Factors Contributing to Students' Graduation in Agricultural Education in a 4-Year University Through the Lens of Social Cognitive Career Theory

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Abstract

This study examined the factors that statistically predict student's degree attainment within agricultural education as a course of study. The study is based on a population of first year agriculture students (n = 616) at a private four-year college in Southwestern Ohio. The study is correlational design, which employed cross-sectional archival survey methodology. Logistic regression analysis was conducted to inform the research questions through the lens of Social Cognitive Career Theory (SCCT: Lent, Brown, & Hackett, 1994). The research questions were designed to measure the extent to which six learning factors predict students' degree attainment in degree programs in agricultural education; the six predictors included: 1) coming from a different a high school setting (rural vs. urban), 2) belonging to the National FFA Organization (FFA), 3) holding an FFA officer position while in high school, 4) having or not having a farm background, 5) parental occupation, and 6) expressed interest in teaching vocational agriculture. Results revealed that four of the six factors did have a significant association with students' degree attainment in a specific a degree program in agricultural education. Specifically, coming from urban school settings, holding an officer position while in FFA, parental occupation related to agriculture, and having an expressed interest in teaching vocational agriculture served as significant predictors that contributed to students' degree attainment of a bachelor's degree in agricultural education. With the current trend that the number of

agricultural education teaching positions is on the rise, there is a demand for agricultural education teachers but a lack of individuals to fill the open positions. Accordingly, from a practical standpoint, the findings inform the way in which the case study institution's agricultural department designs and implements recruiting strategies that encourage more high school students to pursue a bachelor's degree in agricultural education. Given the study's data that shows only seven percent of the students graduated with a degree in agricultural education, a follow-up study may need to investigate how such student hands-on learning experiences as teaching reactions contribute to their degree attainment. This future study would allow researchers to inform academic professionals insights as to how the number of graduates in their program could potentially look after that learning experience.

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CHAPTER 1: INTRODUCTION

Research Topic and Background

Agriculture has come a long way from the days of cows, sows, and plows. Contrary to this misperception, "modern agriculture encompasses discipline specializations that have wide appeal" (Beyl, Adams & Smith, 2016, p. 51). Family farms are viewed to be "better stewards of the environment and as doing more to ensure the protection of water and air resources, and the welfare of livestock than corporate farms" (Wachenheim & Rathge, 2000, p. 2). From the founding of this nation, agriculture has played an integral role from the Washington administration to current day. "President Washington's first address to Congress stressed the importance of agriculture to the nation, stating only that its advancement need no recommendation" (Duemer, 2007, p. 142). One of the most vital pieces of legislation to impact agriculture in the 19th century was the Morrill Act of 1862. Duemer (2007) states:

> The agricultural origins of the Morrill Act go back as far as the American Revolution and were manifested in two forms. The first of these was the struggle for the creation of the Department of Agriculture and the second was the movement toward agricultural education (p. 136).

As time progressed to modern day, the "scope of agriculture goes well beyond the farm gate to encompass a broader range of food-and fiber- related activities" (Penson, 2018, p. 2). By 2050, the global population is projected to reach nine billion people. This necessitates to educate the public about agriculture and its importance began with the creation the Morrill Act of 1862 in which its purpose was to "open college doors to

farmers' sons and others who lacked the means to attend the colleges then existing" (Duemer, 2007, p. 136).

Before the Morrill Act of 1862 passed, the conversation of agriculture policy had been discussed in Presidential administrations from Washington, the 1st president (1789 – 1797), to Taylor, the 12th president (1849 – 1850). However, no significant proposals were ratified until 1849 when President Zachary Taylor addressed congress in his State of the Union Address and pointed out that "no direct aid has been given by the General Government to the improvement of agriculture except by the expenditure of small sums for the collection and publication of agricultural statistics and some chemical analysis" (Congressional Globe, as cited in Duemer, 2007, p. 138). Within the address, the President proposed "to elevate the social condition of the agriculturalist, to increase his prosperity and to extend his means of usefulness to his country, by multiplying his sources of information, should be the study of every statesman, and primary object with every legislator" (Duemer, 2007, p. 138).

Even though President Taylor recommended the "establishment of an Agricultural Bureau in the Department of the Interior," the Congress still resisted the creation of an Agricultural Bureau or Department (Duemer, 2007, p. 138). It was not until 1862, when a "bill for the creation of an Agricultural and Statistical Bureau was introduced in the House of Representatives" and eventually approved by President Abraham Lincoln on May 15, 1862, was what we are now familiar with as the Department of Agriculture, was established (Duemer, 2007, p. 141).

Prior to the establishment of the Department of Agriculture, U.S. House of Representative member, Justin S. Morrill in 1857 proposed the Morrill Act. The Morrill

Act "was signed to initiate the establishment of agricultural colleges in the United States of America due to the demand for federally supported agricultural colleges" (Mazurkewicz, Harder, & Roberts, 2012, p. 176). The original intent of the Morrill Act was to establish federal funding for land grant institutions to promote agricultural education. The benefits of agricultural education would "extend far beyond universities, to extensions which would affect change on individual homes and farm lifestyles across the country" (Duemer, 2007, p. 144).

Statement of the Problem

Since the passing of the Morrill Act in 1862, many colleges and universities have adopted agricultural education programs throughout the United States. The land-grant colleges and universities "assumed the role of preparing secondary agriculture teachers" (Hillson, 1987, p. 13). Lawver (2012) noted, nationwide, approximately 2.2 million teachers will be needed to fill positions in the next ten years because of teacher attrition, retirement, and increased student enrollment and more than 700,000 teachers will be needed in high-poverty urban and rural districts" (p. 28).

The way that colleges and universities are preparing students to fill these positions are through provisions made possible through the Smith-Hughes National Vocational Education Act of 1917. The purpose of this act was to provide federal aid to states. With this provided aid, the states would promote vocational education that would focus on agriculture studies and industrial trades such as home economics (Winship, 1917).

From the time that the Smith-Hughes National Vocational Education Act was passed in 1917, many young adults have decided to select agricultural education as their career choice. According to Kantrovich (2010), "Agricultural education in the United

States is in a constant state of flux" (p. 6). Kantrovich's argument suggested that the number of elementary and secondary school teachers for agricultural education should be increased because school enrollees who are farmers' children and expect to take agriculture courses for their future career are projected to be increased. With this information, Kantrovich (2010) notes, "it is as important as ever that data is available to illuminate the numbers and sources of new teachers in Agricultural Education" (p. 6). While it is important that data is available to track the changes as they are implemented in agricultural education, there have been a few studies to investigate the effects of school-based agricultural education on students' career choice to become agriculture teachers (Ingram, Sorensen, Warnick, & Lawver, 2018).

When a student enrolls in agricultural education courses in either junior or senior high school, part of their requirements for the course are to complete a supervised agricultural experience (SAE) which enables students to develop and obtain agricultural competencies, skills, and practical experience as it relates to a potential career choice for the student in agricultural fields. Research shows that those who have been enrolled in agricultural education courses and involved in SAE experiences are more likely to choose agricultural education as a college major (Ingram et al., 2018). Beyond the learning experience that a student gains through agricultural courses and SAEs, Park and Rudd (2005) found that secondary agriscience teachers' curricular, instruction, and mentorship play an influential role in a student's decision in pursuing agriculture-related career and academic degrees. In alignment with the significant role of agriscience teachers at the secondary level in the nation, Lawver & Torres (2012) argued that postsecondary

institutions should promote secondary agricultural programs where they motivate students to become a secondary agricultural teacher.

Using data from a postsecondary institution in Ohio where they recruit and prepare students to teach agricultural education at the secondary level, this study identified factors that contribute to student's degree attainment in agricultural education. Hereinafter, this institution refers to as "the case study institution," which is the pseudonym to protect the college's confidentiality.

As background, the case study institution's agriculture department formation began in 1946 when a local newspaper announced the upcoming auction of the 247-acre farm that joined the case study institution's campus on the south and the east" (Stuckey, 2008). It was not until two years later that the first class was offered in 1948. From that time in 1948 to 2019, the case study institution's agricultural department has seen over 2,500 enrollees in the program. While not all of them enrolled to become agricultural education instructors, some students did select the concentration as a major area of study.

According to the National Teach Ag Campaign, there are over 11,000 middle and high school agriculture instructors. These instructors come from all 50 states, Puerto Rico and the Virgin Islands. Smith, Lawver, & Foster (2019) reported, "9,071 school-based agricultural education programs employed 13,827 teachers" (p. 2). With over 13,000 teachers that were considered school-based agricultural education (SBAE) instructors, Smith et al., (2019) noted additional teachers were still needed to meet the demand in SBAE. "State supervisors reported 61 full time and 10 part-time vacancies as of September 15, 2018" (Smith et al., 2019, p. 2).

With the growing number of SBAE instructors, the need to recruit students into the case study institution's agriculture department is vital in filling these growing about of positions that are being created. In 2016, SBAE employed 11,557 teachers, 2017 employed 12,690, and in 2018 employed 13,827 teachers. The problem that the case study institution has is that the number of students who declare agricultural education as a concentration get nowhere near those of students who declare agricultural business, agronomy, or animal science as a concentration within the agriculture major. As such, the way in which the case study institution could recruit more students to declare agricultural education as a concentration will need to be addressed.

Purpose of the Study

The purpose of this study was to analyze the extent to which coming from a different high school setting (i.e. rural vs. urban schools), belonging to the National FFA Organization (FFA), holding an FFA officer position while in high school, having or not having a farm background, parental occupation, and having an expressed interest in teaching vocational agriculture were associated with students' graduating with a degree in agricultural education at the case study institution. Particular attention was given to the case study institution's agriculture student's backgrounds in FFA, farm background, high school setting, parental occupation, and expressed interest in teaching vocational agriculture to measure the degree attainment in agricultural education as a major concentration.

The following research questions framed this quantitative study of the case study institution's agriculture major students' degree attainment in agricultural education as an academic concentration area of study.

Research Questions

1. To what extent does coming from a rural or urban high school setting predict students' degree attainment in agricultural education at the case study institution?
2. To what extent does being a member of FFA predict students' degree attainment in agricultural education at the case study institution?
3. To what extent does holding an office while being a member of FFA during high school predict students' degree attainment in agricultural education at the case study institution?
4. To what extent does having a farm background predict students' degree attainment in agricultural education at the case study institution?
5. To what extent does parental occupation predict students' degree attainment in agricultural education at the case study institution?
6. To what extent does expressed interest in teaching vocational agriculture predict students' degree attainment in agricultural education at the case study institution?

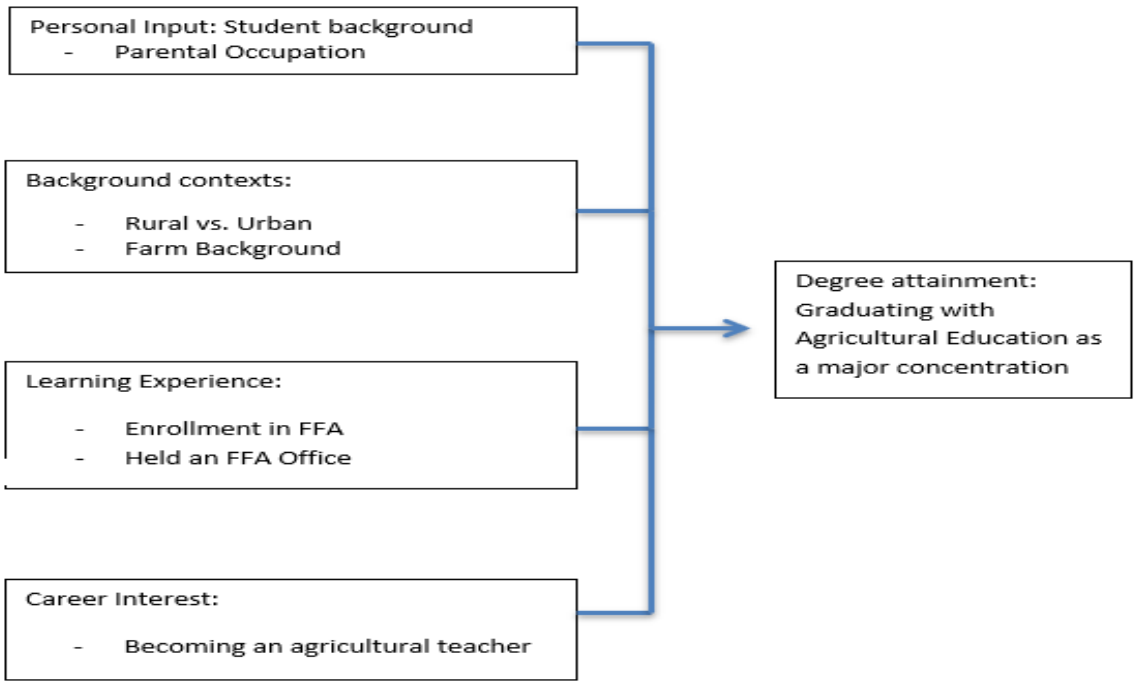
Theoretical Framework

This study incorporated Social Cognitive Career Theory (SCCT: Lent, Brown, Hackett, 1994) to investigate the relations between the aforementioned factors and student's degree attainment in agricultural education. As shown in Figure 1**,** student's background, learning experiences, and career interest are theorized to predict their degree attainment. In this study, student's farm background, parents' occupation, and FFA membership status were analyzed as representing students' background in SCCT;

students' high school experiences were analyzed as reflecting students' learning experience in SCCT; and expressing interest in teaching vocational agriculture was analyzed as reflecting their career interest in SCCT.

Figure 1.

Proposed factors in a student's experience analyzed as potential predictors of degree attainment in an agricultural education concentration at the case study institution.



With respect to a student's high school experience, Hughes and Barrick (1993) argued through classroom and laboratory instruction, supervised experience, and FFA activities, agricultural education in public schools has a heritage of developing a student's personal skills and abilities that are needed to be employed in the agricultural industry. The continued development of these skills and abilities push many of the students into a desire to continue agricultural education studies at the college level. Once at the college level, Park & Rudd (2005) noted through their actions, comments, and instruction,

secondary agriscience teachers influence many decisions about a student's career and further education.

