2012

ORGANIZATIONAL ADAPTATION THROUGH DIFFUSION AND SOCIAL NETWORKS: A STUDY OF FAMILY CONSUMER SCIENCES EXTENSION AGENTS

Deborah Adkins Murray
University of Kentucky, deborahmurray@windstream.net

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained and attached hereto needed written permission statements(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine).

I hereby grant to The University of Kentucky and its agents the non-exclusive license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless a preapproved embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's dissertation including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Deborah Adkins Murray, Student

Dr. Lars Björk, Major Professor

Dr. Beth Rous, Director of Graduate Studies

ORGANIZATIONAL ADAPTATION THROUGH DIFFUSION AND SOCIAL NETWORKS: A STUDY OF FAMILY CONSUMER SCIENCES EXTENSION AGENTS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Education in the
College of Education
at the University of Kentucky

By

Deborah Adkins Murray

Lexington, Kentucky

Co-Directors: Dr. Lars Björk, Professor of Educational Leadership Studies
and Dr. Wayne Lewis, Assistant Professor of Educational Leadership Studies

2012

ABSTRACT OF DISSERTATION

ORGANIZATIONAL ADAPTATION THROUGH DIFFUSION AND SOCIAL NETWORKS: A STUDY OF FAMILY CONSUMER SCIENCES EXTENSION AGENTS

This study examines the interconnectedness of social networks of the early adopter Family and Consumer Science Extension Agents (FCS Agents) of the Mental Healthiness and Aging Initiative (MHAI) pilot conducted in eleven (11) eastern Kentucky counties between October 2007 and April 2009 and compares the social network connections of the FCS Agents in the other six Extension Districts in Kentucky.

This research used whole-network survey analysis applying the social network approach, a conceptual model for explaining the communication of new ideas and information within an organizational network. Organizational networks are important structural elements of organizational systems and key to understanding diffusion of new programs within institutional organizations, such as the Kentucky Cooperative Extension Service.

Previous diffusion studies by Extension scholars have concentrated on the classic diffusion model of agricultural technology innovations with individual farmer adopters. Adoption of new programs and ideas is the process by which individuals in a social system decide to use the communicated new idea, program, and/or technology. This conceptual model describes the stages of diffusion through the attributes of the clientele adopters. The social network conceptual model describes diffusion through communication channels. Identified opinion leaders are matched with those who nominate them or closely identify with them in a diffusion network perspective to accelerate the diffusion process through an optimal pairing of network member with influencers.

Data were collected from the FCS Extension Agent network in an online survey "FCS Health Information Communication Network Survey" from July 1, 2011 – July 30, 2011. Participants were asked to rate each of their co-workers in their own district, and in each of the other six districts, on how often they go to each person directly for health education information. Hypothesis testing supports the use of opinion leaders, bridges

and communication structures within the social network structure of FCS agents for diffusing health programming within the Cooperative Extension Service.

KEYWORDS: Cooperative Extension, Diffusion of Innovation, Social Network Analysis, Organizational Structure, Health

Deborah Murray

April 12, 2012

ORGANIZATIONAL ADAPTATION THROUGH DIFFUSION AND SOCIAL NETWORKS: A STUDY OF FAMILY CONSUMER SCIENCES EXTENSION AGENTS

By

Deborah Adkins Murray

Dr. Lars Bjork, Co-Director of Dissertation

Dr. Wayne Lewis, Co-Director of Dissertation

Dr. Beth Rous, Director of Graduate Studies

April 12, 2012

To my greatest accomplishments: my husband, children, and grandchildren

ACKNOWLEDGEMENTS

This dissertation has been a life-long journey, one I dreamed of as an undergraduate and tucked away while I devoted my life to my family and career. As a result, I have two accomplished children and their spouses who have made education a priority in their lives. I hope the work that I have done on this journey of discovery will leave a legacy for their children and grandchildren; that education is far more than a career. Education has truly been a remarkable journey that I never undervalue. It has made a tremendous difference in my life.

The credit for the completion of this dissertation goes to many. My husband L.D. deserves his own honorary doctorate; he knew what this degree meant to me and would not allow me to quit, even at my darkest moments of dealing with a cancer diagnosis. He never pushed but would gently ask where I was in the process. My children provided inspiration through their show of encouragement and pride that I was attempting this monumental task.

I especially want to thank Dr. Joyce Logan, who although retired, kept encouraging me to finish my dissertation. Her many cards during my cancer treatments were an inspiration. She truly exemplifies the strengths of the University of Kentucky.

Dr. Björk's leadership classes helped me frame my study and he provided a tremendous amount of encouragement as I began the final leg of my dissertation journey. I appreciate Dr. Lewis' enthusiasm for my study and feel a special bond through our interests in social network methodology. My dissertation committee's support of my efforts and willingness to allow me to immerse myself in my study has been invaluable. I always felt their willingness to help.

Finally, I would like to thank the many leaders at the University of Kentucky and in the School of Human Environmental Sciences and Family and Consumer Sciences who have inspired me with their strength and commitment to discovery in our field.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

The purpose of this study was to determine if there was a correlation between the organizational social networks of a change agent, the University of Kentucky (UK) Cooperative Extension Service's Family and Consumer Sciences (FCS) Agent, and the early adoption of an innovative program, the Mental Healthiness in Aging Initiative (MHAI). The innovation was the adoption of the MHAI program. This study was based on the premise that program developers, who understand the influence of social networks of change agents in the adoption of an innovation or new program, can develop effective strategies in facilitating more rapid community and individual change.

Early references in Cooperative Extension programs focusing on youth, families, and communities addressed the influence of neighbors in the adoption of new ideas. Cooperative Extension scholars viewed the community as an extension of the farm community. Research in the social science disciplines of Cooperative Extension was found to be very limited (Rogers, 1963, 1995). However, diffusion research traditions have studied particular innovations from many disciplines including library science, medicine, public health, consumer product innovation, marketing, education, and technology. In 1995 (Rogers), this research interest generated more than 3,800 publications with 150 publications generated by Cooperative Extension scholars. Cooperative Extension research primarily focused on individual farmers and the diffusion process through individual adopter attributes. There is no focus on how the diffusion process occurs within the social networks of the Cooperative Extension organization with the mandate for diffusing new research, programs, and technology to clientele.

Background of the Study

Federal Enabling Legislation

The Morrill Acts of 1862 and 1890, the Hatch Act of 1874, and the Smith Lever Act of 1914 created the United States land-grant system. The Morrill Acts provided public lands for sale for the establishment of such colleges in every state of the nation. There are now more than 100 such universities. The Hatch Act of 1887 provided for agricultural research at the land-grant universities. Congressman Hatch from Missouri, sponsor of the Act, was concerned that the United States would not be competitive in world agricultural markets (Holt, 2007). Getting research results to poorly educated farmers in rural communities became a priority when the boll weevil began destroying the important cotton crop at the turn of the 20th century.

The 1909 Country Life Commission appointed by President Theodore Roosevelt set the stage for funding a national Cooperative Extension Service, commonly referred to as Cooperative Extension. President Woodrow Wilson signed the Smith Lever Act of 1914 providing funding to the land-grant universities through the United States Department of Agriculture for the establishment of state Cooperative Extension programs throughout the country. President Theodore Roosevelt's Commission on Country Life's final report in calling for the establishment of a national Extension system stated:

> It is to the Extension department of [the land grant] colleges, if properly conducted, that we must now look for the most effective rousing of the people on the land. . . . It is of the greatest consequence that the people of the open country should learn to work together, not only for forwarding their economic interests and of competing with other men who are organizing, but also to develop themselves and to establish an effective community spirit (Commission on Country Life, 1909/1911, p. 128).

County, state, and federal governments collaborated to give the people access to the wealth of knowledge generated by the land-grant institutions. The Smith-Lever Act of 1914 created the Cooperative Extension Service by providing local, state, and federal funding to support the dissemination of the research from the land-grant Universities to the people at the local level. The language of the Act included a statement "diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics and encouraging application of the same" (Section 1).

This federal legislation over the years has provided a uniform infrastructure that is recognizable from state to state. Land-grant colleges receive the credit for creating a food production system now in place in the United States that has contributed to the wealth of the country and is envied by the rest of the world (United States Department of Agriculture, 2011).

Kentucky Legislation

In Kentucky, the federal, state, and local partnership has been instrumental in the growth of Cooperative Extension. Federal formula funds in support of Kentucky Cooperative Extension in 2010 were $11 million (Henning, 2011). The state legislature provided $31 million in 2010 (Henning, 2011) to the College of Agriculture for Cooperative Extension funding, with local governments supporting local programs. The passage in 1962 of Kentucky legislation (KRS. 164.620) created extension districts with the authority to levy taxes in support of Cooperative Extension. These taxing districts have enabled Cooperative Extension to remain a viable force at the local level by contributing $41 million in 2010 (Henning, 2011) in direct support for county

programming, that enhances the College of Agriculture's prominence within the Commonwealth.

The University of Kentucky Land-Grant Mission

Kentucky Cooperative Extension. The Kentucky Cooperative Extension Service's website describes Cooperative Extension as the most comprehensive outreach program of the University of Kentucky (USDA, 2011). The Cooperative Extension state offices, located at a land-grant university, provide statewide leadership and service through a network of Cooperative Extension administrators, specialists, and faculty located on the University campus.

