randomly selected from a sample will belong to the same species. However, instead of having the answer from the formula that equals diversity (\( D \)),
subtracted from 1, this index divides (D) by 1. The resulting number, when
compared to the number reached using the Simpson Diversity Index, will be
different but will represent the same biodiversity. In this case, it would represent
religious diversity. Moreover, differing from the Simpson Diversity Index (1-D),
which has a maximum value of 1, the Simpson Reciprocal Index (1/D) bases its
maximum value on the total number of species in the given sample. Thus,
substituting the six religious denominations of focus for biological species in this
study will give a maximum value as high as six. The closer the number is to six, the
more religiously diverse that particular county will be. For this study, the decision to
employ the Simpson Reciprocal Index rather than the more traditionally used
Simpson Diversity Index was made because the results are more intuitive.

Once the indices were computed in Excel, the process of transferring data
into map form could begin. I used GIS to generate maps showing the degree to which
the values of religious adherence varied over the years 1980-2010. A total of 15
maps were produced; four maps for the years 1980-2010 employing the Herfindahl
Index, four maps for the years 1980-2010 employing the Simpson Reciprocal Index,
four maps for the years 1980 employing the percent adherence formula, and three
maps combining all four maps for each index and algorithm used. Also, within these
maps, a layer was created in GIS to plot out major cities (with a population greater
than 100,000) in the southeastern United States. Plotting out major cities within the
study area was necessary for proper analysis to be conducted. By plotting out these
major cities, potential trends and patterns may be exposed that could lead to a
better interpretation of diversity in the southeastern United States in reference to the six religions being studied.

In addition to the maps that employ the two indices, another five essential maps were generated in GIS that illustrate the rates of religious adherence for each county in the study area. The percentage of adherence, which uses the data sets downloaded from both the Digital Atlas of American Religion and the Census Bureau, was computed in Excel by dividing the total adherence cell by the total county population cell. The resulting number for each county is then color-coded into 5 categories ranging from 0 to 100 percent. The color scheme for these maps was chosen from a scheme created in in ColorBrewer. ColorBrewer, “is an online tool designed to help people select good color schemes for maps and other graphics," and was developed by Cindy Brewer and Mark Harrower which were funded by the NSF Digital Government and designed at the GeoVISTA Center at Penn State Univeristy (ColorBrewer 2013). These maps are essential to the research because it will assist in the potential detection of various trends and patterns that may come about within these maps over the four-decade span for which this research is conducted.

Aside from the maps employed in this study, histograms were created to corroborate the findings in the above-mentioned maps. The histograms employed in this study graphically display the distribution of the religious adherence data covering the four-decade time span being evaluated in this study. To create the histograms, a formula was developed and implemented into new columns in Excel.
for each of the indices used as well for the percentages of adherence. When employed, the resulting numbers will indicate the number of counties within the ranges used in each index as well as the number of counties with high and low percentages of adherence. So, for instance, the 1990 histogram (Figure 17) accompanying the map that employs the Herfindahl Index will show the number of counties that fall between the ranges of 0-0.4, 0.41-.6, .61-.8, and .81-1. The histograms are a supplement to the maps because they account for change that is not clearly observed when viewing the maps alone.
CHAPTER 4: RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the maps created using the statistical data collected from both the Digital Atlas of American Religion and the United States Census Bureau. As explained in the methodology chapter, there are several maps to be presented in this chapter. The first set of maps for evaluation in this chapter will be the maps created that employ the percent adherence data of each county in the region. The next two sets of maps will be those, which employ the mathematical algorithms drawn from economics and biology. In all, a total of 27 maps and histograms were made employing these data sets and the chosen statistical indices. After presenting the maps created using each one of the indices employed, I will provide a detailed analysis of both the data set and maps made. Through this detailed analysis, I will discuss observations made between the maps spanning the four decades that are the focus of the study.