The theoretical framework presented above provided a foundation for formulating the research questions for the cross-sectional analysis of archival data in this case study. "Identifying why students choose education as a career choice" is central to modern day recruiting efforts (Lawver & Torres, 2012, p. 29).

Methodology

The research design for this study was a correlational design, which employed cross-sectional archival survey methodology. Logistic regression analysis was conducted to inform the research questions based on institutional data collected from graduates from 2010-2016. The data archive consisted of individual student responses to a first day Principles of Crop and Animal science class survey. The survey was developed in 1977 by four professors at the case study institution to gain a better understanding of the first year agricultural student. The purpose was to give professors within the department a better understanding of student's backgrounds and background knowledge as it pertains to agriculture before instruction began. This would allow professors to pace their instruction uniquely to each class so that material would be delivered in the most efficient way. Survey questions asked the students to identify themselves by name, home address, home county, telephone number, and college mailbox number. In addition, the survey asked students what High School they graduated from, whether or not they were a member of FFA, whether or not they held an office in FFA, whether or not they have a farm background and if they did what size, what are their parents occupation, where did they first hear about the case study institution, why did they come to the case study

institution, what their favorite livestock species was, what their future career choice was, and are they interested in teaching vocational agriculture.

After the data archive was organized, the responses were analyzed for the factors that predicted students' degree attainment in agricultural education as a major concentration. The data were organized in a way to code if a student came from a rural or urban setting, was a member of FFA, whether they held an FFA office, had a farm background, if at least one of the parental occupation was agricultural, and if they had an expressed interest in teaching vocational agriculture.

As noted earlier, the archival data analyzed came from students through the years 2010-2016 totaling over 600 students who obtained bachelor's degree in agriculture with a specific academic concentration. Note that the case study institution's agriculture department provides the following six academic concentrations: 1) Agricultural Business, 2) Agricultural Communications, 3) Agricultural Education, 4) Agronomy, 5) Animal Science, and 6) Plant, Environmental, and Soil Science.

The archival data for the independent variables in this study came from the survey developed in 1977. While the survey was developed in 1977, the department began agriculture classes in 1948. Graduates between 1948-1976 had been contacted by the department and asked to complete the developed survey that freshman agriculture students were receiving so that a complete departmental survey of all students who have been through the department from its formation was collected. Thus, completed responses to the survey of 1948-1976 classes were reflected in the data archive according to their year of entry in the program.

Swortzel (1998) recommended in his study to "replicate every three to five years to ascertain the status of the profession and to determine trends regarding the education professoriate in agriculture" (p. 71). Having a case study that spanned 70 years' worth of students allowed the researcher to assess the degree attainment in students who enrolled in agricultural education as well as encompassing factors that Lawver & Torress (2012) noted could provide "additional factors that influence students' intent to teach" (p. 40). Accordingly, this case study included the aforementioned independent variables, which have been less explored in previous studies. This case study provides insight into the way in which agriculture students' degree attainment in agricultural education is predicted by the status of high school setting, FFA membership, holding an office in FFA, having a farm background, parental occupation, and expressed interest in teaching vocational agriculture.

Definition of Terminology

The following terms are defined to assist the reader and provide context and awareness to the study.

Agricultural Literacy: possessing knowledge and understanding of food and fiber systems. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture (Frick, Kahler, & Miller, 1991).

American Association of Agricultural Education (AAAE): provides an emphasis on understanding agriculture in a modern world through the need for an agriculturally literate society (Doerfert, 2011).

Career Technical Education (CTE): practice of teaching specific career skills to students in junior, senior, and post-secondary school.

Food and Fiber system: Economic activities of farms and firms that assemble, process, and transform raw agricultural commodities into final products for distribution.

4-H: extension education provided by public universities that provides learning experiences to children through problem based educational methods.

Hatch Act of 1887*:* provided the United States Department of Agriculture with the first mandate to sponsor experimental research in the United States.

Land-Grant Institutions: "College created by the Morrill Act were funded by the sale of publicly owned land and became known as land-grant institutions" (Fields et al., 2003, p. 7).

Morrill Act of 1812: "established a national system of publicly funded colleges dedicated to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes" (Fields et al., 2003, p. 7).

National Congress of Vocational Agriculture Students: national livestock judging contest held for vocational agriculture students.

National FFA Organization: In 1988, the organization formally known as the Future Farmers of America changed its name to the National FFA Organization. The change reflected the growing diversity in agriculture. The organization, delivered through junior and senior high school, teaches agricultural education by studying the food, fiber, and natural resource industry.

School-based agricultural education (SBAE): educational program delivered through career and technical education.

Smith-Hughes Act of 1917: U.S. legislation that provided federal aid to the states for the purpose of promoting vocational education in agricultural, industrial, and home economic sciences.

Smith-Lever Act of 1914*:* established a national extension service that extended outreach programs through land-grant universities to educate rural Americans about advances in agricultural practices and technology.

Supervised Agricultural Experience: programs that are made up of projects where students apply agricultural skills and knowledge taught in the classroom.

Vocational Education Act of 1963***:*** provided vocational education opportunities for all individuals in any community, in any occupations that require less than a baccalaureate degree for job entry.

Assumptions

"Assumptions are postulates, premises, and propositions that are accepted as operational for purposes of the research" (Lunenburg & Irby, 2008, p. 135). This study included the following assumptions: (1) the participants responded to the survey accurately and indicated their background to the best of knowledge as first year agriculture students at the case study institution, (2) the participants understood the directions on the survey as to what the prompts were asking of the participants, (3) participants used in the study was representative of the students in the agricultural major at the case study institution, (4) the sample size was sufficient to determine the degree attainment in agricultural education as a major concentration based on high school setting, FFA membership, holding an office in FFA, having a farm background, parental occupation, and expressed interest in teaching vocational agriculture.

Limitations

Limitations are components that could potentially affect the interpretation of findings or on the discernibility of the results (Lunenburg & Irby, 2008). Results of this study are limited to the case study institution, which may not be representative of students who earn degrees in agricultural education at other academic institutions of higher education. A particular limitation of this case study is that the archival data reflect students 'responses to a survey completed as freshmen, although students often change their concentration of study before they graduate. As such, there might be some intervening factors that influence students' academic concentration in their college degree in case that students change their concentration at some point. As noted earlier, the case study institution's Agriculture department currently has six concentrations that incoming students can choose from. Those six concentrations include: Agricultural Business, Agricultural Communications, Agricultural Education, Agronomy, Animal Science, and Plant, Environmental, and Soil science. Often, a student enrolls in one selected concentration and then completes coursework in another concentration and then decides to change concentrations. A third limitation to the study is that often students' transfer in and out of the case study institution and their survey responses might not be recorded or removed from the survey data.

In addition, being that there are other licensure tracks to teach vocational agriculture besides the traditional four-year teaching degree, individuals could assume an alternative teacher certification beyond graduation. Individuals might have an underlying interest in teaching vocational agriculture but have decided to go into industry before deciding on teaching at a later point in their career.

Delimitations

Lunenburg and Irby (2008) describe delimitations as self-imposed boundaries on the purpose of overall scope of the study that is set by the researcher. A delimitation of this study is the participants were limited to students at the case study institution, and not a wider array of students from across the Midwest or United States. This narrow focus of the study prohibits extrapolation of results to students that would only apply to institutions similar to the case study institution. The majority of the students that enrolled in the case study institution's agriculture department where from Ohio or neighboring states. The second delimitation of the study is that the students who took the survey are geographically close to one another. This does not accurately depict the potential survey responses from first year agriculture students from across the United States.

Significance of the Study

Being able to provide insight to the factors that statistically predict students' degree attainment in secondary-level agricultural education will provide assistance and guidance when developing recruitment materials and help focus existing recruitment efforts at the case study institution of post-secondary education (Lawver & Torres, 2012). For example, is it possible to gauge whether students who attained a degree in agricultural education at the case study institution are more likely to have belonged to the National FFA Organization (FFA) in High School, held an office position in FFA, had a farm background, lived in a rural or urban setting, had a parent in an agricultural related occupation, or expressed interest in teaching vocational agricultural education? Developing successful recruiting and retention materials to target prospective students with similar backgrounds to previous institutional graduates has become a central focus

in many higher-level admission departments across the United States. “Since recruiting students to the profession is essential to maintaining and growing secondary agricultural programs across the country, it is vital to investigate the factors that play a role in choosing agricultural education as a career” (Lawver & Torres, 2012, p. 29).

Specific to the case study institution, and their ability to attract potential agricultural education majors, “insight into the factors that influence student’s choice to teach will provide assistance and guidance when developing recruitment materials” that admission counselors use (Lawver & Torres, 2012, p. 29). Driven by a desire to leave their mark on society, today’s agricultural students want to impact the world around them in a positive manner (Beyl et al., 2016). In an attempt to reverse the decline in the field of agricultural enrollment at colleges and universities, recruitment strategies are constantly being revised to attract new students (Beyl et al., 2016).

Swortzel (1998) addressed “the coming years regarding the make-up of faculty and staff” in the recruitment of potential students to secondary educational training in agricultural education will become imperative” (p. 62). Results of this case study could lead to future research aimed at identifying if there are predictable associations more broadly between student background and enrollment in agricultural education as a major area of study. Such future research could assist in the recruitment of students into agriculture programs at colleges and universities by narrowing the target market of the most predictable potential students.

The changing dynamic of students of agriculture remains a main focus for not only the case study institution but also Land Grant institutions in general. However, as agriculture has changed, the Land Grant institutions have changed as well, reflecting the

complex nature of agriculture. Kunkel (1995) states, "the future of agricultural education must reflect what agriculture has become and will be" (p. 19).

In the late 1980s and 1990s "businesses and industry, as well as higher education, was challenged to re-think its major mission to prepare for the 21st century. Higher education and specifically colleges of agriculture were also being challenged to think about the need for change in order to address issues in the 21st century" (Fields, Hoiberg, & Othman, 2003, p. 7).

Kunkel (1995) presents information about the changing dynamic of agriculture departments but notes how they "maintain their roots in agriculture, but that agriculture is seen not only as an employer and a producer of food and fiber, but also as a system based on stewardship of resources and the environment and on the maintenance of the public health" (p. 19). Just as Kunkel discussed the changing dynamic agriculture departments, the disconnect to agriculture in general continues to widen as only two percent to four percent of the population is directly connected to farming and ranching that raise crops that feed and clothe the people of the United States and many foreign countries (Penson, 2018). With this growing disconnect from the average individual in the United States, the non-agricultural population has little to no understanding of the complexities involved with sustaining and teaching about a viable agriculture system (Doerfert, 2011).

Research completed by Vincent, Henry, & Anderson (2012) revealed, "life experiences" have a direct correlation to students selecting agricultural education as their academic major (p. 193). With the constant desire to recruit a greater number of students, colleges and universities are redesigning strategies to recruit the next generation student. One framework that was implemented by Lent, Brown, Talleyrand, McPartland, Davis,

Chopra, Alexander, Suthakaran, and Chai (2002) "identified factors that influenced college students' career choice as an interest in the subject matter and previous contextual work experiences or experiential learning" (p. 62).

However, there are a lack of studies that considered such factors as high school geographic setting, FFA enrollment, if an FFA office was held, if one has a farm background, parental occupation, and having a expressed interest in teaching vocational agriculture in investigating a student's degree attainment in agricultural education. Smith et al. (2019) noted individuals that often enroll in agricultural education do so because of previous experiences. Lawver & Torres (2012) found a wide range of those experiences to include academic factors, such as agricultural education classes, SAE, and 4-H which refers to programs that revolve around children learning the best by doing. Children in 4-H complete hands-on projects in the areas of science, health, agriculture, and civic engagement, where they are guided my adult mentors along the way, as well as social support or mentorship from peers, parents, and agriculture teachers.

The results of this study could potentially assist office of admissions at the case study institution, in recruiting and retaining the next generation of agricultural students who wish to concentrate in agricultural education. Lawver & Torres (2012) note, "it is vital for agricultural education stakeholders including secondary agriculture teachers, state agriculture teachers' organizations, teacher preparation programs, the National Teach Ag Campaign, and National FFA to continue to promote the positive benefits of choosing a career in agricultural education" (p. 38).

This case study expanded the parameters to include new independent variables such as if a student has a farm background, high school setting, parental occupation, and

expressed interest in teaching vocational agriculture. These variables are new to previous studies that traditionally have only looked years of FFA membership. Future research may be conducted to study these factors more broadly in a representative sample of academic institutions.

Organization of the Study

This dissertation is presented in five chapters. Chapter one provides an orientation to this study. It includes the background of the research topic, the statement of the problem, the purpose of the study, the theoretical framework, the research questions to be addresses, methodology, definition of terminology, assumptions, limitations, delimitations, and the significance of the study.

Chapter two provides a review of literature on the Smith Hughes Act, the Morrill Act of 1862, the history of recruiting agricultural education students, and research studies pertaining to a student's college major choice in agricultural education. Chapter three outlines the methodology used in conducting this study. This chapter also addresses the research design, the population, the instrumentation, and data analysis procedures. Chapter four will address the analysis of the data and Chapter five will discuss the interpretation and implications of the study.

Summary of Chapter

This chapter introduces the research study that was conducted to determine the extent to which selected factors contribute to students' degree attainment in agricultural education in a 4-year college. Through the incorporation of a SCCT model, the student's background, learning experiences, and career interests are associated with their decision

to attain a degree in agricultural education teacher and thus enrolling in agricultural education as a major concentration.

Insight into the factors that predict to students' degree attainment in agricultural education at the case study institution will assist recruitment efforts into their programs. As Smith et al. (2019) report, the number of SBAE instructor is growing and the need to recruit students to fill these positions are project to rise. This study was intended to analyze selected factors and potentially assist in recruiting as well as retention efforts into agricultural education at the case study institution.