County Extension Agents are located in every county of every state. This network of local agents supported by specialists and administrators provides useful, practical, and research based information to address current issues and problems for agricultural producers, small business owners, youth, consumers, and others in rural areas and communities of all sizes (USDA, 2011).

Cooperative Extension in Kentucky has been entrenched in the Commonwealth since 1914. In 1917, there were forty-nine (49) agricultural agents and twenty-eight (28) home demonstration agents (Smith, 1980). Early work of these Cooperative Extension workers focused on producing and preserving food for the war effort. By 1919, there were seventy-four (74) agriculture and sixty-three (63) home demonstration agents (Smith, 1980). Today, there are more than 360 Extension agents and as many support staff working in all 120 Kentucky counties. Extension agents with educational expertise in the areas of agriculture, family and consumer sciences, youth development, and

community development diffuse research results utilizing diverse methods and technologies.

College of Agriculture. The network of county extension offices has provided the College of Agriculture with a direct link to the taxpayers and the political powers within the state. The Previous University of Kentucky (UK) administrators did not realize the potential within this low-key, yet extremely influential organization, until the separation of UK's community college system and the creation of a separate system. During Dr. Lee Todd's presidency (2001-2011), the last remnant, Lexington Community College, of the UK community college system transitioned from University of Kentucky control in 2004 and became part of the Kentucky Community and Technical College System. Until this time, UK presidents did not fully tap into the Cooperative Extension network as a resource for advancing the institution's initiative in better serving the citizens of the Commonwealth. This may have been due to influence from the Dean of the College of Agriculture or shortsighted because of their academic connections with the University's operation of the statewide community college system. With the separation of UK and the community college system, UK President Lee Todd recognized the importance of this extensive outreach network to the overall mission of UK.

The Cooperative Extension Service for more than a half century operated as a distinct organization within the College of Agriculture and has a deep connection with Kentucky's agrarian culture and to local people and their interests and concerns. The historically strong agricultural economy of the state has built a solid system of connection to the University of Kentucky. This rich history of accomplishment and political power can blindside the organization, making it a victim of its past and success and slow to

change (Belasco, 1990). The challenge to the College and Cooperative Extension is to maintain its agent and grassroots connections and support while changing to address the complex issues facing the constituents it serves.

Leadership. Agriculture administrators and professors have traditionally held the top leadership roles in the Cooperative Extension organization, even though it has a much more diverse program and employee base. The organization made 7.7 million contacts in 2010 with Kentucky citizens (College of Agriculture, 2010). Only 1.6 million contacts were adult and youth agriculture and natural resource program contacts.

During 2001, the College of Agriculture and Cooperative Extension changed leadership with the appointment of University President, Dr. Lee Todd, who appointed Dr. Scott Smith as Dean of the College of Agriculture and Director of the Cooperative Extension Service. The retirement of the Associate Dean for the Cooperative Extension Service, Dr. Walter Walla, and the appointment of his replacement, Dr. Larry Turner in January 2002, brought additional change. Both of these leaders were from agriculture disciplines. The University of Kentucky's Board of Trustees, under the leadership of Dr. Todd, began the task of developing a three-year strategic plan for UK. Immediately, Dr. Turner began the process of transforming Cooperative Extension, with substantial influence from Dr. Todd's leadership. The premature death of Dr. Turner in 2006 brought further changes and organizational stress within the system.

The External Environment

National Movement for Change

On a federal level, the Extension Committee on Organization and Policy (ECOP) Futures Task Force (1987) called upon Cooperative Extension to expand its efforts and

utilize the resources of the total university to tackle complex social and individual problems and spawned a multitude of journal articles and an impact on Cooperative Extension that has lasted more than twenty years. In an editorial article of the *Journal of Extension*, Dr. Roy S. Rauschkolb, Chair of ECOP and Director of the Arizona Cooperative Extension Service (1988), noted that in testimony before the ECOP Futures Task Force, some clientele perceived Cooperative Extension personnel as not having knowledge relevant to their needs.

In *Shaping The Future: A Strategic Plan For Natural Resources And Environmental Management Education, Cooperative Extension System's Base Program In NREM* (United States Department of Agriculture, 1994) a report of a strategic planning committee for agriculture programs of the Cooperative Extension Service urged the system to change. The committee recommended a decentralization of the structure with a strong feedback loop noting leadership was crucial to change. An organizational change study conducted in 1998 of thirty-four state Cooperative Extension programs and personnel (Betz, Marczak, Peterson, Sewell, & Lipinski, 1998) recognized that a positive environment of organizational learning, as described by Peter Senge (1999), was an important component of organizational change and the organization's view of the world. This 1998 change study identified a gap in what the system was doing versus what it should be doing. The feedback to a systems thinking-learning organization (Senge, 1999) and change from a current organizational environment to a new organizational environment brought need for a change in structure for better serving at-risk audiences.

Kellogg Commission

The National Association of State Universities and Land-Grant Colleges' (Now the Association of Public and Land-Grant Universities) Extension Committee on Organization and Policy (ECOP) published the report "The Extension System: A Vision for the 21st Century" (2002) in response to the Kellogg Commission report (2000) on the future of the land-grant university system. The Kellogg Commission challenged the land-grant institutions to engage communities to affect the quality of life within the states these institutions serve. This extensive change initiative (1996-2000) has spurred a multitude of state initiatives to institute change in an attempt to stimulate a movement that transforms the land-grant institutions and their ability to affect the economic and social well-being of the United States of America as well as the global community (Warner & Christenson, 1984). Cooperative Extension work has always been about change and affecting the economic and social well-being of communities. Early goals of Cooperative Extension work included public health, most notably good nutrition and home nursing (USDA, 2011).

Cooperative Extension enabling legislation and the Hatch Act of 1887, which created the agricultural experiment stations, directs Cooperative Extension to apply practical research knowledge. The Kellogg Commission (2000) identified this issue more recently as relevant in 1998 by directing the land grants to work with communities to solve problems.

An Internet search of state Cooperative Extension websites and the *Journal of Extension* provides a plethora of documents and reports from task forces, committees, and internal entities. These documents generated by a system known for its complex

culture of committee work and task forces, in many instances, bogged down the system making it inflexible and slow to respond to issues (Cooperative Extension Service, 2002).

The Cooperative Extension Service identifies its mission as a link between the counties of the Commonwealth and the State's land grant universities to help people improve their lives through an educational process focusing on their issues and needs (University of Kentucky, 2011).

Kentucky Environment

The vision as described in the Extension Manual (2011) states: "The Kentucky Cooperative Extension Service is the educational resource for all Kentuckians that serves as a catalyst to build better communities and improve quality of life (Section 1.1)." The manual directs new agents to assist people in identifying problems and solutions through new knowledge and assisting in the implementation of Extension programs. Cooperative Extension transfers knowledge by working with people in social networks. The Cooperative Extension System accomplishes this through a highly bureaucratic organizational network structure within the University of Kentucky's College of Agriculture as depicted in Appendix A.

During its ninety-plus year history, the organization has changed very little in basic structure and core values. Some administrators questioned the Cooperative Extension system's relevancy for the 21st Century referring to it as a 90-year-old agrarian artifact (Bull, Cote, Warner & McKinnie, 2004). These administrators recognized the need to involve all Cooperative Extension professionals in a leadership role. The challenge to the system according to 2004 ECOP Chair, Dr. Keith Smith, is to exert what Jim Collins (2001) calls fifth level leadership, one that focuses on building an

organization from what is best for the organization; not what is best for individual interests. Bull et al. (2004) warned the system with these words "Whether Extension will remain relevant in significant part, lies within each of us privileged to be Extension Professionals (conclusion section, para. 1).

The University

The University of Kentucky established as an 1862 land-grant institution to provide instruction in agriculture and the mechanical arts, provided access to higher education for common citizens in every state. The land-grant designation has lost much of its meaning to the masses as the University has grown to be the flagship university in Kentucky, with a student population of more than 26,000 students (The Carnegie Foundation for the Advancement of Teaching, 2010). The significant role the land-grant system has played in the diffusion of new technologies, mainly agricultural technologies, throughout the country has given way to the pressure of changes in public higher education focused more on life-long learning and engagement (Sherwood, 2004; National Association of State and Land-Grant Universities, 2008).

Goal VI of the University of Kentucky's 2003-2006 strategic plan (University of Kentucky, 2006) acknowledged the need to improve the health of Kentuckians. Objective number four of Goal VI stated that the university would expand the utilization of the Cooperative Extension Service to promote public health education. The language of this goal indicated the University administration's perception that Cooperative Extension was outdated and historically not involved with health education. The language of the goal inferred Cooperative Extension needed a change in structure. Goal V of the 2006-2009 (p. 8) University Strategic Plan focuses on building partnerships with communities to

elevate the quality of life of Kentuckians by building upon its time-honored responsibility for outreach and the institution's potential for accomplishing this (University of Kentucky, 2006). Cooperative Extension as the most extensive outreach program of the University has a major role to play in building partnerships with communities. The University reaches every county in Kentucky with an extension office located in each county seat.

Top 20 task force. In response to a legislative mandate for the University to become a national top 20 public research university, President Lee Todd established the Top 20 Task Force. This task force had a dual mandate to develop a strategy for national ranking and a strategy for improving the overall quality of life for Kentuckians. The Task Force (University of Kentucky, 2005) established measures for national prominence including the discovery, dissemination, and application of new knowledge. One indicator of success for the University included improvements to the health of the citizenry of the Commonwealth through outreach and service activities. Cooperative Extension, through the network of all 120 county Extension offices, can be an important venue for improving the health of Kentuckians.