In these observations, I will identify trends or patterns that may aid in understanding how diverse the southeastern region of the United States is for a particular year as well as how these trends or patterns change or stay the same time. One possible trend or pattern that may emerge is the presence or absence of a strong correlation between urban areas and areas of high diversity. For instance, Fulton County, Georgia, is the county in which the city of Atlanta is located.
Obviously, this large metropolitan area has a very dense population and one would assume that this city and county would exhibit high rates of religious diversity. By incorporating major cities in the Southeast into all of my maps, I will be able to identify and evaluate whether or not there is a correlation between major cities and high religious diversity. Another possible trend or pattern that will be assessed in this chapter will be whether or not there is a relationship between lack of diversity and participation (adherence) or vice versa. This will be accomplished by evaluating the maps that employ the percent adherence of each county in the study’s region based on religious adherence data and total county populations.

4.2 Percent Adherence Results and Discussion

This section presents the maps and histograms that illustrate the percentage of adherents in each county in the study region. As mentioned earlier in the methodology chapter, these particular maps are quite simple to create. All that is needed for these maps to be made is the total number of adherents and the total population of each county. Once data are collected, these maps are then created by dividing the total number of adherents by the total population of a given county. The resulting numbers are then color-coded into a scheme and plotted on the map of each of the four years chosen for this research. The analysis employing the formula for the percentage of adherence in each county (Total Adherents/Total Population) yielded the following maps and histograms (Figures 2-10).
Figure 2: County-Level Rates of Adherence Map, 1980.
Figure 3: County-Level Rates of Adherence Map, 1990.
Figure 4: County-Level Rates of Adherence Map, 2000.
Figure 5: County-Level Rates of Adherence Map, 2010.
Figure 6: County-Level Rates of Adherence Map for All Years.
Figure 7: 1980 Histogram of County-Level Rates of Adherence.

Figure 8: 1980 Histogram of County-Level Rates of Adherence.
Figure 9: 2000 Histogram of County-Level Rates of Adherence.

Figure 10: 2010 Histogram of County-Level Rates of Adherence.
Figures 2-6 are maps that show the rates of adherence in for each county in the southeastern United States for the years 1980, 1990, 2000, and 2010. The importance of such maps to this type of research is that it concentrates on this study's main goal, which is to more accurately depict local and regional variability by revealing more finite details. These finite details, which are typically left out of similar research when done at the national or international scale, will provide a more accurate representation of what is truly happening in the region over the period being studied as well as among the 6 particular religious denominations of focus. These particular maps will also show the potential degree of dominance regarding this study's six religious denominations of focus within the southeastern region of the United States.

The first map (Figure 2) reveals the percentage of adherence of the region in 1980. The lighter colors reveal counties with lower percentages of adherence among the six religions being evaluated whereas the darker colors reveal the opposite and indicate counties with higher percentages of adherence. So, for this particular year, the map indicates that the state with the lowest percentage of adherence in regards to the six religions of focus is Florida and the state with the highest percentage of adherence, according to this map, is Alabama. Analyzing this particular map, it goes without saying that the core of the region appears to have the highest percentage of religious adherence when measured at the county level. Therefore, in regards to this study's six religions of focus, these six religions are the most dominant in this region of the United States in this particular year. This
observation is also echoed by the histogram representing the percentage of adherence in 1980 (Figure 7). In this particular histogram, it is evident that the majority of the counties in this region have percentages of adherence between 40-60 percent.

Evaluating the other three maps with the 1980 map (Figure 2) as the basis of evaluation, there are trends and patterns that seem to emerge across the years being mapped in this study. It is clear that the core of this region, which is Louisiana, Alabama, and Georgia, remains the area in the region that has the most counties with the highest percentage of adherence throughout the four years being evaluated. Staying consistent, the state of Florida remains the state with the lowest percentage of adherence throughout the years of focus. Similar to Florida’s consistency, Alabama also remains constant throughout all four years as being the state with the highest percentages of adherence. Another trend that seems to emerge when evaluating all four years across the board is that the middle years, 1990 and 2000, see a spike in the percentage of religious adherence in the region. This is especially true for North and South Carolina, both of which show relatively low percentages of religious adherence in the 1980 and 2010 maps.