CHAPTER II. REVIEW OF THE LITERATURE

The purpose of this chapter is to present a review of the relevant literature for this research study. This review of literature was divided into the following sections: (a) problems in agricultural education, (b) agricultural literacy, (c) The National FFA Organization, (d) Legislative Acts, (e) Social Cognitive Career Theory, (f) agricultural recruitment.

Problems in Agricultural Education

Individuals are further removed from agriculture today more than any time in recent history. Two to three generations are removed from a connection to agriculture (National Research Council, 2000). To perceive agriculture as being limited to only farming and ranching would be incorrect. These operations account for only two percent to four percent of the nation's output (Penson, 2018). The scope of agriculture goes beyond the farm gate to encompass a broader range of food-and fiber – related activities. The agricultural sector, when viewed from a broader perspective, accounts for approximately 12% to 15% of the nation's output (Penson, 2018)

With the continued removal from our agricultural roots, the everyday knowledge about agricultural practices has dissolved for the vast majority of citizens over time. Tomorrow's agricultural educators have "an especially crucial mission: teach tomorrow's farmers and ranchers how to feed the world" (Grant, Field, Green, & Rollin, 2000, p. 1684). As Doerfert (2011) discussed the complexities in maintaining our current agricultural system, the lack of a connection to agriculture and its complexities allows the uninformed population to impact potential policy decisions that will affect agriculture

and its ability to function in a changing global market place (National Research Council, 2000).

Thomas Jefferson, who is the 3rd President of the United States (1801-1809), had a vision for America's future related to agriculture during his presidency. Jefferson believed that the United States' prosperity "was based on a nation rich in agricultural wealth" (Grant et al., 2000, p. 1685). In a letter to President Washington in 1793, Jefferson acknowledged that agriculturalists could buy an acre of new land cheaper than we can manure an old acre (Jewett, 2009). Jefferson knew that land productivity would become vitally important as the young nation grew. In an effort to promote continual stewardship of the land, Jefferson encouraged agricultural societies to become educated at a young age.

> Agriculture is a science of the first order. It counts among its handmaids the most respected sciences, such as Chemistry, Natural History, and Botany. In every College and University, a professorship of agriculture, and the class of its students, might be honored as first (Jewett, 2009, *Jefferson: The Agronomist. https://www.varsitytutors.com/earlyamerica/jefferson-primer/agronomist*)

If the young nation would have such wealth, it would yield respect and power on the world stage for the country. As agriculture became an important component of society, enlightenment thinkers in America adopted the idea of building the country as a primarily farming society (Danbom, 1997). Educating young American farmers to cherish agrarian culture was a central theme of the Jefferson administration.

Communicating clear and concise agricultural information is necessary to understand rural economy (Torres & Cano, 1995). Notably, often the public understands

and assimilates information, on which it bases its decisions and choices from the professionals who are training the next generation of leaders and policy-makers, namely, educators (Elliot, 1999). In other words, the public may be limited to broadening their horizons because they tend to select information favoring their existing belief or might be given limited information from what the agricultural professionals address in public. As such, agricultural professionals, who could impact the public's perspectives, should be given an education, which enables them to elaborate multiple aspects and see the bigger picture on certain phenomenon. In this regard, John Dewey, who was educational reformer that promoted experimental learning, explained:

> A primary responsibility of educators is that they not only be aware of the general principle of the shaping of actual experience by environing conditions, but that they also recognize in the concrete what surroundings are conductive to having experiences that lead to growth (Dewey, 1938, p. 40).

That National Research Agenda for the American Association of Agricultural Education (AAAE) under Research Priority One outlined an emphasis on understanding agriculture in a modern world through the need for an agriculturally literate society (Doerfert, 2011). During the early years of the 20th century, the desire to implement agricultural education at the secondary level grew rapidly in popularity (Hillison, 1987). Misconceptions about agriculture and agricultural education can be corrected by reaching out to both young people and adults, regardless of ability, and can be corrected when taught about agriculture and its role (Johnson, Wilson, Flowers, & Croom, 2012).

According to Penson (2018), the agricultural field is a "complex science that deals with how producers, consumers, and societies use scarce and natural resources in the

production, processing, marketing, and consumption of food and fiber products" (p. 8). Today, agriculture has become intensely specialized, so that even those engaged in agriculture may know or understand little about the intricacies of inputs and resources needed outside their scope (Martin, 2015).

Agricultural Literacy

An agriculturally literate person has been defined as a person who understands the food and fiber system and its current economic, social and environmental impact on all persons' lives (Spielmaker & Leising, 2013). Powell, Agnew, & Trexler (2008) base the definition of agricultural literacy on three different aspects which center on the "philosophical and epistemological positions of the participants" (p. 86). The first approach focuses on programmed agricultural literacy. Curriculum design within education should have its own agricultural disciplinary framework that establishes values and the agenda to be delivered (Powell et al., 2008). The deductive model does not designate a specific course in agriculture but rather relies on existing courses in the curriculum to infuse agricultural examples to promote agricultural literacy. The second approach, inductive model, states, "agricultural literacy results from integrating interdisciplinary academic and process skills in context while focusing on an agricultural issue (Powell et al., 2008, p. 86). Through the use of effective communication, Frick et al. (1991) align with the inductive model and believe society will be able to look at agricultural issues and needs in the context of current society's broad goals and understand concepts. The third approach is a model through evaluation. Meischen and Trexler (2003) note as one becomes literate, they master the ability to make judgments

based on culturally established norms and are able to assess agricultures impact from them.

Over the years, scholars have moved away from knowledge-based understanding of agriculture to include a more boarder sense of the term to encompass environmental and potential global social significance as it pertains to agriculture (Spielmaker & Leising, 2013). Recent trends in agriculture literacy tend to define the concept in a different way yet again. Current focuses are on conversational knowledge, critical analysis, and value-based judgments are the aspects that an agriculturally literate person possesses (Brandt, Forbes, & Keshwani, 2017).

Resources have been developed to improve the agricultural literacy of students. For example, National programs such as Agriculture in the Classroom and Food and Fiber Systems literacy are designed to improve students' literacy within agriculture (Brandt et al., 2017). Nevertheless, students still lack agricultural literacy. Colleges and Universities recruit students to enroll in agricultural education so that they can have knowledge and understanding of current issues in agriculture. Agricultural literacy is an issue, not only in American society, but abroad as well. Establishing a base knowledge and understanding of agriculture is necessary as the global population expands. (Kovar & Ball, 2013). As the population continues to grow, the need to establish and maintain a sustainable and viable agricultural system will become a central theme in agricultural education.

The National FFA Organization

The National FFA Organization (FFA), formally known as FFA, is a youth organization that prepares students for various aspects of life, such as developing

leadership and personal skills and career success through agricultural education. The FFA organization and its traditions are grounded in agrarianism (Martin & Kitchel, 2013). Agricultural education provided by FFA is "one of the components of Career Technical Education (CTE) where students learn skills necessary to become successfully employed within the agricultural industry" (Smalley & Sands, 2018, p. 308). One of the components that are used within agricultural education to assist students in learning about agriculture is the use of the FFA organization. FFA provides students with the opportunity through real-world examples to showcase their knowledge and skills in a competitive workforce (Smalley & Sands, 2018). One aspect of the workforce that is experiencing a shortage is agricultural education instructors and recruiting and retaining individuals to major in this subject area.

According to Ingram et al. (2018), "the agricultural education profession has been plagued with a shortage of teachers for more than 40 years" (p. 64). Of the 9,071 school-based agricultural education programs reported in 2018, they employed 13,827 teachers (Smith et al., 2019). As was mentioned in Chapter 1, additional teachers are still needed to meet the demands of growing agricultural programs. The 2017-2018 school year nationwide saw 247 new positions and 140 new programs added within agricultural education (Smith et al., 2019). FFA traditions often represent stepping-stones for members to continue their experience and transition into a practitioner's role in the classroom (Martin & Kitchel, 2013).

To address the fact that the agricultural industry is seeking a substantial number of new hires to meet global workforce needs, the number of students matriculating to agricultural education majors should be studied. (Duncan, Carter, Fuhrman, & Rucker,

2015). “Agricultural education in the United States provides a wide range of experiences to students outside of the classroom” (Mukembo, Edwards, Ramsey, & Henneberry, 2014, p. 156). It is these experiences that often lead an individual to experiment with a potential career choice. Not only experiences through education but experiences that are acquired during the formative period of an individual’s life may set the future direction of one’s life course by affecting the choices made and the achievements attained (Bandura, 1986). Mukembo (2014) found that individuals’ career aspiration is affected by a wide range of academic and social factors such as childhood experiences, training outside of school, relationships with peer/friends or teachers, perceptions of prestige or social status associated with the career, and participation in co-curricular activities. This conclusion aligns with Duncan et al.’s (2015) study that found being involved in FFA plays a large role in terms of motivation for a student to enroll in a college of agriculture and environmental science. Significant individuals such as teachers, associated with the FFA organization, provided a stronger influence over student college choice (Herren, Cartmell, & Robertson, 2011).

While FFA instructors might have influence over a student and their potential college selection, a limited amount of studies has been conducted to factor in whether being an officer in while in FFA can predict students’ degree attainment in agricultural education. Duncan et al. (2015) found that college recruiters may need to educate guidance counselors on the options in colleges of agriculture as well as the career possibilities as one transitions from FFA involvement in high-school to studying agricultural education at the college level. Koon, Frick, & Igo (2009) found that freshman students are more likely to complete an agricultural degree if they had agricultural

experience such as FFA or lived in a rural setting, or have been enrolled in a high school agriculture class.

Legislative Acts

There are numerous acts of legislation that have been passed that impact agricultural education. This section provides an overview of those acts.

Hatch Act of 1887. The Hatch Act of 1887, Smith-Lever Act of 1914, Smith-Hughes Act of 1917, and the Vocational Education Act of 1963 directly impacted agricultural education and the way teachers of tomorrow are recruited to deliver material to the students that they will be instructing.

The Hatch Act of 1887 took the first steps in the development of agricultural research in the United States. A network of state agricultural experiment stations was established in conjunction with the U.S. Department of Agriculture (USDA). In 1880, a group of research-oriented professors from midwestern colleges met at the University of Illinois and formed a group known as the Teachers of Agriculture. The purpose of these meetings was “improved agricultural production that benefits the entire population, not solely the producers on the farms” (Knoblauch, Law, & Meyer, 1962, p. 39). The Hatch Act noted:

in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established, under direction of the college or colleges or agricultural department of colleges in each State or Territory a department known and designated as an "experiment station (Hatch Act, 1887, p. 1)

Smith-Hughes Act of 1917. The Smith-Hughes Act of 1917 was the national legislative model for establishing agricultural education programs in public high schools (Jewell, 1993). By the time the Smith-Hughes act was enacted, "many states had begun to form their own associations for pre-college students studying agriculture" (Jones & Edwards, 2019, p. 109). Jones and Edwards (2019) noted that along with the promotion of vocational agriculture, a common objective for young farmer associations and young farmer clubs was to bring about social engagement for youth in rural environments.

After the enactment of the Smith-Hughes Act, the first national contests for youth in vocational agriculture were judging events hosted by the National Congress of Vocational Agriculture Students (Tummons, Simonson, & Martin, 2017). Part of vocational education is preparing individuals to work as a tradesman. Through the Smith-Hughes Act, these contests as Tummons et al. (2017) described, allowed for the social interaction among members; emerging agricultural leaders saw this networking activity as an opportunity for members to develop leadership and social skills for their career advancement.

Smith-Lever Act of 1914. Hillison (1996a) describes the passage of the Smith-Lever Act as a concession to the agricultural interests. Upon the passage of the Smith-Lever Act, "a commission was appointed to determine the feasibility of federal support for vocational education" (Hillison, 1996a, p. 11). The purpose behind the act was to establish extension services that would work with land-grant universities to inform the population about agricultural developments as they pertain to agriculture. As the USDA set up the programs, a report from the department in 1914 justified the passage of the act by asking young individuals on the farm if they were being reached by extension

services. Report (1914) found that extension might be reached in the widespread organization of these clubs and other institutions, if other forms of extension work were taken up, but that kind of work would involve regular school instruction for young people. The passage of the Smith-Lever Act in 1914 had a direct impact on the passage of the Smith-Hughes Act of 1917. The Smith-Hughes Act "shifted the definition of agricultural education from being science-based and academic-oriented to a strictly vocational definition" (Hillison, 1996b, p. 10).

Vocational Education Act of 1963. Vocational education began well before the Vocational Education Act of 1963 passed. The act was passed because there was evidence that Smith-Hughes Act of 1917 was not broad enough, or flexible enough, or rich enough, to meet the needs of society at the time or the needs of society in the future (Celebrezze, 1965).

The Vocational Education Act of 1963 was intended to offer new and expanded vocational education programs to bring job training in line with the industrial, economic, and social realities of today and the needs for tomorrow" (Celebrezze, 1965). This act of legislation had a direct impact on agricultural educators. It contributed to the growth of FFA by expanding the scope of vocational agriculture to include off-farm agricultural occupations and enterprises (Jones & Edwards, 2019).

One of the act's purposes as stated by Celebrezze (1965) was that people, with an emphasis on high school students, will have ready access to vocational training or retraining which is of high quality, which is realistic in the light of actual or anticipated opportunities for gainful employment. According to the National Research Council (1988), rather than funding programs of vocational education from earmarked grants,

vocational agricultural education had to compete for funds with other occupational areas, and labor market projections would dictate where potential funding would be allocated.

Even with the increased competition for funding, response from the agricultural education community was largely positive. Bunten (1964) stated, "the new legislation has removed the barrier of training for off-farm, agriculture-based occupations. It has opened up a whole new vista of vocational education in agriculture" (p. 4).

Jones and Edwards (2019) proclaim the use of vocational style education is grounded in the philosophical perspective of pragmatism. After enactment of the Smith-Hughes Act, several opportunities have presented themselves to students studying agriculture. The National Research Council (1988) summarized these opportunities as "vocational agricultural teachers desire to help students excel in traditional production oriented programs" (p. 43).