Administration directed the Family and Consumer Sciences (FCS) program within Cooperative Extension to provide leadership for improving the health of Kentuckians through the diffusion of health information and evidence-based practices. Established in the spring of 2002, the purpose of the Health Education through Extension Leadership (HEEL) program was to improve health through innovation and change.

HEEL: The Cooperative Extension Change Model

It is within this environment of institutional change at the federal agency and university level that the Health Education through Extension Leadership (HEEL) program came into existence. The University submitted the original proposal for funding through the USDA-CSREES on February 12, 2002, listing the HEEL project as a collaboration of the University of Kentucky Medical Center, Kentucky School of Public Health (now the College of Public Health) and the College of Agriculture's Cooperative Extension Service. Justification for funding made available on May 15, 2002 included Kentucky's poor health status, the collaboration of the UK academic health centers and the unique position of Cooperative Extension with University county offices in every county of the state. In 2002, HEEL became a separate organizational structure with a director and a staff of Extension Specialists and Extension Associates under the direction of the Assistant Director of Family and Consumer Sciences.

Framework. The framework of the 2002 HEEL project created a structural diffusion change model bridging the infrastructure of the College of Medicine's School of Public Health with the College of Agriculture's Cooperative Extension Service (Scutchfield, Harris, Tanner, & Murray, 2007). At the core of the framework was *Healthy Kentuckians 2010* (Stapleton et al., 2000), Kentucky's response to *Healthy People 2010* (National Center for Health Statistics, 2001), a blueprint for increasing the quality and availability of community-based educational programs addressing prevention, mortality rates, and promotion of Kentucky's health and wellbeing.

The operational theory behind the HEEL change model is the diffusion of innovation theory. Utilizing the Cooperative Extension network system as the diffusion

system for creating community change, the objective of the program is to diffuse health interventions at a much faster rate than other community education and intervention programs.

Theoretical Framework

The diffusion of innovation theory, grounded in Cooperative Extension work, provides a foundation for how the organization interacts with those whom it serves. Based on research conducted from 1940 through the 1960s, the focus of Cooperative Extension scholars has been on the adoption of innovations in farming operations (Stephenson, 2003). Rogers (1963, 1995) referred to the diffusion process as the Extension Agents' "strategy for change" (1963, p. 69).

The diffusion of innovation theory was the theoretical framework for this study. Everett Rogers (1963) identified four main elements influencing the adoption process as being the innovation itself, the communication of the innovation, the innovation-decision process, and the social system.

Innovation

Attributes of an innovation will affect the rate of diffusion of new ideas and programs. Rogers (2003) noted that an idea or program is innovative if it is novel to the individual. Perception of "newness" (p. 12) determines how an individual reacts to it.

1. Relative advantage: Does the individual see the program as increasing effectiveness or providing economic benefit?
2. Compatibility: Is the program voluntary? Is it one FCS Agents choose to implement because of community needs or is it perceived as mandated by administration?

3. Complexity: Is the program compatible with other Cooperative Extension programs or similar to other programs implemented? Is it perceived as easy to implement?
4. Trialability: Do FCS Agents perceive the program as having choices of curriculum pieces that allows the FCS Agent to try the program without adopting the entire program? Do they perceive the program as having limited risk to their careers or clientele?
5. Observability: Do they perceive the program as having high visibility with community members as well as with the administrators who evaluate their performance?

These attributes of diffusion (Rogers, 1995) affect whether an innovation will be implemented.

Communication of the innovation. New programs diffuse through information exchanges between individuals. The process involves an FCS Agent with knowledge and/or experience of the new program, another FCS Agent without knowledge and/or experience with the new program, and a communication link, channel, through which information about the new program flows (Rogers, 2003).

Innovation decision process. Rogers (2003) refers to this element as time because time is a dependent variable. Five steps that characterize the process are dependent on time. There must be knowledge of the new program, persuasion to adopt the new program, a decision to adopt a new program, implementation of the program, and confirmation that the new program is integrated into the Cooperative Extension program.

The social system. Rogers (2003) defines the social system as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal (p. 23)." Social systems can be individuals, informal groups, organizations and subsystems within organizations, such as the FCS Agents, a subsystem of Cooperative Extension.

This theory, grounded in Cooperative Extension work, is appropriate for this study. Everett Rogers (1963), the most influential American scholar of diffusion theory, credits Cooperative Extension program evaluators with the beginning of diffusion research, noting that extension agents adopt the approach that they try to develop in their clientele. A greater understanding of the Cooperative Extension System network and the influence of social network connections within the organization will add to the knowledge base of Cooperative Extension.

A criticism of the Innovation Diffusion Theory is the presumption that innovation is always positive (Rogers, 2003), and there is a need to determine if social programs are actually new or just improved and therefore not actually an innovation (Bradach, 2003; Hartley, 2005).

Review of the Literature

The health education knowledge base for effectiveness of community interventions is limited. It is interesting to note that only five referenced research-based literature reviews informed *Healthy Kentuckians 2010.* The literature reviews focused on public health interventions without expanding on community-based family program development and design (Stapleton et al., 2000).

The elements of a diffusion system include innovators, change agents, opinion leaders, innovation decisions, and the consequences of innovation (Rogers, 1995). The influence of social networks on the innovation decision process and the relationship of the interconnections of the early adopters and non-adopters is of particular interest. In addition, the notion that early adopter FCS Agents' social networks within the Cooperative Extension organizations may be an attribute of the diffusion process is interesting. Rogers (1995, 2003) identified the attributes of an innovation as being variables that affect the rate of adoption for any given innovation. The network approach to the diffusion of innovations is a relatively new methodology. Using network analysis, complex mathematical formulas, to analyze the pattern of interpersonal communication in a social system, patterns of communication can be mapped (Valente & Davis, 1999).

Other studies have found some attributes associated with organizational social networks. From a study of high school principals (Holloway, 1977) on the attributes of new educational ideas within the educational system, a new social dimension emerged that Rogers (2003) refers to as the "status conferring aspects" (pp. 230-231) of the innovation. Early adopter FCS Agents may choose to adopt a particular program because it will provide them with a certain level of prestige among the peers in their social network. Status motivation may be more important to early adopter FCS Agents than to later adopters.

Studies of Cooperative Extension innovations have focused on individual adopters within client groups and not upon the diffusion of innovation within the organization of professional field staff. There is a need for studying the diffusion of innovation within the Cooperative Extension organization because the framework of

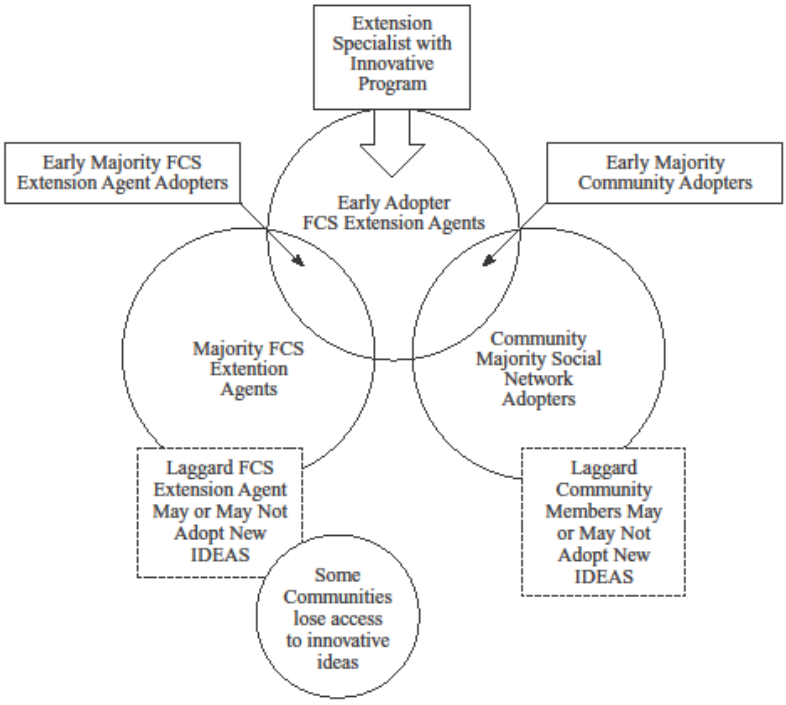
Cooperative Extension incorporates the theory in the foundation of the work of the organization. How can the organization spread innovation without understanding how innovation spreads within the ranks of those who are the change agents for local communities?

In Cooperative Extension, diffusion is not a linear process but a dynamic process that occurs at different levels over time in various subsystems of a larger diffusion system. Rogers (2003) categorizes adopters as early, early majority, late majority, and laggard adopters. This system of classifying categories describes characteristics of adopters based upon a normal distribution frequency (see Appendix B). Rogers (2003) describes early adopters as being more integrated into the organizational social system. Others in the organizational social system often follow their lead. Early majority adopters interact frequently with their peers and provide the interconnectedness in the system's interpersonal networks (Rogers, 2003, p. 284). Late majority adopters are skeptical and often adopt because of peer pressure. Laggards are the last to adopt and many are isolated from others in the social network from a lack of personal and/or organizational social network resources.

In the Cooperative Extension System, the communication channel (Rogers, 1995) for diffusing new curricula, technologies, and knowledge to professional staff, is through the formal organizational network and structure with FCS Agents adopting at different stages. FCS Agents either choose to participate in a new program or not. Rogers (2003) refers to this organizational diffusion process as optional innovation decision making. During these different stages of adoption, FCS Agents are change agents and influencers with the clientele in the counties.