To supplement these findings, histograms for each year were also made from the percent adherence data (Figures 7-10). The histograms, as referred to earlier, graphically display the distribution of percent adherence data. These play a pivotal role in arguing for or against what the maps depict. For instance, when only looking at the percent adherence maps for all four years, it is easy to comprehend how one
could view the middle years as being the years with the most counties having the highest percentage of adherents. However, the histograms, which display the data in a more intuitive way, suggest the contrary. In fact, the years having counties with the highest rates of adherence are actually 1980 and 2010. In this particular case, the histograms contradict what one might be quick to ascertain from only looking at these maps.

As mentioned earlier, when creating these maps, a layer was added in the GIS to plot cities within the study area that have populations larger than one hundred thousand. This is relevant to the research at hand because it could indicate a potential correlation between areas of high religious diversity and major cities. One of the largest metropolitan areas known in the southeastern United States is Atlanta, Georgia, which is in Fulton County. In 1980, Fulton County and the surrounding counties had a religious adherence percentage below 20 percent. This percentage increases to between 40 and 60 percent in 1990 and stays within this percentage range in 2000 and 2010. Similar to the Atlanta area in 1980, the major cities in the state of Florida, with the exception of Gainesville, Tallahassee, and Jacksonville, remain between 0 and 20 percent. In fact, this remains constant throughout the years being studied. Although Atlanta, Georgia, and most of the major cities in Florida have low percentages of adherence, it is important to note that this research is only evaluating the denominations in the six major religious “families.” Even though these religions are stereotypically known as being the more dominant religions in this region of the United States, people in these particular cities could be
members of other Christian denominations or non-Christian religions, such as Islam and Hinduism.

While this research aims to develop maps that better depict and represent religious diversity in this region of the United States, some issues regarding the data should be noted. When assessing the maps of religious adherence percentages, a few counties stand out. These particular counties appear as white, which is not a color within the color scheme selected and depicted in the legend. In assessing the data set, it was clear that the counties depicted as white in the maps had a percent adherence number that exceeded one hundred percent. As previously mentioned in the methodology chapter, county adherence percentages were calculated by dividing the total adherence numbers of each county by the total population of each county. All of the counties in white show county adherence percentages above one hundred, which is not possible unless there was a flaw in the collection of religious adherence data. So, in these particular cases, the potential problem at hand is a “cross-county” issue involving denominational attendance and adherence. That is, a person who crosses county lines in order to attend church is not accurately accounted for when his/her particular church reports congregational information to data collectors such as the Glenmary Research Center and the Digital Atlas of American Religion. Another pattern that is clearly evident in the percent adherence maps is the consistently low adherence rates in the state of Florida. This pattern is likely due to the relatively large population of adherents to religions not analyzed in
this study, especially the large Jewish population in southern Florida (Sheskin 1994).

4.3 Herfindahl Index Results and Discussion

As mentioned before, the Herfindahl Index is a frequently used mathematical algorithm in economics that measures anticompetitive behavior in industries (Matsumoto et al. 2012). This index calculates the amount of competition in a given market by taking into account the market share of a firm and the number of firms represented. When the resulting number is closer to 0, it indicates more economic diversity and when the resulting number is closer to 1, it indicates a lack of economic diversity. For this study, the number of religious adherents was substituted for the number of firms and each county in the southeastern United States substituted for the market of evaluation. So, when modified for this study, when the resulting number is closer to 0, it indicates an area of high religious diversity whereas a number closer to 1 indicates an area lacking in diversity. The analysis employing the Herfindahl Index yielded the following maps and histograms (Figures 11-19).
Figure 11: 1980 Map Employing the Herfindahl Index.
Figure 12: 1990 Map Employing the Herfindahl Index.
Figure 13: 2000 Map Employing the Herfindahl Index.
Figure 14: 2010 Map Employing the Herfindahl Index.
Figure 15: Herfindahl Index Combined Map of All Years
Figure 16: 1980 Herfindahl Index Histogram

Figure 17: 1990 Herfindahl Index Histogram
Figure 18: 2000 Herfindahl Index Histogram.