Social Cognitive Career Theory

Lent, Brown, and Hackett (1994) proposed a social cognitive framework for explaining three aspects of career development. According to Brown and Lent (1996), Social Cognitive Career Theory (SCCT) suggests occupational and academic interests develop primarily from self-efficacy beliefs and outcome expectations, which may or may not match more objective indicators of abilities. SCCT also posits "perceptions of barriers moderate the relations between interest and occupational choices" (Brown & Lent, 1996, p. 355). Students may be less likely to translate their interest into choices if they believe there will be unsurpassable obstacles to implementing those choices. Brown and Lent (1996) says self-efficacy beliefs and outcome expectations are assumed to develop primarily from reinforced performance accomplishments, modifying faulty self-

efficacy percepts and outcome expectations, review previous performance accomplishments, and benefit cognitively form these experiences.

According to the first aspect of SCCT, students may "prematurely eliminate potentially rewarding occupational pursuits because of inaccurate self-efficacy, outcome expectations, or both" (Brown & Lent, 1996, p. 356). The second aspect reports even individuals with well-developed and differentiated interest in a particular career path will be unlikely to pursue that path if they perceive substantial barriers to beginning or advancing that career selection (Brown & Lent, 1996). Thirdly, SCCT says assistance in identifying "foreclosed occupational paths and overcoming choice barriers should involve helping individuals to acquire new experiences and to reprocess old experiences in such a way that faulty efficacy and outcome percepts may be counteracted" (Brown & Lent, 1996, p. 357).

Social Cognitive Career Theory (SCCT) has taken on alternative meanings throughout the years. Lent and Brown (2017) note SCCT was to extend the study of career behavior to a broader range of person and situations than those highlighted by earlier career theories (p.3). However, as time has progressed so has the development of the theory. The past 20 years have seen much progress in the diversification of career development theory and research, and the field seems poised to dramatically extend these advances, relying on a new generation of social justice-minded and internationally oriented theorists and researchers" (Lent & Brown, 2017, p. 3).

The SCCT framework, according to Lent and Brown (1996), focuses on the processes through which (1) academic and career interest develop, (2) interest, in concert with other variables, promote career-relevant choices, and (3) people attain varying levels

of performance and persistence in their educational career pursuits. It should be taken into account that all of these constructs work together in varying degrees, suggesting that the interests, abilities, and goals all work impact one's career development outcome.

To "conceptualize the complexly interacting influences among persons, their behavior, and their environments, SCCT adopts Bandura's (1986) triadic reciprocal model of causality" (Lent & Brown, 1996, p. 313). Bandura's (1986) model says individual's attributes, external environmental factors, and overt behavior each operate as interactive sets of variables that mutually influence one another. SCCT centers on three variables through which individuals guide their own career behavior: self-efficacy beliefs, outcome expectations, and personal goals (Lent & Brown, 1996).

According to Bandura (1986), self-efficacy beliefs refer to "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). Outcome expectations refer to beliefs about the consequences or the outcomes of performing particular behaviors (Lent & Brown, 1996). Bandura (1986) defines personal goals as one's intention to engage in a certain activity or to produce a particular outcome.

Agricultural Recruitment

Colleges and Universities across the United States and the world often find themselves at odds attempting to recruit the same student to their institution. While some institutions are known for specific areas of study and therefore students already know that is where they want to attend, some students look at several different colleges and universities before ultimately deciding on where to attend. Agriculture recruiting

throughout the U.S. is no different. Agricultural departments across the country find themselves attempting to standout so potential students will enroll in their program.

Once a student decides where to attend, preparation in agricultural education courses begin to train them to replace the individuals who are retiring. As more jobs are created, the recruiting of qualified teachers to fulfill these positions will be challenging. Smith et al. (2019) notes the lack of qualified teacher candidates creates challenges for agriculture education in schools.

A qualified teacher is defined as an individual employed full-time by school who taught supervised teaching courses in agricultural education, guided mentoring in early field experiences, or student teaching internships within the past two years" (Swortzel, 1998).

However, Rocca (2013) states, "nationwide colleges of agriculture have struggled to meet the need for qualified graduates to fill jobs in the industry" (p. 72). Pertaining to agricultural education, approximately 2.2 million teachers will be needed to fill positions in the next ten years because of teacher attrition, retirement, and increased student enrollment (Lawver & Torres, 2012).

According to Smith-Hollins, Elbert, Baggett, & Wallace (2015), land grant colleges of agriculture have problems recruiting and retaining students for their programs (2015). The number of high school graduates peaked in the 2010-2011 academic year and since then, there has been a challenge for recruitment of students into agriculture disciplines due to the declining size of the pool of recent high school graduates (Beyl et al., 2016). However, according to Digest of Education Statistics (2018), degrees conferred in the colleges of agriculture have been on a steady increase.

Even though obtained agriculture degrees shows a steady increase at colleges and universities, "there remains a strain to meet the demands for industry for students in agricultural related fields" (Smith-Hollins et al., 2015). The new demand has created a shift in the workforce and is calling for colleges to recruit a new type of student to agricultural related programs (Hicks, 1991). This new demand, according to Esters (2007), has impacted the type of student who currently enrolls in colleges of agriculture. Unlike the traditional college student, these students will come from a culturally diverse background; many not have grown up on a farm and furthermore, may have limited experience with agriculture (Esters, 2007).

There have been several factors identified that relate to students' choice to enroll in colleges of agriculture. Wildman & Torres (2001) include influential people, images of agriculture and exposure to agriculture as children. As for agricultural education, Kyriacou & Coulthard (2000) found that undergraduates view teaching as an enjoyable career choice as the most important factor influencing their choice. Additionally, the feeling of responsibility, contributions to society, and job mobility impacted teaching as a career choice. Furthermore, students who enter the teaching profession expect to make a difference in the lives of students (Stiegelabauer, 1992).

Brunetti (2001) found the most important motivation for experienced teachers' choice to teach was the opportunity to work with young people and watching their students learn and grow. Harms and Knobloch (2005) identified several factors to explain career choice for those in agricultural education and career technical education. The factors included serving others, touching people's lives, making an impact, the 'calling'

to the career, salary and benefits, balance between career and personal time, and opportunities for advancement.

Agricultural education is only one segment of the big picture on agriculture and related programs. According to Smith-Hollins et al. (2015), only about six percent of the student population is being served by this area. Smith-Hollins et al. (2015) goes on to report, "many argue that a strong agriculture industry is pivotal to this country's survival" (p.307). FFA Advisors (as cited in Smith-Hollins et al., 2015) stated, a strong U.S. agriculture industry is vital to the health, safety and prosperity of this country.

In a study conducted by Elfers, Plecki, Wedel, and John (2008) asked college students at large to identify important factors in their consideration of career options, job stability ranked first, listed as "Very Important" by 77% of the 610 respondents. Historically, teaching has been considered a career option with high stability and job security. However, only 43% of these students described teaching as a career that definitely offers job security (Elfers et al., 2008), which reflects that a considerable number of students is unware of the advantages of agricultural teachers.

As shown, there are many factors that are relevant to the student decision-making process on attaining an agricultural education degree. "The factors associated with their decision are critical to the agricultural teaching profession; increasing the number of students who consider agricultural education represents an initial step in resolving the national shortage of teachers" (Thieman, Rosch, & Suarez, 2016, p. 31). Identifying the individuals, events, and activities that are predictive of students' that are active in considering agricultural education as an area of study and a career can lead to more

informed decisions regarding where to invest recruitment resources (Thieman et al., 2016).

Summary of the Chapter

This review of literature in this chapter has provided contextual information regarding agriculture as it pertains to recruitment in the United States: its beginnings, alterations, and current standing. The review has examined the current day's agricultural education problems, the need for agricultural literacy education in the United States, impacts through the National FFA Organization, and the legislative acts that have changed the way agricultural education is delivered. Further, Social Cognitive Career Theory, which serves as a guiding framework of the study, was reviewed in light of factors pertaining to students' decision in attaining a specific degree.

Upon review of the literature, no previously conducted study referenced similar constructs chosen in this study to determine an individual's degree attainment of agricultural education as major concentration at a college or university. As a result, research was needed to examine the extent to which the selected independent variables – high school geographic setting, FFA enrollment, if an FFA office was held, if one has a farm background, parental occupation, and expressed interest in teaching vocational agriculture does determine ones' degree attainment in an agricultural education major through the lens of the SCCT.

CHAPTER III. METHODOLOGY

This chapter describes the research methods used for this study. The chapter is divided into nine sections: (a) Purpose of the Study, (b) Research Questions, (c) Research Design, (d) Population, (e) Instrumentation, (f) Data Collection, (g) Data Analysis, (h) Human Subject Protection (IRB), and (i) Assumptions and Research Bias.

Purpose of the Study

The purpose of this study was to determine the extent to which a range of student background, learning experience, and career interest factors are associated with student degree attainment in agricultural education as a major concentration at the case study institution. Particular attention was given to investigating the relations between students' career interest in becoming an agricultural teacher and the following student background and learning experience factors: 1) high school settings (i.e., rural vs. urban schools) 2) case study institution's agriculture students backgrounds in FFA, 3) if an office was held while in FFA 4) farm background, 5) parental occupation, and 6) expressed interest in teaching vocational agriculture.

Research Questions

This case study examines the extent to which student background contexts, learning experiences, and career interests predicted students' degree attainment in agricultural education as a major concentration at a private college. The following research questions were explored:

1. To what extent does coming from a rural or urban high school setting predict students' degree attainment in agricultural education at the case study institution?

2. To what extent does being a member of FFA predict students' degree attainment in agricultural education at the case study institution?
3. To what extent does holding an office while being a member of FFA during high school predict students' degree attainment in agricultural education at the case study institution?
4. To what extent does having a farm background predict students' degree attainment in agricultural education at the case study institution?
5. To what extent does parental occupation predict students' degree attainment in agricultural education at the case study institution?
6. To what extent does expressed interest in teaching vocational agriculture predict students' degree attainment in agricultural education at the case study institution?

Research Design

This quantitative study utilized archival survey data from a single, private college based in the state of Ohio to examine if degree attainment in agricultural education is predicted by the aforementioned independent variables.

Logistic regression of the archival survey responses was conducted to investigate the research questions, given that degree attainment in agricultural education is treated as the dichotomous dependent variable coded as 1 = degree attainment in agricultural education as an academic concentration and 0 = degree attainment in the other five academic concentrations. The independent variables were be students' high school setting (i.e., rural vs. urban settings), FFA membership, the status of if an officer position was held, the status of if the student has a farm background, if the students' parental

occupation was agricultural related, and if there was an expressed interest in teaching vocational agriculture.

Population

The population of this case study included a convenience sample of archival data previously collected from first year college students enrolled at a specific private college, 2010-2016. All participants were enrolled in a first-year principle of agriculture course at the time they complete a survey questionnaire. The participants ranged from students with an agricultural background to no background at all. The participants all provided answers to the first day survey as part of the course goals and objectives, so the data being used for this study is archival, and have been stripped of all identifiers, or any way to link the data back to an individual.

Instrumentation

A review of the literature indicated previous studies utilized a variety of data collection techniques. Studies conducting similar research have utilized a nonexperimental descriptive-correlational research design method (Lawver & Torres, 2012). This type of research often uses survey questionnaires to gather information from subjects (Ary, Jacobs, & Razavieh, 2010).

The researcher selected to use the archival survey data from an instrument that was previously developed by four professors at the case study college. The survey had been issued since 1977 when the survey was developed. Three of the four professors hold Ph.Ds.' in agricultural education while the fourth holds a Ph.D. in animal science. The questions in the survey were designed to obtain a background of the students that the faculty within the agriculture department would be instructing. To insure content validity

of the original survey, the four professors ran a pilot study to analyze the results of the responses to the designed survey. The pilot study showed that survey questions asked gave the instructing professors adequate background knowledge of the students they would be teaching. The individuals who designed the survey are experts in agricultural education, such that this survey instrument ensures content validity. The original survey included nine questions and was designed to collect data related to students experience in agriculture, experience in FFA, how they were recruited to the case study institution, and future career aspirations.

The survey response scale was divided into two sections. Section One consisted of dichotomous questions where Yes = 1 and No = 0. Section Two consisted of one-word responses to the various questions. All survey received was anatomized beyond academic year so that individual identification would be protected.

The target population was first year agricultural major students who were enrolled in a foundation of agriculture course. The subjects were from various backgrounds that included both rural and urban setting, were from 23 states, four different countries, and generally were recent high school graduates or transfer students with one year of college completed.

The study participants completed a class survey of their background in agriculture, previous education, interest in the enrolled selected institution, and interest in teaching vocational agriculture. The survey consisted of short open-ended and dichotomous questions (Yes and No questions). In addition to surveying student's background information, the survey contains questions that ask about parents' occupation, expressed interest in teaching vocational agriculture, and favorite livestock

species. The data for favorite livestock species, which did not align with SCCT, was not included in this study.

Data Collection

Archival data collected from the department utilized to assess a total of 616 students who have attended the case study institution's agriculture department from 2010 to 2016. With respect to the independent variables, the department under study has recorded student responses from the 1940s to present day. While earlier surveys have incomplete sets of information, all students have completed the same survey from the original date of implementation through current day without any alternations in questions. The researcher extracted responses of students who completed the survey and obtained a Bachelor of Science degree in Agriculture with a certain academic concentration throughout the years from 2010 to 2016.

The instructing faculty members employed by the case study institution have collected the archival data, which was used for this study. Students' responses to the survey have not been shown publicly. All the survey responses provided for this study were anonymized, de-identified and aggregated. Personal identification of the participants was not provided to the investigator or any coding that would identify responses and be able to be linked to individual persons will not be used. While the investigator knew the identity of the case study institution and department that provided the data, institutional confidentiality was maintained in all research findings.

The survey data was collected from participants during the first day of class at the case study institution under study. Participants were asked to complete the paper copy of the survey at the end of the first session of class during the fall semester. If a transfer

student were to come to the case study institution, that student would complete the same survey that the students took in the fall except during the spring semester. Two full time professors at the case study institution that team-teach the introduction to agriculture course administered the survey. One of the professors that administer the survey has been issuing the same survey from his original hire data in 1977.