Diffusion is not static and occurs over time within the Cooperative Extension network organization as FCS Agents gain greater knowledge and expertise with the innovation. As this is occurring, they become the change agents for early adopters within their communities. The influence of FCS Agent early adopters with the early and late majority adopters of FCS Agents results in diffusion of new programs occurring simultaneously within the Cooperative Extension organization social networks and the community social networks (Figure 1.1).

Figure 1.1. *The Innovation Diffusion Social Network Process: The Cooperative Extension System.*



Diffusion studies by Cooperative Extension scholars have concentrated on the classic diffusion model of agricultural technology innovations with individual farmers. This classic conceptual model describes the stages of diffusion through the stages of

adoption identified by Rogers (2003) as awareness, persuasion, trial, adoption, and confirmation of the adoption (behavior change).

The lens of this study viewed the Cooperative Extension diffusion network as a structural diffusion model composed of a multitude of social networks that create a network exposure to an innovation. Although a similar study examined factors influencing the adoption of a program by employees of a not-for-profit voluntary health organization, the March of Dimes (Goldman, 1992), no similar research has been conducted with an organization whose theoretical foundation is diffusing innovations through social networks.

Duke (2004) identifies three components of any change model as being initiating, implementing, and sustaining change. Rogers (1995) defines diffusion as a five-staged process of gaining knowledge, attitude change, adoption, or rejection of the change or innovation, implementation, and then confirmation. The HEEL change model focuses on initiating and implementing change through the development of innovative programs and resources through the Cooperative Extension System. This occurs by providing in-service training, educational materials, and incentives to FCS Agents to encourage a change in organizational attitude and culture. The purpose is to facilitate the adoption of new health curricula and programming.

Context of the Study

Kentucky continues to fall behind the improvements of other states, ranking 44th in the nation, according to the United Health Foundation (2010), in the health status of its citizens. The United States Department of Health and Human Services (Office of Disease Prevention and Health Promotion, 2011) new ten-year guidelines for 2010-2020 for

improving this country's health status will need to address the social environment. Rural areas attempting to implement a health intervention face unique difficulties, such as limited access to existing resources due to geographical distance, lack of transportation, or economic hardship (Hawley, 2006).

Because of the connection to the University of Kentucky, the 120 county extension offices are in an instrumental position to affect the health status of the state. Understanding the factors that influence the adoption of health curricula by county extension agents can provide Cooperative Extension administrators with a model for introducing other issue-driven programs and curricula to address effectively the innovation adoption patterns within the Cooperative Extension Diffusion System. Being able to frame the network attributes in a systems' perspective will provide a better understanding of the organizational dynamics that impact the diffusion process and allow for a better focus of organizational resources (Bolman & Deal, 1997).

Diffusion research traditions have studied particular innovations from many diverse disciplines. Cooperative Extension research primarily has focused on individual farmers and the diffusion process through individuals, mainly from University Extension Specialists and County Extension Agents to individual farmers.

Cooperative Extension, identified as a grass roots organization, has the expectation that local communities identify the issues they want Cooperative Extension to address. Much of the decision-making process is guided by County Extension Agents who are autonomous in their decisions regarding the curricula and programs they choose to conduct within their communities and counties. Gallagher (1967), University of Kentucky professor and director of the Center for Developmental Change in the College

of Agriculture during the 1960s, referred to the extension agent as a change agent performing four key roles in Cooperative Extension work: analyst, advisor, advocator, and innovator. The role of innovator is creating an innovation to satisfy a client's need (Gallagher, 1967). Change agents link client systems to knowledge systems and link needs with innovations within many disciplines (Gallagher, 1967; Napierkowski & Parsons, 1995; Thompson, 2006). The nature of the diffusion of innovation theory, and how it may influence the foundation and development of Cooperative Extension programs is an important area of study and provides an organizational framework for this study. Cooperative Extension is a complex organization, as are most modern organizations.

Current Study

The context of this study was the University of Kentucky Cooperative Extension Service's Family and Consumer Sciences program goal to improve the diffusion of new innovative programs through the network of FCS agents in every county of the state. The study contributes to the organization's knowledge of how the organizational social networks of FCS Agents implementing new programs impacts the diffusion of such programs in local communities. This study may not be descriptive of agriculture or youth-development agent organizational social networks. This study is particular to the State of Kentucky and the Cooperative Extension organization. It is not descriptive of other organizational networks, or other states' Cooperative Extension System.

Before looking at the structural and social networks of Cooperative Extension, it is important to understand the social and historical context of the MHAI program implementation. Cooperative Extension, a centralized diffusion model for outreach and

innovation, as defined by Rogers (1995), is concerned with changing the health of Kentuckians through a managed uniform approach. The Family and Consumer Sciences Agents' social system must first adopt the Mental Healthiness in Aging Initiative, as diffused through the Cooperative Extension System, before any diffusion can occur with their clientele. Community diffusion of knowledge programs is more highly decentralized with FCS agents having the dual role of community change agents as they themselves are adopting the MHAI at various adoption levels. This study predicted that the connectedness to the FCS organizational network was an attribute of diffusion affecting the adoption of the MHAI by FCS Agents.

This study was a follow-up study to the HEEL Mental Healthiness in Aging Initiative (MHAI) funded by the USDA Rural Health and Safety Program (Murray & Zanjani, 2007). The MHAI was a multifaceted social marketing program designed to promote community awareness of mental health in relation to aging in Extension District 1 in Eastern Kentucky. The study personnel predicted that Cooperative Extension, as the diffusion network, would rapidly diffuse innovative messages about mental health.

The MHAI pilot study personnel included the researcher and a colleague, (Murray and Zanjani). Study personnel recruited through email twenty-one (21) FCS Agents from the counties in the Cooperative Extension District 1. The premise was that early adopters for mental health programming within the Cooperative Extension organization would naturally emerge according to Roger's (2003) curve for adopter categories (see Appendix B). Thirteen agents in twelve counties volunteered to participate in the pilot (Figure 1.2). Study personnel dropped Carter County from the study following initial focus group data collection because the FCS Agent in Carter County left her position.

Figure 1.2. *MHAI Pilot Counties in Eastern Kentucky*

The goal of the MHAI was to build the capacity of the community to deal with the mental health issues of older community members. The fact that residents of the remaining eleven (11) pilot counties reported feeling significantly more able to help older adults with a potential mental illness than those not in the pilot counties indicates that the key message of the MHAI was diffused in those counties (Kruger, Murray & Zanjani, 2011; Zanjani, Kruger & Murray, 2011).

Mental Healthiness and Aging Initiative Study

The MHAI (Murray, 2007) tested the theory that complex health messages could be diffused more rapidly by utilizing the Cooperative Extension Diffusion System. This initiative aimed to improve the health of elder rural adults (persons aged 65+ years of age) by developing community relationships in rural areas of Kentucky through partnership with Family and Consumer Sciences (FCS) Extension Agents; creating

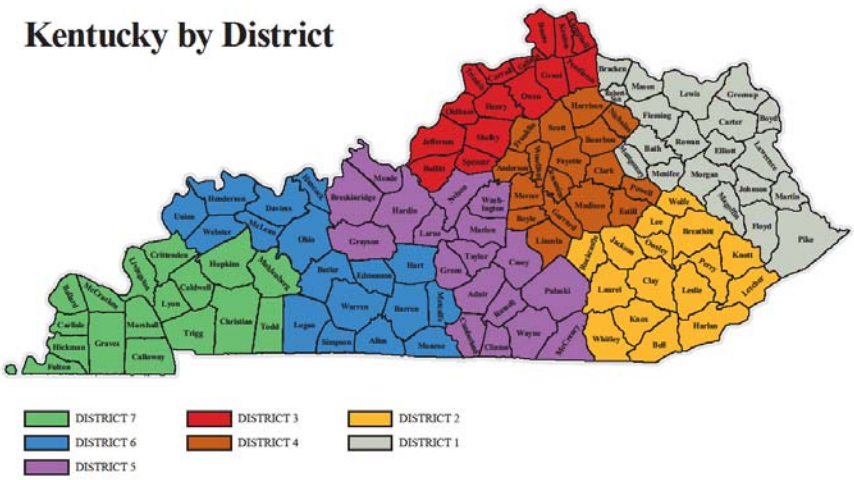
discussion in the community regarding mental health and aging; and implementing a community mental health and aging awareness intervention program.

The MHAI awareness intervention program strived to communicate key messages and increase knowledge surrounding positive mental health and aging. Implementing this project was a salient step toward decreasing mental health-related disadvantages experienced by elders, particularly those residing in rural communities (Glasglow, Morton, & Johnson, 2004; Mainous & Kohrs, 1995).

When comparing three groups from a random telephone survey (N=774) in twenty-seven (27) control counties, twenty-nine (29) media intervention counties, and eleven (11) full intervention counties, results indicated the full intervention counties agreed more with being able to assist elders who may have a potential mental illness when necessary (Zanjani et al., 2011; Kruger et al., 2011). The MHAI also demonstrated that community interventions on mental health could occur within majority rural regions. The MHAI study provided evidence supporting the effective use of the Cooperative Extension Diffusion System for the diffusion of complex health messages.