Figure 19: 2010 Herfindahl Index Histogram.
Looking at the 1980 map that employs the Herfindahl Index (Figure 11), we can readily identify a few patterns. First, the state with the most religiously diverse counties, in reference to the six religious denominations being evaluated in this study, is the state of Florida. In the last section, which revealed maps that showed the percentage of adherence in each county in the study region, Florida remained consistent across the study period as being the state with counties having the lowest percentages of adherence. While that is the case, that does not necessarily mean that the state of Florida is not religiously diverse in regards to the religions analyzed in this study. Of all of the states being evaluated in this study, Florida has the most cities whose populations exceeded one hundred thousand. With that being said, it is safe to say that those cities and the counties in which they are located have a larger number of people who quite possibly adhere to a religion that is not included in this research or who are not members of a religious denomination at all. For example, the Miami region of south Florida has a significant Jewish population that is not accounted for in the data employed in this study. A second observation that can be made when assessing this map is that the New Orleans area is depicted as being strongly homogenous with regard to the religions being evaluated. Keeping in mind that the Herfindahl Index measures “anticompetitive behavior in industries,” this observation may very well suggest that the New Orleans area is dominated by one religion or a religion or religions not researched in this study. This is not surprising given the predominantly Catholic population in and around New Orleans. A third observation that is evident when evaluating this particular map and year is that
there seems to be a strong correlation between major cities and areas of high diversity.

Using the 1980 map that employs the Herfindahl Index (Figure 11) as the basis of evaluation, the next paragraph discusses trends and patterns that are observed in the maps that employ the Herfindahl Index. Similar to the 1980 map (Figure 11), Florida remains the state with the highest diversity amongst the six religions of focus in this study. Also, the New Orleans area of Louisiana remains consistent as the area in the region with the least diversity. When comparing all four years together (Figure 15), another observable trend when assessing the maps that employ the Herfindahl Index is that the coastal regions of the southeastern United States appear to become more diverse over time. Understanding that numbers closer to one are represented by the lightest shade in this color scheme and that this specific color identifies areas of high diversity, it is apparent that the coastal region experiences some of the most significant change in religious diversity over the 20 year period. This is especially true for the Carolinas and the Gulf Coast.

It proved necessary to incorporate major cities into the maps when evaluating the maps employing the Herfindahl Index. By incorporating the cities into these maps, a strong correlation between major cities and counties with high religious diversity with respect to the six religious families of focus became apparent. The lighter shade of pink indicates counties with high religious diversity, and for the most part the major cities in this region are located in counties with high religious diversity. For example, all of the major cities in Florida are located in
counties with high religious diversity. This pattern persists over the 20-year period of the study.

The major observation that emerged from evaluating all four maps employing the Herfindahl Index is that over the 20-year period the southeastern region of the United States, in regards to the six religious families being studied, is becoming more religiously diverse. Although this assessment can quickly be made by evaluating the maps, this observation is strengthened by examining the histograms for each year (Figures 16-19). Knowing that a value closer to 0 reveals counties with high diversity, the histograms are testament to the above-mentioned observation that the Southeast is becoming more diverse, at least with respect to six religious families being evaluated. Evaluating the histograms for all four years (Figures 16-19) reveals that the lowest category, which correlates to counties with high diversity, increases as the years progress.