Once the participants complete the survey, the professor entered the results into the database with the rest of the data that has been collected throughout the years. Only data that has been stripped of any identity was provided for analyses.

The professor(s) that administered the survey disclosed to students that their responses would be recorded in an archival database according to the academic year they began the program. However, if the data were to ever be used for any study, the respondents were informed their responses would be anonymized and stripped of any personal identifiers to ensure participant identity is protected.

No personal identifying information was given by the survey administer. The responses were coded to permit student data to be collected for analysis. Further, no key code linking responses to participants was provided by the survey administer to the investigator. Thus, participants' private information and survey responses were kept strictly confidential.

Data Storage and Analysis

The case study institution's agricultural department, which has served as data custodian, provided anonymous raw student response data. The supplied data were provided to the investigator as an Excel spreadsheet. Upon received of the data, it was stored in a password protected file to which the investigator only had access.

A Statistical Package for the Social Sciences (SPSS 24 Statistics) was used to analyze the data through a quantitative lens. Descriptive and inferential statistics were used to describe the population as it related to the student response (high school setting of either rural or urban, whether the student was a member of FFA, whether the student was held an officer position in FFA, whether the student has a farm background, whether the students' parental occupation was related to agriculture, and whether the students' expressed in interest in teaching vocational agriculture).

To analyze the proposed research questions, high school setting of either rural or urban, membership in FFA, held an officer position while in FFA, if the student has a farm background, parental occupation, and expressed interest in teaching vocational agriculture can predict whether or not a student attains a degree in agricultural education as a major concentration in college. Logistic regression was performed to identify the relation between the independent variables and dependent variable being studied. Logistic regression is explained by the binary dependent variable assuming the value of one it the event happens, and zero otherwise (LaVergne, Bakhtavoryan, & Williams, 2018). The data was coded where the value of 1 = True and 0 = False.

This data were examined to replicate the methods employed by by Lawver and Torres (2012) to identify factors that predicted senior agricultural education students' choice to become a secondary agricultural education teacher, and Vincent et al.'s (2012) study that provided a deeper understanding of the reasons students made the decision to pursue a career in agricultural education. Table 1 provides the logic of the data analysis.

Table 1.

Logic of Data Analysis depicting how the independent and dependent variables in the research questions were analyzed.

Research Question	Independent Variable	Dependent Variable	Data Analysis
1. To what extent does coming from a rural or urban high school setting predict students' degree attainment in agricultural education at the case study institution?	Student high school setting: Rural vs. Urban	Agricultural Education concentration selection: Selection of Agricultural Education as a concentration within agricultural major	Logistic regression
2. To what extent does being a member of FFA predict students' degree attainment in agricultural education at the case study institution?	FFA membership: Student FFA membership in high school	Agricultural Education concentration selection: Selection of Agricultural Education as a concentration within agricultural major	Logistic regression
3. To what extent does holding an office while being a member of FFA during high school predict students' degree attainment in agricultural education at the case study institution?	Student elected to FFA officer position: Did the student in high school hold a officer position while in FFA	Agricultural Education concentration selection: Selection of Agricultural Education as a concentration within agricultural major	Logistic regression

Research Question	Independent Variable	Dependent Variable	Data Analysis
4To what extent does having a farm background predict students' degree attainment in agricultural education at the case study institution?	Agricultural background: Does the student come from a farm background	Agricultural Education concentration selection: Selection of Agricultural Education as a concentration within agricultural major	Logistic regression
5. To what extent does parental occupation predict students' degree attainment in agricultural education at the case study institution?	Parental occupation: What is the students' parents' occupation?	Agricultural Education concentration selection: Selection of Agricultural Education as a concentration within agriculture major	Logistic regression
6. To what extent does expressed interest in teaching vocational agriculture predict students' degree attainment in agricultural education at the case study institution?	Expressed interest: Does the student have an interest in teaching vocational agriculture?	Agricultural Education concentration selection: Selection of Agricultural Education as a concentration within agriculture major	Logistic regression

Human Subjects Protections (IRB)

The purpose of the study was to analyze archival data previously collected by the case study institution to assess background information of freshman students who enroll in a first-year agriculture course. Archival data provided to the principal investigator was anonymized and coded as numeric format for data analysis. The case study institution

ensured that data provided to the investigator had been de-identified such that that survey responses were not linked with individuals' private identities. While the researcher knows the identity of the case study institution and the department, institutional confidentiality will be maintained in all presentations of research findings and publications.

The researcher successfully completed the CITI Program course for investigators prior to submitting for IRB approval. Following Xavier University IRB approval, the investigator followed the guidelines set forth by the IRB. A letter of permission was obtained from the case study institution, granting permission to use the provided anonymized archival data and no further internal review was needed from the data providing institution (See Appendix A).

Assumptions and Research Bias

Delineation of assumptions provides the researcher a basis for formulating research questions and interpreting data resulting from a study (Lunenburg & Irby, 2008). Students who participated in this survey did so willingly, and responses are designed to provide the participant with anonymity.

All students who enroll the agriculture department at the case study institution completed the survey regardless of time of enrollment. Therefore, the sample is assumed to be representative of the student base within the agriculture department, regardless of concentration selected within the major of agriculture.

The design of the survey insured that respondents were not asked questions that include unwarranted assumptions about the respondents' characteristics (Whitley et al.,, 2013). Given that the responses are anonymous, it can be assumed that the participants are doing so to create a better educational experience for themselves, rather than selecting

responses that make students look good or bad (Whitley et al., 2013). This should alleviate the risk of social desirability bias.

The investigator of this study is an employee of the case study institution. The investigator did participate in the survey when the investigator took the survey their freshman year in the program. Beyond being one individual respondent in the population of the survey, the researcher has not formed any pre-disposed view as to the outcome of the research to avoid confirmation bias.

Summary of the Chapter

This chapter has presented the details of the method and procedures that will be followed for this dissertation research study. The use of quantitative analysis, an archival survey, and a SCCT research design addressed the purpose of the research to examine the extent to which student background contexts learning experiences, and career interests predict students' degree attainment in agricultural education as a major at a private college.

The research design is grounded in theoretical and empirical evidence as well as previous and ongoing practices. The design of the study analyzed six years of data through descriptive and inferential statistics to examine the population as it related to the student responses. This research design allowed the researcher to examine the relationship, interpretation, and backgrounds of agriculture students who ultimately attain a degree in agricultural education. Chapter 4 turns to presenting the findings from this data and the analysis of the data. Chapter 5 will provide greater conglomeration and discussion of the findings, implications, and ultimate conclusions of this research study.

CHAPTER IV. DATA ANALYSIS

The purpose of this study was to determine the extent to which students' graduating with a degree in agricultural education can be predicted by the following independent variables: coming from a different high school setting, belonging to the National FFA Organization (FFA), holding an FFA officer position while in high school, having or not having a farm background, parental occupation, and having an expressed interest in teaching vocational agriculture through the lens of SCCT (Lent et al., 1994). The study used archive data provided by the case study institution to address six research questions. The archive data had been collected from 2010 to 2016, which students completed in a first-year agriculture course where they completed the survey questionnaires related to the aforementioned independent variables. The following research questions guided the study.

1. To what extent does coming from a rural or urban high school setting predict students' degree attainment in agricultural education at the case study institution?
2. To what extent does being a member of FFA predict students' degree attainment in agricultural education at the case study institution?
3. To what extent does holding an office while being a member of FFA during high school predict students' degree attainment in agricultural education at the case study institution?
4. To what extent does having a farm background predict students' degree attainment in agricultural education at the case study institution?
5. To what extent does parental occupation predict students' degree attainment in

agricultural education at the case study institution?

6. To what extent does expressed interest in teaching vocational agriculture predict students' degree attainment in agricultural education at the case study institution?

This chapter is outlined as follows. Following the descriptive and inferential statistics of the independent and dependent variables, answers to the six research questions will be provided. In the descriptive statistics, basic features of the data will be described to show a summary about the sample used during the study. For inferential statistics, logistic regression was used to investigate the research questions to attempt to reach conclusions that relate back to attaining a degree in agricultural education. Logistic regression was an appropriate statistical method given that the dependent variable was dichotomous variable coded as 1 = degree attainment in agricultural education as an academic concentration and 0 = degree attainment in other academic concentrations. Logistic regression showed amount of variance in the dependent variable explained by each independent variable, after taking into account all other independent variables.

As noted in Chapter 1 and 3, the case study institution's Agricultural department provides the following six academic concentrations: 1) Agricultural Business, 2) Agronomy, 3) Animal Science, 4) Agricultural Communications, 5) Agricultural Education, and 6) Plant, Environmental, and Soil Science. As such, this study analyzed the extent to which the aforementioned independent variables could predict that students' would graduate with a degree in the agricultural education concentration from the case study institution. The independent variables were students' high school setting, FFA membership, the status of if an officer position was held, the status of if the student has a

farm background, if the students' parental occupation was agricultural related, and if there was an expressed interest in teaching vocational agriculture.

Analysis of Data

The archival data obtained for analysis in this study were comprised of 616 students. Of the student population, seven percent of the students graduated with a degree in agricultural education. FFA involvement yielded 66% of the population and 41% of the students in the survey held an officer position while enrolled in FFA. Students' parent occupation had 31% of the population having parents that had an agricultural related career. Of the 616 students in the survey, 65% had a farm background and 35% came from urban settings while 65% had a rural high school setting. The population had approximately 31% of the 616 participants (188) who expressed an interest in teaching vocational agriculture. Table 2 presents the summary of students' backgrounds related to these variables.

Table 2.

Students' Backgrounds Related to the Study's Variables

Variables	Proportion (n = 616)
High School Setting Rural	65% (401)
High School Setting Urban	35% (215)
Member of FFA	66% (409)
FFA Officer while in FFA	41% (250)
Farm Background	65% (402)
Parental Occupation	31% (189)
Expressed Interest in Teaching Vocational Agriculture	31% (188)

Note. The number of students in parentheses.

Tables 3-8 shows the proportion of students who attained their bachelor degree in either agricultural education or the other five academic concentrations in light of each of the six independent variables: high school settings (i.e., urban vs. rural), status of being a member of FFA, status of being an officer of FFA, farm background, parental occupation related to agriculture, and vocational interest in agricultural education. In Tables 3-8, the column titled "False," refers to students who graduated with the other five academic concentrations: 1) agricultural business, 2) agronomy, 3) animal science, 4) agricultural communication, and 5) plant, environmental, and soil science. The column titled "True" refers to students who graduated with an agricultural education.

Table 3 presents the proportions of rural vs. urban students that attain a degree in one of the six academic concentrations in agriculture. Figure 2 presents the bar chart that visualizes the proportions of rural vs. urban students' that attain a degree in either agricultural education or the other five academic concentrations. Of the population of 616 total students, 65% identified as having a rural high school setting, while 35% identified as having an urban high school setting. Of the 401 total rural students, six percent of the students attained an agricultural education degree, while a total of 215 urban students resulted in nine percent of the students attaining an agricultural education degree. Descriptively, nine percent of urban students and six percent of rural students graduated with a degree in agricultural education. These descriptive statistics reveal a slightly smaller percentage of students from rural high school settings graduated with a degree in agricultural education than in one of the other five academic concentrations. No statistical

tests were run to determine whether the difference in percentages observed for students from rural and urban high schools was significant.

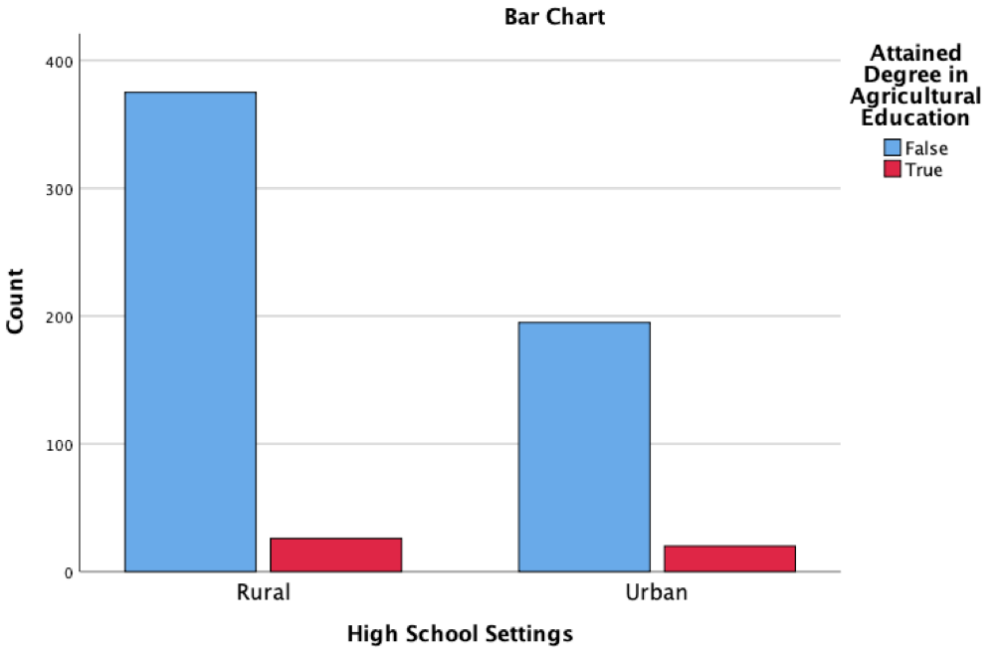
Table 3.

Degree Attainment in Agricultural Education Concentration by High School Settings

Graduate with an Agricultural Education Degree				
		% False (n)	% True (n)	% Total (n)
High School Settings	Rural	94% (375)	6% (26)	65% (401)
	Urban	91% (195)	9% (20)	35% (215)
Total		93% (570)	7% (46)	100 % (616)

Figure 2.