The MHAI study did not evaluate the factors that contributed to the diffusion of the MHAI. This current study examines the influence of organizational social networks as a factor in the early adoption of the program. This study will examine organizational social networks in other Cooperative Extension Districts of Kentucky for similar network characteristics for potentially utilizing the Cooperative Extension Diffusion Network more efficiently for more rapid diffusion of key health messages and programming. The Extension Districts were established in 2003 from fourteen (14) former organizational structures into seven (7) districts shown in Figure 1.3.

Figure 1.3. *Kentucky Cooperative Extension Districts*



Purpose of Study

The purpose of this study was to examine the influence of social networks on the adoption by Family and Consumer Sciences (FCS) Agents of the Mental Healthiness and Aging Initiative (MHAI) pilot conducted in eleven (11) eastern Kentucky counties between October 2007 and April 2009. Additionally, the purpose of this study was to examine the interconnectedness of social networks of the early adopter Family and Consumer Sciences (FCS) Agents of the Mental Healthiness and Aging Initiative (MHAI) pilot conducted in eleven (11) eastern Kentucky counties during October 2007 and April 2009.

The research questions evolve from the framework of Cooperative Extension as the diffusion social network system. University faculty members serve as the innovators with the Health Education through Extension Leadership program (HEEL) with staff as the system change agents, introducing the new program to the organizational social network of FCS Agents. The staff members of the HEEL program, as the system change

agents, encourage the adoption of new programs by the local change agents, the FCS Agents. The Cooperative Extension System is the communication network controlling the innovation process.

The research questions pertinent to this study include:

1. Are there similarities in the organizational social network connectedness and attributes of FCS Agent early adopters of the Mental Healthiness in Aging Initiative (MHAI) and the FCS Agent non-early adopters in the Extension District 1 organizational social network?
2. Are the organizational social network connectedness and attributes of the FCS Agents in the seven (7) Extension Districts similar?
3. Are there bridges in the social networks of the FCS Agents that could influence the early adoption of new health programs across District networks?

This study sought to find patterns of FCS organizational social network connectedness among all of the Extension Districts that may better explain why some FCS Agents choose to be early adopters of new health programs.

Research Design

This study used a quantitative research design to gather data on the communication patterns in the social network of the FCS Agents employed by the University of Kentucky Cooperative Extension Service.

Data Collection

The study recruited 115 FCS Extension Agents in the Kentucky Cooperative Extension System via email (See Appendix C) to participate in an online survey from July 1, 2011 – July 30, 2011. The email included a direct link to the FCS Health

Information Communication Network survey website on the secured UK server. The data were collected using a list of all FCS Extension Agents from the public listing of all Extension Agents in the Field Staff Directory (see Appendix D). The survey instrument instructed the FCS Agents check their level of education completed, the year they earned their highest degree, the length of time in their current county, the Extension District they are currently in and other Extension Districts they have worked.

Recruitment began with an email to FCS Extension Agents sent by Dr. Ann Vail, the Director of the School of Human Environmental Sciences and with another email sent by Deborah Murray, the study investigator (see Appendix C).

Population. The target population is all Cooperative Extension employees with the title of County Family and Consumer Sciences (FCS) Agents employed by the University of Kentucky's College of Agriculture (N-115) as of July 1, 2011.

The Family and Consumer Sciences program resides within the School of Human Environmental Sciences (HES) within the College of Agriculture. The HES website defines the program as:

> Family and Consumer Sciences Extension improves the quality of individual and family life through education, research, and outreach. This multidisciplinary field focuses on building assets of individuals and families to address the perennial problems faced across the lifespan. Family and Consumer Sciences Extension operates within an ecological framework with the basic needs of food, clothing, and shelter at its core. The next level emphasizes well-being with a focus on human development, parenting, resource management, nutrition, health, and aesthetics. At the community level, Family and Consumer Sciences Extension prepares individuals for community and economic development and activity. Professionals in Family and Consumer Sciences Extension enable individuals and families to develop capacity for strengthening families and building community for an ever-changing society (School of Human Environmental Sciences, 2007).

The programs of Cooperative Extension are community based, and extension agents are managers of programs with a great deal of autonomy in the adoption of programs to address locally identified needs.

Data analysis. Analysis used a network model based in network analysis assumptions, network theories and methodology for analyzing collected data to answer the research questions. Numerical data was downloaded as an Excel file and imported into IBM SPSS 20 software, and UNICET 6 (Borgatti, Evertt. & Freeman, 2002) social network analysis software. Mathematical equations identified patterns and regularities that measure structural properties of networks, and/or relational properties of actors within networks (Marsden, 2005). NETDRAW (Borgatti, 2002), a visualization software package, was used to graph the survey data.

Limitations of the Study

This study is limited to one aspect of the decision-making process, that of the influence of organizational social networks on early adopter FCS Agents adopting the MHAI program. The Cooperative Extension system has a diverse group of county extension agents, many of them involved in implementing parts of health programming; this study focuses on the Family and Consumer Sciences (FCS) Extension Agents within the larger Kentucky Cooperative Extension Service field staff (see Appendix D). The purpose of this study is to examine diffusion social networks within one subsystem of a larger diffusion system. The study's assumption that the MHAI is a new and innovative program is a limitation of the study. The flow of federal dollars for program support expects that innovation will occur. There is value in recognizing improvement in existing

programs and not reinventing the wheel, even though funding sources are more interested in investing in potential innovations (Braddach, 2003).

Concentrating on attributes of successful innovations might prevent us from greater knowledge by concentrating on the attributes of failed innovative programs (Hartley, 2005). A limitation of this study is the concentration on a successful diffusion program, the MHAI program. Another study on the failures of FCS Agents to adopt or to discontinue implementation of the MHAI program might have additional value to the Cooperative Extension System.

Significance of this Study

In the Summer of 1993, the editor of the *Journal of Extension* (Ritter), noted the importance of theory in the practice of Cooperative Extension work in a post-modern society and advocated the use of conceptual frames for organizational change. Today, universities with formal educational programs designed to prepare Cooperative Extension educators are incorporating the diffusion theory as a core competency in educational programs (Scheer, Ferrair, Earnest, & Connors, 2006). One would expect to see more Cooperative Extension studies on the application of the theory to diverse disciplines within the expanding missions of the land-grant universities and their focus on total university engagement. A search of the literature did not reveal new Cooperative Extension studies.

The role diffusion theory plays in innovation and change in organizations is an identified gap in the diffusion research (Goldman, 1992; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 1995) . The diffusion of innovation theory, grounded in Cooperative Extension work, provides a foundation for how the organization interacts

with those whom it serves. Based upon research conducted between 1940 through the 1960s, the focus of Cooperative Extension scholars has been on the adoption of innovations on farm operations (Stephenson, 2003).

Early references in Cooperative Extension programs focusing on youth, families, and communities addressed the influence of neighbors in the adoption of innovation process. Cooperative Extension scholars viewed the community as an extension of the farm community with research in the social science disciplines of Cooperative Extension work being very limited (Rogers, 1963; Way, 2001). The study of organizational social networks will provide a better understanding of the diffusion process in organizational theory. An understanding of the influence of social networks as an innovation attribute on adoption of a new innovative health program, such as the MHAI, can improve program development and more effectively target complex health-behavioral change programs targeting populations.

CHAPTER TWO: LITERATURE REVIEW

Introduction

This study sought to find patterns of FCS organizational social network connectedness among all of the Extension Districts that may better explain why some FCS Agents choose to be early adopters of new health programs.

The research questions pertinent to this study include:

1. Are there similarities in the organizational social network connectedness and attributes of FCS Agent early adopters of the Mental Healthiness in Aging Initiative (MHAI) and the FCS Agent non-early adopters in the Extension District 1 organizational social network?
2. Are the organizational social network connectedness and attributes of the FCS Agents in the seven (7) Extension Districts similar?
3. Are there bridges in the social networks of the FCS Agents that could influence the early adoption of new health programs across District networks?

Chapter Purpose

The purpose of this chapter is to review the literature, as it relates to this study, on organizational structure, organizational leadership, the diffusion of innovation, and the role social networks have in diffusion of innovation to provide a framework for studying organizational social networks within Cooperative Extension as a diffusion system. The chapter will review theoretical concepts related to organizational structure, leadership, diffusion processes and social networks as they emerged from work specifically related to rural populations and applied to Cooperative Extension.

Organizational Structures

It is important to understand organizational structures as a foundation for understanding diffusion processes in complex organizational systems such as Cooperative Extension. In looking at organizational structure in which change and diffusion processes occur, the questions asked are what should the structure look like? How should it work? How will it deal with the most common structural questions of specialization, department alignment, span of control, and coordination?

Organizational Structure Configurations

Different configurations of organizational structures identified by Mintzberg (1979) include simple structure, machine bureaucracy, adhocracy, divisionalized form, and professional bureaucracy. How an organizational structure functions will affect the complexity of the diffusion system at work (Valente, 1995). Success or failure of diffusion of an innovation within the organization, over time, depends on how well aligned the innovation is with the organization's task, technology and environment.

Simple structure. The simple structure works in small operations where there is direct supervision and close working relationships with employees or group members. Authority figures in the simple structure control all operations as well as any innovation or change that may or may not take place. The ability to innovate is tightly controlled by authority figures.

Machine bureaucracy. The machine bureaucracy capitalizes on standardized procedures with decisions being made at the top of the organization and carried out by employees. The United States Postal Service is an example of a machine bureaucracy in a

government agency. The lack of innovation in this agency is resulting in a grim outlook and future demise, and is a weakness of the machine bureaucracy (Bolman, 1997).