In a recent study of religion in the American South, Brunn et al. (2011) show that “while 75 percent of the U.S. population is white, the populations of strong Bible Belt were on average 85 percent white” and “Bible Belt counties have lower mean percentages of foreign born and Hispanic populations” (Brunn et al. 2011, 537). This potentially explains why this region is highly diverse among the six religious families being evaluated. Similarly, this could explain the observation revealed in the percent adherence maps.
4.4 Simpson Reciprocal Index Results and Discussion

The Simpson Reciprocal Index, as stated in an earlier chapter, is related to the Simpson Index of Diversity traditionally used in biology and ecology to calculate the biodiversity of a habitat by measuring the probability that two randomly selected individuals will belong to the same species. The reciprocal of this index is more intuitive and therefore more proper for this study. Similar to the original Simpson Index, the reciprocal index accounts for the total number of organisms of a particular species as well as the total number of organisms of all species. However, instead of subtracting the resulting number by 1, as it does in the traditional Simpson Index, the reciprocal index divides by 1. Also, for this study, the total population of each county will be substituted for the total number or organisms of all species and the total number of adherents will be substituted for the total number of organisms of a particular species. The analysis employing the Simpson Reciprocal Index yielded the following maps and histograms (Figures 20-28).
Figure 20: 1980 Map Employing the Simpson Reciprocal Index.
Figure 21: 1990 Map Employing the Simpson Reciprocal Index.
Figure 22: 2000 Map Employing the Simpson Reciprocal Index.
Figure 23: 2010 Map Employing the Simpson Reciprocal Index.
Figure 24: Simpson Reciprocal Index Combined Map for All Years.
Figure 25: 1980 Simpson Reciprocal Index Histogram.

Figure 26: 1990 Simpson Reciprocal Index Histogram.
Figure 27: 2000 Simpson Reciprocal Index Histogram.

Figure 28: 2010 Simpson Reciprocal Index Histogram.
The 1980 map that employs the Simpson Reciprocal Index (Figure 20) reveals patterns that are similar to that exposed in the maps employing the Herfindahl Index. For example, similar to the 1980 Herfindahl Index map (Figure 20), this map depicts the state of Florida as having the highest diversity among the six religious families. In comparison to the maps that employ the Herfindahl Index, the lower numbers using the Simpson Reciprocal Index reveal counties with low diversity. With that in mind, another similarity between the 1980 Herfindahl Index map (Figure 11) and this map (Figure 20) is that the New Orleans area of Louisiana is depicted as one of the areas with the lowest diversity among these religious families. Moreover, the changes in the coastal region in these maps correlate with the observations found in the maps employing the Herfindahl Index, which suggests that this area of the southeastern United States is becoming more diverse over time.

Figures 20-24 all show patterns of religious diversity for the years 1980, 1990, 2000, and 2010 based on the mathematical algorithm used in the Simpson Reciprocal Index. Using the 1980 map (Figure 20) as the base year for evaluating all four years together, trends and patterns will be identified and discussed. Again, similar to the evaluation of all four maps employing the Herfindahl Index, all four maps employing the Simpson Reciprocal Index expose patterns and trends that are consistent throughout the 20-year period under assessment. Florida, for instance, remains the state with the highest diversity among these six families. Also, the New Orleans area of Louisiana is consistent throughout all four years of evaluation as being an area of low diversity. Another similarity among the maps that employ these
two statistical indices is that the core of the region, revealed earlier as being the states of Louisiana, Alabama, and Georgia, remains an area of high diversity.

A complimentary addition to these maps and the patterns and trends exposed are the histograms that reveal the results of the data employing the Simpson Reciprocal Index. These histograms are vital in backing up or going against these trends and patterns. For instance, when looking all four maps that employ this index, change over time is relatively clear to see. Knowing what the categories in the legend mean, this region is becoming more diverse amongst the six religions being evaluated.
CHAPTER 5: CONCLUSION

The goal of this study was to explore new ways of mapping religious patterns in the United States that take into account and more clearly depict local and regional variability. Through an in-depth literature review, four approaches to religion in geography were identified. These approaches have developed and progressed over time but their methodological shortcomings are significant. Most significantly, geographers have typically mapped patterns of religion in the United States at the national scale. This approach engenders a number of shortcomings, one of which is the masking of local and regional variability. In order to rectify this shortcoming, this study aimed to develop new ways in which geographers can map religious patterns in the United States by drawing upon statistical methods from other academic fields and by narrowing the area of study to the sub-national scale.