Bar Chart of Agricultural Education Degree Earners from Rural and Urban High Schools



Note. This figure charts the contingency table for students' High School setting as compared to whether or not they did or did not attain a degree in the agricultural education concentration.

Table 4 presents the proportions of status of being a member of FFA for students that attain a degree in either agricultural education or the other five academic concentrations. The row titled, "False," refers to students who were not a member of FFA and the row titled, "True," refers to students who were a member of FFA. Figure 3 presents the bar chart for visualizing the proportions of those students who were and were not members of FFA that attain a degree in agricultural education. Of the population of 616 total students, 34% identified as not being a member of FFA, while 66% identified as being a member of FFA. Of the 207 total non-FFA students, only one percent of the students attained an agricultural education degree, while 66% of students (409 students) that were members of FFA resulted in 11% attaining an agricultural education degree. As such, descriptively, 11% of students who were members of FFA graduated with a degree in agricultural education. One percent of students who were not members of FFA graduated with a degree in agricultural education. These descriptive statistics show a smaller percentage of students that did not belong to FFA graduated with a degree in agricultural education than one of the other five academic concentrations. No statistical tests were run to determine whether the difference in percentages observed for students who were and were not members of FFA was significant.

Table 4.

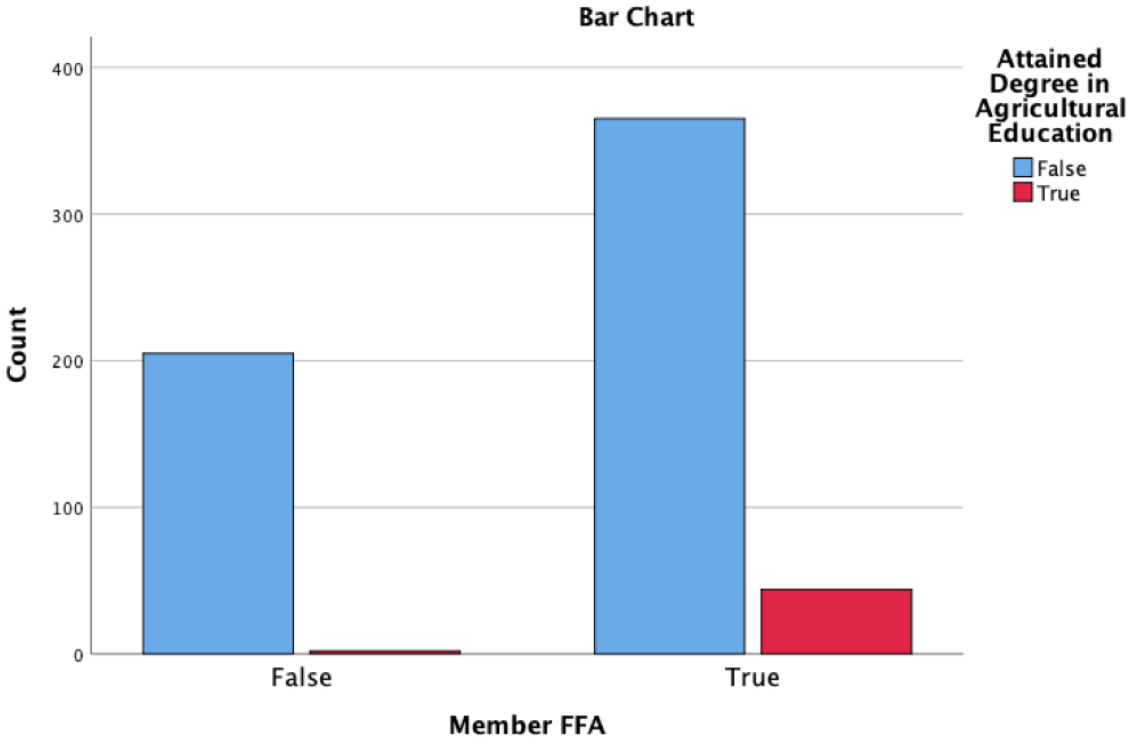
Degree Attainment in Agricultural Education by status of being a member of FFA

Graduate with an Agricultural Education Degree				
		% False (n)	% True (n)	% Total (n)
Member of FFA	False	99% (205)	1% (2)	34% (207)
	True	89% (365)	11% (44)	66% (409)
Total		93% (570)	7% (46)	100% (616)

Note. The number of students in parentheses

Figure 3.

Bar Chart of Agricultural Education Degree Earners having been a member of FFA



Note. This figure charts the contingency table for students' belonging to FFA as compared to whether or not they did or did not attain a degree in the agricultural education concentration.

Table 5 presents the proportions of status of holding an FFA officer position with in FFA for students that attain a degree in either agricultural education or the other five academic concentrations. The row titled, "False," refers to students who were a non- FFA officer and the row titled, "True," refers to students who held a FFA officer. Figure 4 presents the bar chart for visualizing the number of students holding an FFA Office or non-FFA Office among students' that attain a degree in either agricultural education or the other five concentrations. Of the population of 616 total students, 59% identified as not holding an FFA officer position, while 41% identified as holding an FFA officer position. Of the 366 total non-FFA officers, three percent of the students attained an agricultural education degree, while a total of 250 students that were FFA officers resulted in 14% attaining an agricultural education degree. Descriptively, 14% of students who were FFA officers graduated with a degree in agricultural education. Three percent of students who were not FFA officers graduated with a degree in agricultural education. These descriptive statistics reveal a smaller percentage of students that did not hold an FFA officer position graduated with a degree in agricultural education than one of the other five academic concentrations. No statistical tests were run to determine whether the difference in percentages observed for students who held and did not hold an FFA officer position while in FFA.

Table 5.

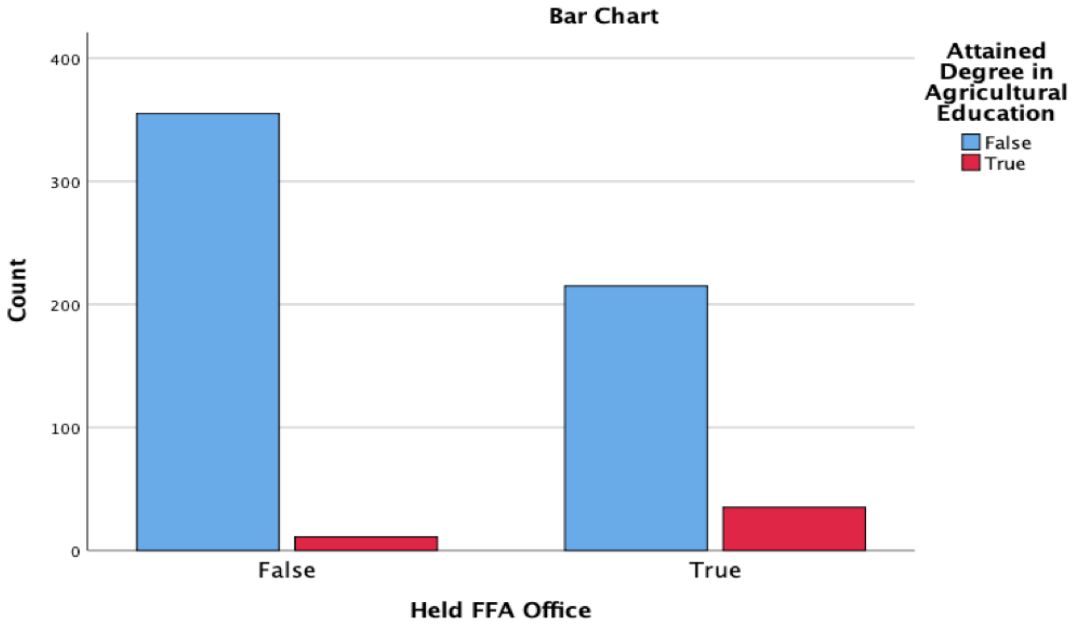
Degree Attainment in Agricultural Education Degree by status of holding an FFA Office while in FFA

Graduate with an Agricultural Education Degree				
		% False (n)	% True (n)	% Total (n)
FFA Officer while in FFA	False	97% (355)	3% (11)	59% (366)
	True	86% (215)	14% (35)	41% (250)
Total		93% (570)	7% (46)	100% (616)

Note. The number of students in parentheses

Figure 4.

Bar Chart of Agricultural Education Degree Earners having held an FFA Office while in FFA



Note. This figure charts the contingency table for FFA members who held an FFA office as compared to whether or not they did or did not attain a degree in the agricultural education concentration.

Table 6 presents the proportions of analyzing having a farm background for students that attain a degree in either agricultural education or the other five academic concentrations. Of the population of 616 total students, 35% identified as not having a farm background, while 65% identified as having a farm background. Of the 214 total non-farm background students, five percent attained an agricultural education degree; while a total of 402 students did have a farm background resulted in nine percent attaining an agricultural education degree. Descriptively, nine percent of students who have a farm background graduated with a degree in agricultural education. Five percent of students who did not have a farm background graduated with a degree in agricultural education. These descriptive statistics show a smaller percentage of students that did not have a farm background graduated with a degree in agricultural education than one of the other five academic concentrations. No statistical tests were run to determine whether the difference in percentages observed for students who had a farm background and those who did not have a farm background was significant.

Table 6.

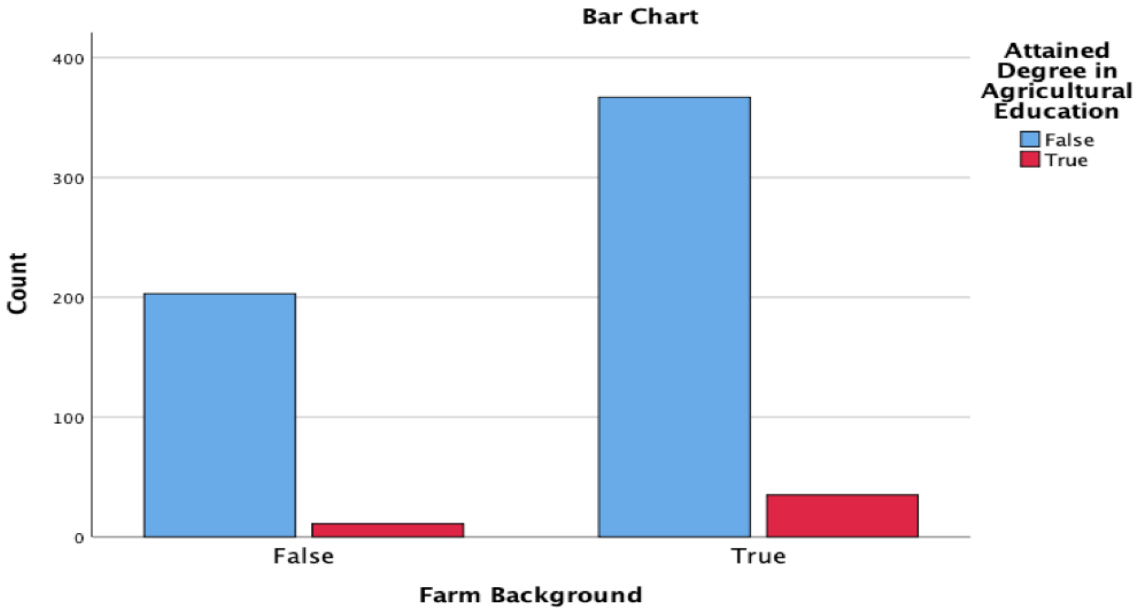
Degree Attainment in Agricultural Education by status of having a Farm Background

Graduate with an Agricultural Education Degree				
		% False (n)	% True (n)	% Total (n)
Farm Background	False	95% (203)	5% (11)	35% (214)
	True	91% (367)	9% (35)	65% (402)
Total		93% (570)	7% (46)	100% (616)

Note. The number of students in parentheses

Figure 5.

Bar Chart of Agricultural Education Degree Earners that have a Farm Background



Note. This figure charts the contingency table for students' Farm Background as compared to whether or not they did or did not attain a degree in the agricultural education concentration.

Table 7 presents the proportions of parents' occupation related to agriculture for students that attain a degree in either agricultural education or the other five academic

concentrations. The row titled, “False,” refers to students whose parents are not related to agricultural occupations and the row titled, “True,” refers to students whose parents are related to agricultural occupations. Figure 6 presents the bar chart for parental occupation of students’ that attain a degree in either agricultural education or the other five academic concentrations. Of the population of 616 total students, 69% identified as not having their parental occupation agriculturally related, while 31% identified as having their parental occupation agriculturally related. Of the 427 total non-parental occupations agriculturally related, six percent attained an agricultural education degree; while a total of 189 students did have parental occupation that was agriculturally related resulted in 11% attaining an agricultural education degree. Descriptively, 11% of students whose parents had an agricultural related occupation graduated with a degree in agricultural education. Six percent of students whose parents did not have an agricultural related occupation graduated with a degree in agricultural education. These descriptive statistics show a smaller percentage of students whose parents did not have an agricultural related occupation graduated with a degree in agricultural education than one of the other five academic concentrations. No statistical tests were run to determine whether the difference in percentages observed for students with and without parental occupation related to agriculture was significant.

Table 7.