Adhocracy. The adhocracy is a flexible organization that achieves its goals through lateral means, and often are the innovative organizations because of the "organizational tent" (pp 68-69) approach to organization structure (Bolman, 1997). The Google Corporation, the foremost innovator of internet search engines and internet applications, is an example of an adhocracy organization.

Divisionalized form. The divisionalized form achieves its goals in self-functioning units. Large research universities, such as the University of Kentucky, are divisionalized forms of organizational structure. Within the university environment, there are colleges that operate as "quasi-autonomous" (Bolman, 1997, p. 66) units such as the College of Agriculture and the medical campus. Innovation occurs within the units that generally operate without much interference from the president or provost's office as long as they operate within the parameters of the institution.

Professional bureaucracy. Cooperative Extension within the College of Agriculture is an example of a professional bureaucracy, concentrating on professional training and indoctrination. The operational core (Mintzberg, 1979), such as the FCS Agent network is large in comparison to other parts of the structure. Professional bureaucracies are slow to respond to changes (Bolman, 1997). Diffusion occurs through the networks of the organizational structure.

Components of Organizational Structure

Mintzberg (1979) identifies five major components of organizational structure: the operating core, strategic apex, middle management, the technostructure and the

support staff. These different components of the organization affect the diffusion of new programs within organizations at different points in the diffusion process.

Operating core. The members of the organization who do the basic work of the organization comprise the operating core. They produce and implement the programs of organizations important to the survival of the organization (Mintzberg, 1979). If they do not adopt and implement new ideas and/or programs, diffusion of innovation does not happen.

Strategic apex. The administrators of the organization responsible for the operation of the organization are the strategic apex. This person or persons (executive committee) are responsible for the mission of the organization and provide leadership for what gets accomplished in the organization (Mintzberg, 1979). The strategic apex formulates organizational strategy to address organizational environments affecting what new ideas or programs diffuse within the organization.

Middle management. Middle managers link the operating core with the strategic apex through authority coordinating the work of the organization. Because middle managers are supervisors and perform the same duties of the strategic apex within one unit of the organization, much of what gets done in an organization is controlled by middle managers (Mintzberg, 1979). Middle managers may or may not support new programs and through performance evaluations send strong messages to employees about new program efforts.

Technostructure. The technostructure provides the professional staff such as specialists who support the work of the operating core. This group within the organization plans and designs new programs as well as trains the operating core to

deliver new programs (Mintzberg, 1979). This level of an organization provides innovative ideas and approaches to the organization's mission. Innovation often begins at this level of an organization.

Support staff. As organizations become more complex, support staffs become more specialized and more numerous often taking on the role of implementing new ideas and programs with clientele. These persons can serve as influencers of the target audiences of new programs and have an impact on the diffusion of new programs. Cooperative Extension employs program assistants in various programs who work directly with clientele.

Organizational Theories

Because organizational structure controls the diffusion of new ideas and programs within organizations, it is important to apply theory for understanding organizational structures. According to Rowan and Miskel (2000), new institutionalism draws from the curricula of economics, political science, and sociology identified by Bolman and Deal (1997) as a four-frame model useful in analyzing organizational structures in complex organizations such as Cooperative Extension. Rowan and Miskel (2000) explain the rise of educational (professional) bureaucracies, by identifying concepts of the structural, human resource, political and symbolic theories. These institutional frames provide a reference for leaders to understand diffusion processes in the complex organizational structures of organizations such as Cooperative Extension that exist within large institutional settings.

The External Environment in Organizational Structures

Complex organizations such as Cooperative Extension are composed of many different actors, individuals, managers, public agencies, corporations, special interest groups, and others. The environment is a strong influence on the structure of the organization. Organizations deal with instability and volatility in the environment by developing sophisticated new structures to deal with emerging problems in the environment (Bolman, 1997). Understanding these factors from different perspectives is important for understanding how diffusion occurs in organizations. Bolman and Deal (1997) identified four frames for understanding organizations; the structural, human resource, political and symbolic frames. These frames provide tools for analyzing different situations within the organization. Structures buffer organizations from interferences in the environment and provide stability (Bolman, 1997). This also can hinder diffusion processes.

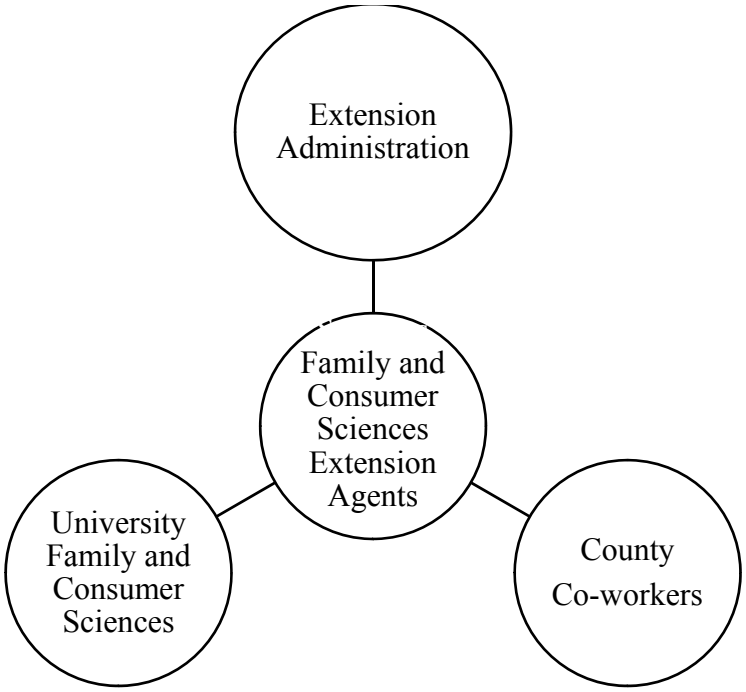
Structural Frame

The structural perspective (Bolman, 1997) views the structure of an organization as a "blueprint" (p. 38) for the pattern of how individuals and their constituencies interact. Sociological aspects of institutional theory (Bolman, 1997; Rowan, 2000) view organizations as natural and open systems that exist in social environments. The principles of scientific management assert that the output of the individual marks the improvement of the world (Taylor, 1916). Several factors influence the output of the organizational structure and affects how innovative an organization will be.

Figure 2.1 depicts the actors in the institutional arrangement of FCS Agents within the formal network of Cooperative Extension. FCS Agents are within the

operating core of Cooperative Extension and their ability to innovate is controlled by the operating apex, administration, and the technostructure of Family and Consumer Sciences state staff. Support staffs at the county level also have significant influence on the FCS Agent's ability to adopt new programs.

Figure 2.1. *Formal Family and Consumer Sciences Organizational Networks*



These institutional arrangements (Rowan, 2000) play a key role in shaping the collective action of institutions such as Cooperative Extension, impacting the diffusion of innovations within the organization.

Economic factor. The economic aspect of the institutional frame views the organization as acting to maximize the value or profits of the organization (Bolman, 1997). Two principal parts of the economic basis of the institutional theory are the principal-agent theory and transaction cost economics. Principal-agent theory explains that employees are agents of the employer and act in the employer's best interests.

Transaction cost economics are the costs of employing agents who act on behalf of the employer. Principle-agent theory and transaction cost economics explain the governance of organizational economic exchanges between Cooperative Extension and the United States Department of Agriculture (USDA), as well as with state and local governments (Rowan, 2000, p. 360).

These governance exchanges add another dynamic to the diffusion process in terms of resource allocation. According to the 2002 Kentucky Report (Jackson, 2003) the budget was $62 million with 81% of the budget coming from state and local taxes (45% of the revenue received from the state budget and 36% from county taxing districts). Federal dollars from the USDA funded nineteen percent of the 2002 budget. By 2006, the budget had grown to $77.7 million with the county contribution growing to 37% of the budget and the state budget contributing 39% of the total budget (Smith, 2007). In 2006, the federal USDA contribution dropped to 13%. In 2010, the budget was more than $98.5 million with 42% being derived from local tax dollars; and state support dropping to 31% of the total budget support (Henning, 2011).

The economic advantage of different stakeholders within the organization influences the stakeholder expectations for the program and directly impacts the kinds of innovations an organization is capable of diffusing. This form of reward power (French & Raven, 1959; Kipnis, 1976; Yukl, 2002) in the form of providing financial resources for the organization can drive the agenda of the organization. There is also the potential for the organization to operate on a parallel basis with these stakeholders exerting influence as well as being influenced (Kipnis, 1976).

Regulation. The regulatory aspects of institutions evolve around rules, policies, procedures, and codes of conduct creating the formal structures of organizations. Not only do university and college policies and procedures regulate Cooperative Extension, but the Cooperative Extension System also maintains a policy handbook of its own, creating an organization that is highly regulated. This fifty-page manual has fifteen operational policies that range from personal work habits and conduct to detailing responsibilities for working with county fair boards and other agencies (University of Kentucky College of Agriculture Cooperative Service, 2011). These policies control the culture of the organization and its ability to adopt innovations that do not conform to Cooperative Extension policies and structure.

Human Resource Frame

The human resource perspective views the organization's purpose in terms of human needs. Cooperative Extension identifies its mission as one of solving people's problems. This frame views organizations through the individuals who make up the organization with relationships of employees being highly valued. Cooperative Extension often refers to members of the organization as the Extension Family. Relationships are important to this frame (Bolman, 1997). Because diffusion occurs within networks of people, this perspective is important to understanding organizations in terms of the relationships that exist within the organization.