To facilitate such a study, data on religious adherence had to be evaluated and chosen. Although there are a number of agencies in the United States that acquire such data, two were identified as being the most up-to-date and reliable: The Glenmary Research Center and the Digital Atlas of American Religion. In order to properly map the data from both of these sources, county population data also had to be acquired from the United States Census Bureau. Similarly, an evaluation of potential mathematical algorithms was necessary. Looking specifically at indices that measure diversity, two indices proved to be the most valuable for this study. Drawing from the academic fields of economics and biology, the two indices of
diversity chosen for this study were the Herfindahl Index and the Simpson Reciprocal Index. Although they are both employed in different fields of academia, they both identify diversity in particular areas. After adapting the religious adherence data to fit within the mathematical formulas in these two indices, the formula was then retrofitted for usage in Excel. The resulting numbers revealed the diversity ranges based off the Herfindahl and Simpson Reciprocal Index as well as the percentage of adherence among each county within the study region. Once the numbers were confirmed, the mapping process could commence.

Supplementing the maps made in this study, histograms break down what is being seen in the maps in an even more intuitive way. Patterns and trends that are observed can be confirmed by these histograms. Similarly, the histograms can also reject observations found within the maps. Such was the case in the percent adherence maps in which the middle years seemed to be the years in which most counties in the region had larger percentages of adherence amongst the six religious families being evaluated in the study. This observation, however, was refuted by the histograms, which identified 1980 and 2010 as being the years with counties with the largest percentage of adherence.

At the beginning of this study, I identified three main research questions for which this study planned to address. The first research question aimed to identify ways in which religious diversity in the southeastern United States can be more accurately measured and mapped. To address this question, my literature review revealed ways in which geographers have traditionally mapped religious patterns of
diversity. Revealing shortcomings within these mapping techniques, this study employed statistical indices with the intentions of illustrating religious diversity in a more accurate way. This lead to the second research question in this study, which was to address which statistical indices more accurately illustrate religious diversity. Based on my research, it appears that the Simpson Reciprocal Index (rather than the Herfindahl Index) appears to show religious diversity in a more detailed way; the trends and patterns are revealed in a clearer way when employing this particular index. The last research question delves into whether or not the employment of statistical indices reveal a more nuanced analysis of religious diversity in the southeastern United States. Although the maps and histograms created in this study reveal ways in which geographers can better map and interpret religious patterns in the United States, especially diversity, much can be added to this study. The magnitude and pervasiveness of cultural differences in spatial cognition are often exaggerated. All humans unevenly share many spatial cognitive structures and processes. This concept is discussed in the article, “Models, Scientific Realism, the Intelligibility of Nature, and their Cultural Significance,” by Hazim Shah bin Abdul Murad (2011). In this article, a section is dedicated to explaining the differences between pictorial and mathematical models in science. The latter view, which is typical of social scientists, often “has the potential to evoke certain non-cognitive, emotive or aesthetic response, depending on the picture presented” (Hazim Shah bin Abdul Murad 2011, 257). Though the maps in this study lead to a better understanding of sub-national patterns of religious adherence, additions to
this approach can be done with more time. For instance, some basic spatial clustering (hot spots) and spatial auto-correlation tests could be run to test where these employed indices cluster. With this in mind, the maps in this study could eventually be explained in more detail by examining statistical relationships to some other geographical characteristics, such as ethnicity, within these areas.
Works Cited


http://www.countrysideinfo.co.uk/biol_sampl_cont.htm (last accessed 6 March 2001).