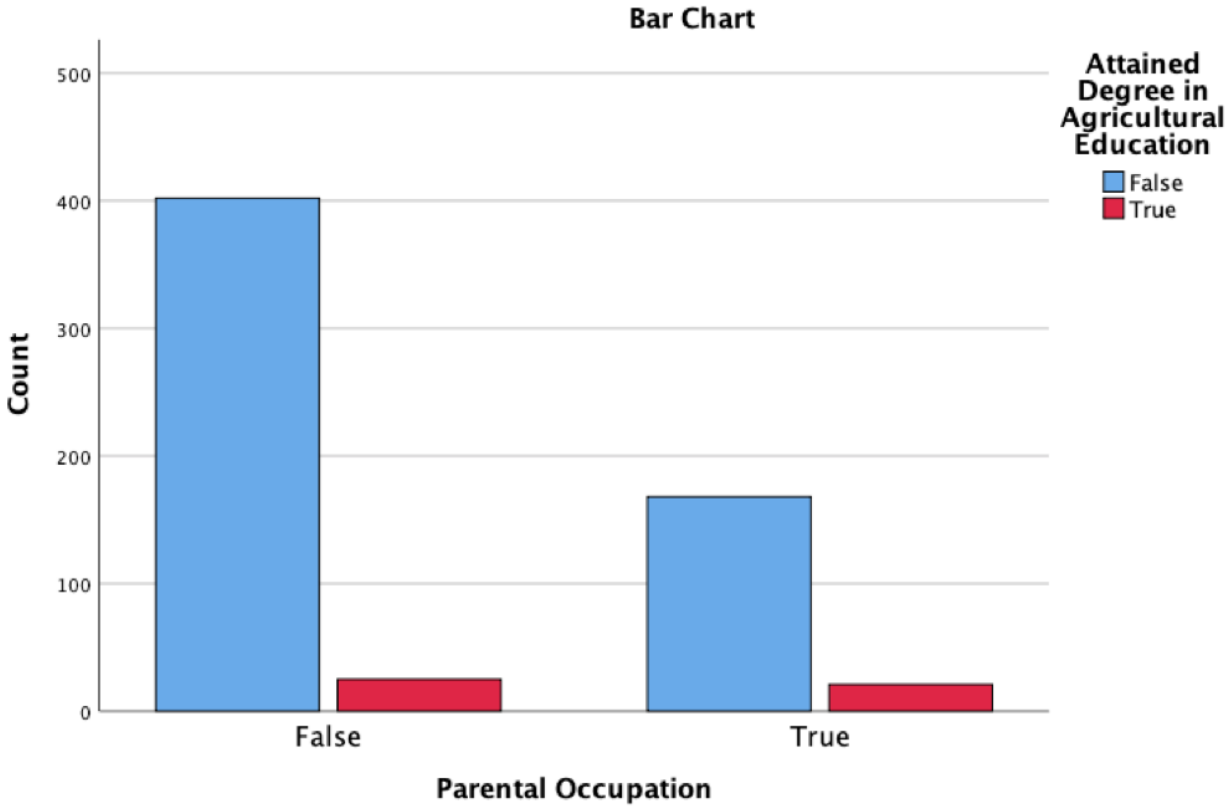
Degree Attainment in Agricultural Education by Parental Occupation related to agriculture

Graduate with an Agricultural Education Degree				
		% False (n)	% True (n)	% Total (n)
Parental Occupation Agricultural Related	False	94% (402)	6% (25)	69% (427)
	True	89% (168)	11% (21)	31% (189)
Total		93% (570)	7% (46)	100% (616)

Note. The number of students in parentheses

Figure 6.

Bar Chart of Agricultural Education Degree Earners with Parental Occupation related and unrelated to agriculture



Note. This figure charts the contingency table for students' Parental occupation as compared to whether or not they did or did not attain a degree in the agricultural education concentration. False represents parental occupation not related to agriculture and true represents parental occupation related to agriculture.

Table 8 presents the proportions for having an expressed interest in teaching vocational agriculture for students that attain a degree in either agricultural education or the other five academic concentrations. The row titled, "False," refers to students who are not interested in teaching vocational agriculture and the row titled, "True," refers to students who are interested in doing so. Figure 7 presents the bar chart for visualizing the proportions of students who expressed interest in teaching vocational agriculture or not among students attaining a degree in either agricultural education or the other five academic concentrations. Of the population of 616 total students, 69% identified as not expressing an interest in teaching vocational agriculture, while 31% identified as expressing an interest in teaching vocational agriculture. Of the 428 total non-expressed interest in teaching vocational agriculture, three percent attained an agricultural education degree; while a total of 188 students did have an expressed interest in teaching vocational agriculture resulted in 17% attaining an agricultural education degree. Descriptively, 17% of students that expressed an interest in teaching vocational agriculture graduated with a degree in agricultural education. Three percent of students who did not express an interest in teaching vocational agriculture graduated with a degree in agricultural education. These descriptive statistics reveal a smaller percentage of students that did not express an interest in teaching vocational agriculture graduated with a degree in agricultural education than one of the other five academic concentrations. No statistical tests were run

to determine whether the difference in percentages observed for students with or without an expressed interest in teaching vocational agriculture was significant.

Table 8.

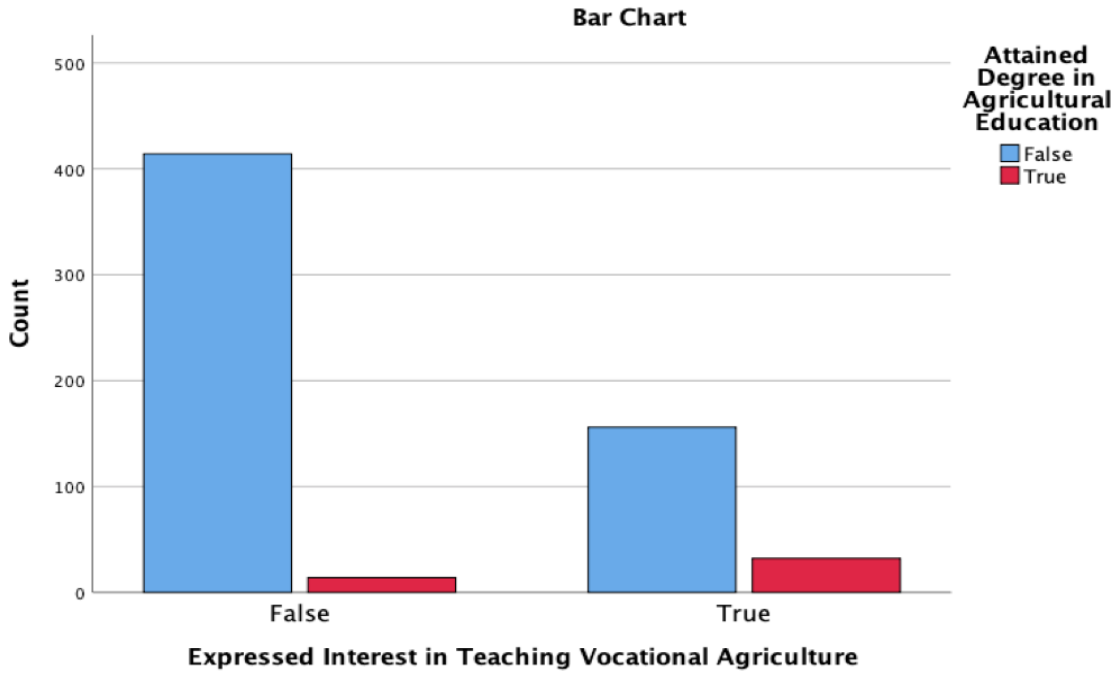
Degree Attainment in Agricultural Education depending on students' interest in in teaching vocational agriculture

Graduate with an Agricultural Education Degree				
Expressed interest in teaching Vocational Agriculture		% False (n)	% True (n)	% Total (n)
	False	97% (414)	3% (14)	69% (428)
	True	83% (156)	17% (32)	31% (188)
Total		93% (570)	7% (46)	100% (616)

Note. The number of students in parentheses

Figure 7.

Bar Chart of Agricultural Education Degree Earners with Expressed Interest in Teaching Vocational Agriculture



Note. This figure charts the contingency table for students' with an expressed interest in teaching vocational agriculture as compared to whether or not they did or did not attain a degree in the agricultural education concentration.

Attaining Agricultural Education Degree

The following section presents inferential data that show the relationship between the aforementioned independent variables and the dichotomous dependent variable – degree attainment in either agricultural education or the other five academic concentrations. Logistic regression analysis was conducted to assess the likelihood that a student would attain a degree in agricultural education based on the selected six independent variables. Table 9 provides the results of logistic regression with the model fit indices.

Within table 9, the values reported at Cox & Snell R Square and Nagelkerke R Square values are referred to as pseudo R^2 values, respectively. Based on the Cox & Snell R square value in Table 9, 9.7% of the variation in the dependent variable (attainment of an agricultural education degree) can be explained by the selected independent variables. Using the Nagelkerke R Square value from Table 9, 23.4% of the variation in the dependent variable (attainment of an agricultural education degree) can be explained by the selected independent variables.

The non-significant result of the Hosmer and Lemeshow goodness of fit test suggests that the model prediction (expected value) is not significantly different from observed value, implying that the predicted model is a well-fitting model, χ^2 (7) = 2.408, p = .934.

The B coefficient in Table 9 depicts the change in the log odds of the dependent variable (degree attainment in agricultural education vs. the other five academic concentrations) that occur for being either True or False status of each independent variable when taking into account all of the other independent variables. Based on Table 9, the following sections answer the research questions.

Table 9.

Logistic Regression Model of Degree Attainment in Agricultural Education

Independent Variables	B	S.E	Wald	P-value	Exp (B)
High School Setting	.696**	.337	4.273	<.05	2.007
Member of FFA	1.481*	.808	3.357	<.1	4.397
FFA Officer while in FFA	.893**	.401	4.953	<.05	2.443
Farm Background	.560	.375	2.224	>.1	1.750
Parental Occupation	.726**	.338	4.621	<.05	2.066
Interest in teaching Vocational Agriculture	1.507***	.353	18.264	< .001	4.513
Intercept	-5.961***	.824	52.324	<.001	0.003
Model Fit Indices					
Cox & Snell R Square	.097				
Nagelkerke R Square	.234				
Hosmer & Lemeshow Test	$X^2(7) = 2.408$, p =.934				
Omnibus Test	$X^2(6) = 62.523$, p < .001				

Note. * p <.1; ** p < .05; *** p < .001

Research Question 1.

In the logistic regression model tested (see Table 9), students who came from urban school settings were more likely to attain their degree in agricultural education (B = .696,) at the significant level of $p <$. 05. These results suggest when holding all other independent variables constant, those students who came from an urban high school were more likely than those from a rural high school to attain an agricultural education degree by a factor of .696.

Research Question 2.

When holding all other independent variables constant, the log-odds of attaining an agricultural education degree for students who reported having a FFA membership showed an increase of 1.481, which was not statistically significant ($p < .1$). This finding suggests that those who hold FFA membership are no more likely to attain an agricultural education degree than those who are not members of FFA.

Research Question 3.

In the regression model tested, the log odds for holding an FFA officer position while in FFA is .893, which shows a .893 increase in the log-odds of attaining an agricultural education degree for holding an FFA officer position, which was statistically significant at the level of $\alpha = .05$ ($p = .026$) when holding all other independent variables constant. This finding suggests that those who hold an FFA officer position during their high school years are more likely to attain a degree in the agricultural education concentration by a factor of 2.443.

Research Question 4.

In the regression model tested, the log odds change for farm background is .560, which shows a .560 increase in the log-odds of attaining an agricultural education degree for having a farm background, which was not statistically significant ($p > .1$). When holding all other independent variables constant, those who have a farm background are no more likely to attain an agricultural education degree than students without a farm background.

Research Question 5.

In the regression model tested, the log odds change for parental occupation is .726, which shows a .726 increase in the log-odds of attaining an agricultural education degree for students whose parental occupation is related to agriculture, which was statistically significant at the level of $\alpha = .05$ ($p = .032$).. When holding all other independent variables constant, those whose parents are involved in agricultural-related occupation are more likely to attain an agricultural education degree by a factor of 2.066.

Research Question 6.

In the regression model, the log odds for students who expressed interest in teaching vocational agriculture is 1.507, which was statistically significant at the level of $\alpha = .001$. This finding suggests that students who expressed an interest in teaching vocational agricultural are more likely to attain an agricultural education degree by a factor of 4.513, after holding all other independent variables constant..

In summary, logistic regression analysis was conducted to investigate the effects of FFA membership, holding an FFA officer position, parental occupation, farm background, high school setting, and expressed interest in teaching vocational agriculture

on the likelihood that students would attain a degree in agricultural education. The logistic regression model was statistically significant, χ^2 (6) = 62.523, p <.001. The model explained 23.4% (Nagelkerke R^2) of the variance in attainment of a degree in agricultural education and correctly classified 92.5% of students. The non-significant result of the Hosmer and Lemeshow goodness of fit test suggests that the model prediction is not significantly different from observed values, implying a well-fitting model, χ^2 (7) = 2.408, p = .934.

Of the six independent variables, four were statically significant at the significant level of α = .05: holding an FFA officer position, parental occupation, high school setting (i.e., urban v. rural high schools), and expressed interest in teaching vocational agriculture. However, neither FFA membership nor having a farm background were significant variables associated with the odds of degree attainment with an agricultural education degree.

With respect to high school settings, after taking into account all the other five independent variables in the logistic regression model, students' high school settings was a significant predictor for students' degree attainment in agricultural education; students came from urban schools were significantly more likely to attain degree in the agricultural education concentration.

With respect to status of being a member of FFA, when the other five variables were taken into account in the logistic regression model, students' membership in FFA was not a significant predictor for students' degree attainment in the agricultural education concentration.

Holding an FFA officer position yielded a significant result in the logistic regression model. FFA members who hold an officer position are more likely to attain a degree in agricultural education.

With regards to students' who have a farm background, the logistic regression model resulted in a non-significant relationship for students attaining a degree in agricultural education. However, parental occupation was a statistically significant predictor for the attainment of an agricultural education degree; those students whose parents had an occupation related to agriculture were more likely to attain an agricultural education degree.

The final research question regarded students' expressed interest in teaching vocational agriculture. The logistic regression analysis suggested that students who had an expressed interest in teaching vocational agriculture were more likely to attain an agricultural education degree.

Summary of Chapter

This chapter presented findings of the research questions using the case study institution's archive data from 2010 to 2016. This study determined the extent to which students' graduating with a degree in agricultural education can be predicted by the following independent variables: coming from a different high school setting, belonging to FFA, holding an FFA officer position while in high school, having or not having a farm background, parental occupation, and having an expressed interest in teaching vocational agriculture. Chapter 5 will interpret the finding relative to the stated research questions, summarize the conclusions derived from the study, and suggest implications of practices and avenues for further research.