Levels of internal support in the organizational climate were found to be the most important factor in the dissemination and level of implementation of evidence-based physical activity programs in forty-nine state health departments in the United States (Brownson et al., 2007). Internal support was a greater factor than external support from

legislators and governors. Budget restraints were the most important factor related to the decision to adopt process. A study of Community Health Centers (CHC) in North Carolina, an institution managed by the United States Bureau of Primary Health Care, found that direct personal involvement of the organization's leadership was an important factor in the adoption of a mandated diabetes registry (Helfrich, Savitz, Swiger, &Weiner, 2007). These CHCs adapted organizational policies to accommodate the mandated innovation. A review of the *Extension Manual* (2011) does not indicate any policy changes conducive to adopting innovative programs or ideas within the organization.

Political Frame

The political frame (Bolman, 1997) views organizational processes as being fluid and the result of the actions of autonomous individuals and interest groups who are pursuing their personal interests in a political arena. It views bureaucracies as taking on their structure in order to protect their "political property rights" (Rowan, 2000, p. 361). Rogers (2003) attributes Cooperative Extension's success to the organization's ability to adjust to the environment and its political connections to the American Farm Bureau Federation and other elite farm leaders. These stakeholders' strong support of Cooperative Extension programs influences its organizational structure. According to Bolman and Deal (1997), the political frame views organizations as comprised of competing individual and group interests. The political frame tells us that organizations are coalitions of members with differences; that most decisions involve scarce resources; and the combination of these factors cause conflict resulting in power being an important

resource. “Bargaining, negotiation, and jockeying for position among the stakeholders” is how decisions are made (Bolman, 1997, p. 163).

The political frame views authority as only one among many forms of power (Bolman, 1997). Gamson (1968) identified those with authority and subordinates as the major players in the political process. Managers in Cooperative Extension with formal authority often depend on social control that can inhibit adoption of new programs or ideas in an organization that contradict the social and cultural norm of the organization (Bolman, 1997).

Symbolic Frame

Institutions succeed because of conformity to institutional rules and procedures (regulatory) and symbolic conceptions of the organization (normative) as well as the ideological foundations of the organization (cognitive) that give order to those in the organization (Bolman, 1997; Rowan, 2000). Bolman and Deal’s symbolic frame (1997) explains how the culture of an organization, as a process, re-creates as new employees learn the ways of the old employees. Symbols define an organization and express the organization’s culture. This conformity or formalization that gives order to organizations can also hinder innovation (Rogers, 2003).

Organizational Leadership

Organizational Culture

The normative aspects of institutions include those informal norms and values that shape the culture of the organization. These informal rules carry meaning to those connected to the organization and determine much of the behavior of the actors (Bolman, 1997; Rowan, 2000).

These cognitive schemata or scripts are actions institutionalized among those connected with the organization and contributes to the difficulty of initiating change and innovation (Bolman, 1997; Rowan, 2000). These scripts are patterns of social actions that repeat themselves according to some orderly set of rules ingrained within the culture of the organization. Other states, but not Kentucky, have conducted studies of the organizational culture of Cooperative Extension. Safrit, Conklin, and Jones (1995) found the organizational values in North Carolina and Ohio to be similar and based in the land-grant mission. The value of having practical high quality programs that solve people's problems was also important in New Mexico (Seevers, 1999). The philosophy of Kentucky Cooperative Extension as stated in the *Extension Manual* (2011) reflects these same values.

Coercive Isomorphism

The concept that organizations conform to rules and regulations that are congruent with the norms and values of the larger social system theorizes that organizations within the institutional environment become homogenous (isomorphism), creating "institutional sectors" (Rowan, 2000, p. 366). Coercive isomorphism is homogeneity occurring because of regulations imposed by legal or agency entities, such as those policies in the *Extension Manual* (2011).

Normative Isomorphism

Organizations who hire employees with certain credentials often are known for normative isomorphism, which occurs by professional codes of conduct that directly affects the behavior of employees creating homogeneity of organizations and institutions, such as the Kentucky Association of Extension Family and Consumer Sciences Agents.

Mimetic Isomorphism

Mimetic isomorphism occurs when organizations mimic the behaviors of successful organizations. Because of the historical presence of the USDA in the early evolvement of the Cooperative Extension System, there is similarity among the systems in every state. Isomorphism creates interconnectedness which is positively correlated to innovation (Rogers, 2003). The rules and regulations, professional identities of the employees, and the mimicking of other organizations constrain leadership within isomorphic organizations, and this controls the kind of innovations an organization will adopt.

Organizational Leadership and Diffusion of Innovations

Leadership in an organization directly affects the organization's ability to adopt innovative ideas or programs. The Cooperative Extension organization has many administrative positions, which affords those in these positions the ability to provide leadership and management of innovation in the organization. Bennis and Nannus (1985) differentiate between a manager and a leader. The manager does things right and the leader does the right thing. The manager is most concerned with carrying out policy, rules and regulations in the day-to-day operation of the organization. The leader creates vision and focuses the activities of the organization on that vision.

The Cooperative Extension organization refers to itself as an agency of change with Cooperative Extension agents and specialists as change agents, those who influence clients in the decision making process of adopting or not adopting an innovation serving as links between the resource system and the clients (Greenhalgh et al., 2004; Rogers, 2003) . Understanding how Cooperative Extension does this occurs by examining

leadership and the organization through different frames of perspective. This allows the transformational leader (change agent) to think differently about the organization and assists the leader in communicating and leading change or innovation.

Leadership Power

Leaders in organizations have several sources of power that influence the adoption of new ideas or programs that are framed in social influence theories. French and Raven (1959) identified these sources of power as being reward power, coercive power, legitimate power, expert power, and referent power. These sources of power are a function of the organizational structure (Bolman, 1997; French, 1959; Pfeffer, 1981), a result of the division of labor in complex organizations. Those within Cooperative Extension who are operating as change agents use different types of power depending on their assessment of the diffusion processes at any given stage of the process.

The leader must be able to interpret the situation and then apply the appropriate skills to influence others. Skills to influence others involve rational persuasion, exchange tactics, legitimate requests, pressure tactics, and personal appeals. These influence tactics correspond to French and Raven's power taxonomy (1959) of the five different types of power identified as reward, coercive, legitimate, referent, and expert (pp. 321-326).

Reward power. The ability to reward employees known as reward power is dependent upon the substance of the reward. The use of pay increases and better performance evaluation measures is a power of supervisors that affects whether an employee will adopt an innovative program. If the supervisor views the innovation positively, the potential of rewards for the employee is much greater. Reward power can sustain the innovation when the reward is no longer available (French, 1959).

Coercion power. The perception of negative consequences for not participating in a new program is coercive power used by supervisors potentially pressured by the strategic apex of an organization that needs or wants employee buy-in. This makes the new program dependent on the supervisor. A change in supervisors could mean lack of support for the new program.

Legitimate power. This power is often difficult to determine because it is culturally based and can reside in position or characteristics of the leader. This type of power is often embedded in the social structure of the organization, involving a hierarchy of authority. The culture of Cooperative Extension respects positions of authority giving certain positions legitimate power. Other forms of legitimate power result from respect for expertise of the Cooperative Extension specialist and/or faculty, or from elected positions within FCS Agent Association positions.

Referent power. Referent power, identifying with the leader or group, is based in relationships, and confers prestige to be associated with a person, group or an organization. The greater the referent power of a change agent or early adopter, the more likely others will adopt the new program or ideas of the change agent. Being connected with the University of Kentucky confers a certain level of referent power.

Expert power. This power is dependent on the ability of the leader to provide information. Power and influence is limited to the expertise of the leader and does not extend to other areas of influence. If followers see the leader as having superior expertise in the innovative program, adoption of new programs or ideas will occur.

Leadership and Influence

Members of any organization have options in exercising power or asserting influence. According to Kipnis (1976), the institutional setting affects the choice of the kind of power members of the organization use and those managers and leaders with more sources of institutional power were better able to influence others within the organization. Cooperative Extension hires FCS Agents with degrees from a multitude of institutions, which may influence the degree of institutional power they have within the larger University of Kentucky and College of Agriculture institutions.

Change agents and influencers. Mintzberg (1983) refers to organizations as power games in which influencers seek to control the organization's decisions and actions. Influencing others involves more than power. Yukl (2002, pp. 168-170) states the leader's ability to influence others is moderated by the leader's position power and personal power, both of which tend to enhance the effectiveness of any influence attempt.

The vertical dyad linkage theory describes the relationship between supervisor and subordinate and how different relationships form between a leader and subordinates over time. This theory tells us that the leader usually forms special relationships, "high exchange," (Yukl, 2002, p. 116) with some employees that serves to influence the employee as well as the leader. According to Yukl (2002), the leader's favorites may be perceived as getting more benefits that can result in alienation, apathy and hostility among the other members of the diffusion system with less influence, "low exchange," with the leader (Yukl, 2002, p. 116).

Yukl (2002) states that too much position power can be as detrimental as too little. Corruption often results from position power when managers or leaders use it to

dominate and exploit subordinates. Leaders with greater reward power perceive subordinates as objects of manipulation, devaluing the worth of subordinates, and use rewards more often to influence subordinates (French, 1959; Kipnis, 1976; Yukl, 2002). In diffusion systems, the types of power that a leader holds will affect the influence the leader has on the diffusion of any given program or idea in an organization. The different types of power held by middle managers and program leaders in Cooperative Extension have an impact on the FCS Agent network and may explain why some FCS Agents have more connectedness to the network than other FCS Agents.