CHAPTER V. INTERPRETATION AND IMPLICATIONS

To address the factors that lead a student to graduate with a degree in agricultural education, the purpose of this study was to analyze the extent to which coming from a different high school setting, belonging to FFA, holding an FFA officer position while in high school, having or not having a farm background, parental occupation, and having an expressed interest in teaching vocational agriculture were associated with students' graduating with a degree in agricultural education. Specific attention was given to the case study institution's agriculture student's backgrounds in FFA, farm background, high school setting, parental occupation, and expressed interest in teaching vocational agriculture to measure the degree attainment in agricultural education as a major concentration. This chapter will interpret the data collected, analyzed, and presented in this study as they relate to each of the research questions.

This quantitative study was conducted in a first-year principle of agriculture course in a private college in Southwestern Ohio. Social Cognitive Career theory (SCCT; Lent et al., 1994) was adopted as a theoretical lens in investigating the relations between the aforementioned factors and student's degree attainment in agricultural education. First year agriculture students completed a survey that was created in 1977 by faculty employed by the case study institution to give professors within the department a better understanding of student's backgrounds and background knowledge as it pertains to agriculture before instruction began. Data obtained from 616 students who completed the survey from 2010 – 2016 were analyzed to determine the extent to which the aforementioned factors had on students' degree attainment in agricultural education.

Interpretation of Study Findings

The following research questions guided this study:

1. To what extent does coming from a rural or urban high school setting predict students' degree attainment in agricultural education at the case study institution?
2. To what extent does being a member of FFA predict students' degree attainment in agricultural education at the case study institution?
3. To what extent does holding an office while being a member of FFA during high school predict students' degree attainment in agricultural education at the case study institution?
4. To what extent does having a farm background predict students' degree attainment in agricultural education at the case study institution?
5. To what extent does parental occupation predict students' degree attainment in agricultural education at the case study institution?
6. To what extent does expressed interest in teaching vocational agriculture predict students' degree attainment in agricultural education at the case study institution?

Analyzing the data provided evidence that four of the six independent variables studies yielded statistically significant results from logistic regression analysis using the significant level of $\alpha = .05$. Coming from an urban school setting, holding an officer position while in FFA, parental occupation related to agriculture, and having an expressed interest in teaching vocational agriculture predicted students' attainment of a bachelor's degree in agricultural education significantly. Analyzing these factors below in relation to each specific research question provides a path to examine the factors contributing to students' degree attainment in agricultural education.

Addressing Research Questions

Research Question 1. The first research question addressed students' high school setting. The logistic regression analysis showed that students from urban backgrounds were more likely to attain a degree in agricultural education compared to their counterparts from rural high schools (B = .696, $p < .05$).

Research Question 2. The second research question addressed students' membership in FFA. Students on the survey were to select either having been a member of the organization or not being a member of the organization. Based on the results of logistic regression analysis in Chapter 4, student membership in FFA are no more likely to attain an agricultural education degree than those where were not FFA members. By a factor of 4.397, holding all other independent variables constant, this difference between being and not being an FFA member was not statistically significant ($p = .067$).

Research Question 3. The third research question addressed students' holding an officer position while in FFA. When completing the survey, students would select yes or no to holding an officer position while in FFA. Results from logistic regression analysis in Chapter 4 suggest that holding an FFA officer position is a significant predictor of attaining the bachelor degree in agricultural education by a factor of 2.443 at the significant level of $\alpha =. 05$ ($p = .026$).

Research Question 4. The fourth research question addressed students' having a farm background. Students were not asked the type of farm background but simply asked to respond to a yes or no question to whether or not they had a farm background. Logistic regression analysis from Chapter 4 suggests that farm background is not statistically

significant. Logistic regression resulted in a non-statistically significant result as evidenced by p =.136.

Research Question 5. The fifth research question addressed students' parental occupation. Students were asked if at least one of their parents had an agricultural related job. The survey did not ask if both parents had an agricultural related job. The logistic regression model suggests parental occupation is statistically significant $\alpha =. 05$ $p =. 032$

Research Question 6. The final research question addressed students' expressing an interest in teaching vocational agriculture. Students were asked on the survey whether or not, regardless of selected academic concentration, if they had an interest in teaching vocational agriculture. Logistic regression yielded a statistically significant result with $p <. 001$.

Summary of the Conclusions

This study was designed to examine to what extent the aforementioned independent variables contribute to students' attaining a bachelor degree in agricultural education by analyzing archival survey responses of those students graduated with either an agricultural education degree or the other five academic concentrations from 2010 to 2016.

The extent of high school setting, FFA membership, holding an FFA office, farm background, parental occupation, and expressed interest in teaching vocational agriculture were factored in to see the extent to which these factors predicted students' attaining a degree in agricultural education. Logistic regression was conducted to analyze the independent variables of the survey responses against the dependent variable and were examined to see if they were statistically significant.

Notably, the logistic regression model showed that holding an FFA officer position were more likely to attain a degree in agricultural education by a factor of 2.443 at the significant level of $\alpha = .05$ ($p = .026$). This suggests these students, because they held an officer position while in FFA, were more likely to attain a degree in agricultural education as compared to if they did not hold an officer position. However, only being a member of FFA was not a significant predictor of attaining a degree in agricultural education. Those who held FFA membership were no more are more likely than those who were not members to attain an agricultural education degree by a factor of 4.397 ($p = .067$). This finding contradicts evidence from the Lawver and Torres's (2012) study that showed agricultural education classes, such as FFA and FFA related activities, contribute to students' enrollment and completion of an agriculture education degree. The Lawver and Torres study was conducted with students participating from nine states (i.e., Arkansas, Illinois, Iowa, Kansas, Kentucky, Missouri, Nebraska, Oklahoma, and Tennessee); the sample consisted of $n = 145$, of which FFA membership status of "Yes" was $n = 127$ (87.59%), and "No" was $n = 17$ (11.72%). This population used in this study was much larger which FFA membership status of "Yes" $n = 409$ (66%) and "No" $n = 207$ (34%), but the sample was restricted to students at a single agricultural college in Ohio.

Fraze et al. (2011) conducted a study that asked 94 high school aged students about their interest towards a career in agricultural education. Fraze and colleagues found that 48% of the students expressed an interest in having a career in agricultural education. The Fraze et al.'s study did result in the positive relationship between vocational interest and a career choice in agricultural education, which mirrors the current study's finding.

Of note, the current study that conducted had a larger population compared to the Fraze et al study and resulted with 31% of the respondents expressing an interest in teaching agricultural education. The previous and current studies support the notion of Social Cognitive Career Theory (SCCT; Lent et al., 1994) which posits that individuals' career interest plays a critical role in shaping their career decision making. In fact, Tang, Pan, & Newmeyer (2008) suggest SCCT can serve as a guiding framework that articulates students' career interests, factoring in interrelated variables.

Students that had parental occupation where at least one parent had an agricultural related career are more likely to attain an agricultural education degree by a factor of 2.066 at the significant level of $\alpha = .05$ ($p = .032$) in the logistic regression model. The log odds for parental occupation are .726, which shows a .726 increase in the log-odds of attaining an agricultural education degree for students whose parental occupation is related to agriculture. This aligns with the Shen et al.'s (2014) finding that indicates parents' occupation is associated with college students' potential career. Shen and colleagues' study included parental occupation as a variable to measure the extent of agricultural education degree attainment. However, this previous study had only focused on agricultural courses and agricultural education related experiences. Conversely, this study provided evidence that parental occupation related to agriculture would increase the likelihood that a student would attain an agricultural education degree.

Implications for Practice

Identifying the factors that influence students' degree attainment could give agricultural professionals the first step towards creating a plentiful supply of well trained and highly qualified agriculture teachers. Lawver and Torress's (2012) earlier study drew

attention to the next logical step on recruitment and retention strategies to maintain quality teachers in the profession.

As noted earlier, previous studies have found that participation in agricultural education, such as FFA, had influenced the students' attitude and ultimately attaining a degree in agricultural education (e.g., Lawver & Torress, 2012). While the current study added new variables to the equation, being involved in FFA was not found to be a significant predictor of attaining a degree in agricultural education. However, holding an FFA officer position was found to contribute to students' attainment of a degree in agricultural education. The mix results from this study did provide new information that will be used in retention strategies at the case study institution in the future.

With findings from this study, the case study institution could develop a leadership group that focuses on retention strategies on how to increase degree attainment within agricultural education. One aspect that could be analyzed is how to increase students' interest in becoming a vocational agriculture educator. This variable was proven to be statistically significant in the analysis. Therefore, the leadership group could present findings from Smith et al. (2019) on the job outlook of a career as an agricultural educator. Holding informational sessions with current students at the case study institution could do this. If the group could present information on job outlook while students' are beginning their academic career (i.e. freshman or sophomore), this would allow the student enough time to complete the agricultural education degree while finishing the bachelor degree within the traditional four-year time frame.

In addition, the case study institution could form a partnership with local school districts and their FFA programs. This partnership could make mutual efforts to increase

the number of students who hold officer positions in FFA during their high school career. While merely enrolling in FFA during high school did not predict degree attainment in agricultural education, merely encouraging membership in FFA would not be sufficient to lead to more students developing agricultural interests that could transition into a desire to attain a degree in agricultural education at the college level.

Seeing that there is a significant difference in attainment of an agricultural education degree between those who hold an FFA officer position and those who do not, the case study institution could devote more attention to individuals who held an office in hopes of recruiting those students to the program. Once an individual is recruited to the case study institution's program, the department could hold workshops with these former officers in the area of agricultural education in hopes they pursue a degree in that field.

The case study institution's programs are in a unique situation. The number of teaching positions in the subject of agricultural education is on the rise. The agriculture department at the case study institution may seek to diversify its student population based off this study's findings. Seeing as the logistic regression found serving as a FFA Officer had a significant relationship to attainment of an agricultural education degree, when the case study institution's agriculture department visits high school FFA programs, perhaps the recruiters could meet separately one on one with the serving FFA officers to tell them more about the case study institution's agricultural education program.

In addition to meeting with FFA officers, the case study institution could send FFA advisors a survey that asks students' their parental occupation. The logistic regression model suggests a significant relationship between students' degree attainment in agricultural education and having at least one parent have an agricultural related

occupation. If the case study institution could find out parental occupation before students enroll at the case study institution, the analysis from the logistic show that parental occupation does factor into students' degree attainment in agricultural education.

Public schools, where FFA programs are offered, could hold information sessions about what FFA is, how FFA operations, and why holding an officer position in an FFA program could lead to a potential career in agricultural education. Outreach activities such as these information sessions could potentially interest in running for an officer position in FFA programs across the United States. These efforts could inadvertently increase the likelihood a student who enrolls in an agricultural college would seek to earn a degree in agricultural education at a college or university level.

Study Limitations

A limitation of this study is that participants were drawn from a single institution of higher education in Southwestern Ohio, so the results may not generalize beyond the case study institution. Additionall, the students that participated in the survey often change their concentration of study before they graduate. As such, there might be some intervening factors that influence students' academic concentration in their college degree in case that students change their concentration as some point. A second limitation to this study is that students' transfer in and out of the case study institution and their survey responses were more than likely not recorded or removed from the sample survey population. These addition or subtraction of student survey responses can skew data for inaccurate results.

In addition, students have other licensure tracks to teach vocational agriculture besides the traditional four-year agricultural education degree. Students could pursue a

concentration other than agricultural education and could assume an alternative teacher certification beyond graduation, never expressing an interest in teaching vocational agriculture on the survey.

Suggestions for Future Research

Expanding upon the research completed in this study of studying factors that contribute to attainment of an agricultural education degree is recommended. This study is only but one sample of many colleges and universities that deliver agricultural education programs. As such, it is recommended that similar studies should be conducted in a wide range of colleges and universities in various regions across the nation. Also needed are studies that include student teaching reactions and continued degree attainment. At the case study institution, agricultural education students are placed in a classroom during the first semester to strictly observe. Often, students switch their academic concentrations after their initial in the classroom experience to a different agricultural concentration. Investigating the relation between student teaching and their degree attainment in an agricultural education would provide professors and administrators with informative insights as to how the number of graduates in their programs could potentially be changed after that learning experience.

If researchers could obtain unidentifiable data, information on students' concentration change within their academic career could provide valuable insights. Conducting a study that would analyze if a student is more likely to attain a degree in agricultural education after a concentration change would allow for continued recruitment of existing agricultural concentrations within a college or university.

Further, as guided by SCCT (Lent et al., 1994), a future study may need to provide a structural relationship among the SCCT's constructs that include students' personal backgrounds, learning experiences, vocational interest and self-efficacy in agricultural education, and their degree attainment in agricultural education. This subsequent study would provide a comprehensive understanding of students' career decision making in becoming an agricultural teacher.

Conclusion

The purpose of this study was to analyze the extent to which coming from a different high school setting, belonging to FFA, holding an FFA officer position while in high school, having or not having a farm background, parental occupation, and having an expressed interest in teaching vocational agriculture were associated with students' graduating with a degree in agricultural education. Four statistically significant predictors from Logistic Regression Model included coming from urban school settings, holding an FFA office, having at least one parent have an occupation related to agriculture, and having an expressed interest in teaching vocational agriculture to attaining a degree in agricultural education. Based on these findings, Chapter 5 discussed implications for practice and future research, as they relate to effective recruitment plans at the case study institution.

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APPENDIX A:

Released Consent of Data

April 21, 2020

To Whom It May Concern:

I give permission to share the material collected of the agricultural department 1st day survey collected from 1948-present day with Chad W. McKay and Dr. Ahlam Lee (authorized researchers) for in a secure excel file. Authorized researchers may use the material for research purposes.

In addition, I give permission for authorized researchers to show findings derived from the shared research in public settings for informational or educational purposes. I understand that researchers may use these excerpts in presentations. I also understand that at times these presentations may be videotaped or recorded and made available to the public via the Internet. In giving my permission, I trust that authorized researchers will use their professional judgment and uphold ethical principles in determining which excerpts and images to present and to which audiences.

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