Teamwork Leadership

Groups or teams accomplish much of the work of organizations. One of the key ingredients of any top performing team is an effective structure of roles and relationships focused on attaining common goals (Bolman, 1997). The right group structure depends upon what the organization is trying to accomplish, who should do what, how decisions should be made, and who is in charge (Bolman, 1997). Coordination of efforts and the values of individual members of the group concerning such things as quality, time, and participation, affect the type of organizational structure that will bring about the desired innovation.

The structure of teams is related to the structure of the institution. Often organized teams reflect the structure of the parent organization. However, successful teamwork depends on the right structure for the task to be accomplished (Bolman, 1997). Structure should depend upon the nature of the task and the degree of interaction of the team members to accomplish the task (Mintzberg, 1979).

Teamwork is a mechanism of organizational behavior and a power game (Mintzberg, 1983). The best structure for the diffusion of innovation is dependent on organizational behavior and the type of organizational diffusion system in place. Rogers (1962) classical diffusion system based on the success of the agricultural Extension Service (Ryan, 1943) was grounded in the expert driven, top down, centralized diffusion system. It is a linear communication system. In 1971, Schön challenged this theory with the idea that diffusion is more complex and occurs horizontally not vertically among networks. These systems are client controlled, but can combine with centralized diffusion systems for more effective diffusion processes (Rogers, 2003). These decentralized diffusion systems are not appropriate for diffusing innovations that require a lot of expertise such as health education programs (Rogers, 2003).

Centralized Diffusion Systems

Decisions to innovate and diffuse in centralized diffusion systems are made by members of the technostructure fairly close to the strategic apex of the organization (Rogers, 2003). Bolman and Deal (1997) describe the management of teams in centralized diffusion systems as simple, dual authority, and hierarchal structures.

Simple structure. The one boss (team leader) arrangement is a top down direct authority model appropriate for simple tasks when there is direct authority to get the job done. This generally is not effective for diffusion as it is top-driven, time sensitive, and task focused as diffusion occurs within social networks (Rogers, 2003; Valente, 1995).

Dual authority. The dual authority model creates a second management level that works well when a task is divisible. Management gives two members authority for the group's work. Cooperative Extension reflects this arrangement, in the positions of

Director of Extension and Associate Dean of Extension and the Dean of the College of Agriculture. The Assistant Director of Family and Consumer Sciences is a dual authority role of the FCS Extension program and the Associate Dean of Extension. This dual authority at the strategic apex of the organizations often slows down diffusion creating additional layers of leadership between the strategic apex and the operating core.

Simple hierarchy. Simple hierarchy is the organizational model most used by Cooperative Extension for teamwork at the technostructure and operating core level. This simple hierarchy creates a middle management position that allows the person at the strategic apex of the organization to concentrate on the mission of the organization without the details of the operation. Diffusion of an innovation is most likely to occur within this team structure, as it is a centralized diffusion system (Rogers, 2003). The geographic location of team members as well as the location of autonomy within the team and organization will affect the diffusion process.

Decentralized Diffusion Systems

Teams for diffusing innovations in decentralized teams are more likely to be circle and all-channel networks (Bolman & Deal, 1997). Rogers (2003) defines diffusion in these systems as being spontaneous and bubbling up from the operational core. It allows for a lot of adaption by users in the diffusion network.

Circle network. This network gives members of the team more access to one another. Information and decisions flow from one team member to another. This simplifies communications, but also is dependent on everyone being actively involved. The circle network can fall flat if no one shares new ideas for the innovation.

All-channel network. The all channel network refers to an interdependent network that is most similar to a sports team that depends on all members for success. The all-channel network is a looser architectural configuration referred to by Helgesen (1995) as a web of inclusion. This network allows for creative thinking and innovation through the free-flowing information between members; however, it is very dependent on communication and relationships (Bolman, 1997).

Cooperative Extension is a centralized diffusion system. The coordination of the work of teams relies on vertical coordination through authority, rules, planning and control systems. This provides for uniformity of the outcomes of the tasks and more predictability in the organization (Bolman, 1997; Gamson, 1968). Lateral techniques such as meetings, task forces, coordinating roles, matrix structures, and networks allow flexibility within the organization and more effectiveness in attaining the organization's goals (Bolman, 1997). However, Rogers (2003) recognizes that diffusion of innovations usually involve a hybrid of both centralized and decentralized systems. It is within this framework of organizational theory that diffusion in organizations occurs.

Diffusion of Innovations

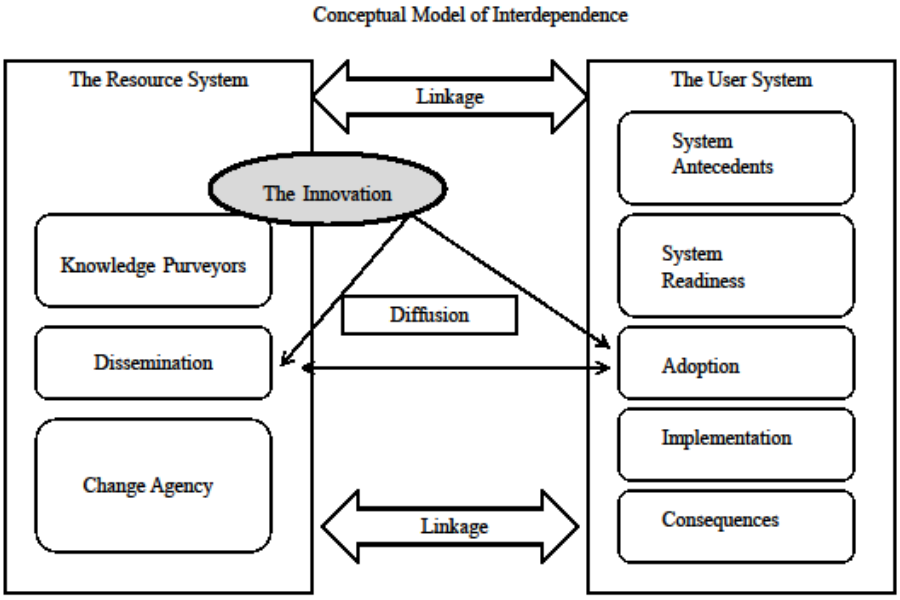
The diffusion of new educational programs within institutionalized organizations, such as the Kentucky Cooperative Extension Service, is a complex process that requires analysis of organizational structures at many different levels. Rogers defines diffusion as a communication process in which new ideas, programs, and/or technologies travel through channels among individuals in a social system (Rogers, 1995). Adoption of new programs and ideas is the process by which individuals in a social system decide to use the communicated new idea, program, and/or technology (Rogers, 1995). The social

system is defined as a set of interrelated units with a common goal (Rogers, 2003). These units may be farmers, families, communities, businesses, health organizations or in the case of this study, the Kentucky Cooperative Extension Service.

Early organizational diffusion studies used the same models applied to the adoption processes of individuals and did not consider the impact of the workings of the system within which diffusion occurs (Rogers, 1995). Damanpour and Schneider (2006) in the study of the effects of environment, organization and top managers in the adoption process in innovation, noted the scarcity of empirical examinations in organizational diffusion processes.

Greenhalgh et al. (2004) analyzed research studies in thirteen research traditions, including rural sociology, in their quest to answer the question of how health service organizations can spread and sustain innovations. This meta-analysis of service organizational studies from a systems approach found relevant structural, contextual, and communication determinants of organizational innovativeness. These studies examined innovation as an emerging dual process resulting in organizations adapting to an innovation, as well as the innovation adapting to the organization. From their analysis, Greenhalgh et al. (2004) developed a conceptual model that maps the different aspects and interactions within organizational networks of the complex empirical findings from these many research traditions (see Appendix E). This diffusion conceptual model illustrates the interdependence of various variables in the diffusion process and network as depicted in Figure 2.2.

Figure 2.2. *Conceptual Model Interdependence (Greenhalgh et al., 2004, p. 595)*[1]



Factors Affecting the Diffusion of Innovation in Organizations

The complexity of diffusion dictates the need for a body of knowledge that is generalizable to any given network and diffusion process. Organizations that support the development of bridges, those individuals with connections with several networks have the greater potential to spread innovations within their organization (Rogers 2003, Valente, 2010). Bridging individuals have many ties to many individuals in other sub-networks of the larger network, such as the seven Extension Districts. The innovation diffuses more swiftly if bridges are early adopters. Often these bridges serve as the only link to other segments of the network (Valente, 1995).

[1] From "Diffusion of Innovations in Service Organizations: Systematic Review and Recommendation" by Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. *The Milbank Quarterly 82*(4). Copyright 2004 by John Wiley & Sons. Adapted with permission.

Rogers Diffusion Model

Rogers (2004) noted the evolution of the diffusion model from focusing on how new ideas are adopted by individuals to how new ideas spread through interpersonal channels in networks. Organizational networks are important structural elements of organizational systems and key to understanding diffusion within institutional organizations, such as the Cooperative Extension. However, Rogers maintains that there is a generalized diffusion model that has universal application. Over forty years of diffusion research studies, estimated by Rogers (2003) to be 5,000, displays consistent patterns across innovations, conditions and cultures (2003).

Rogers (2003) diffusion model identified five characteristics of innovations as relative advantage, compatibility, complexity, trialability, and observability. The characteristics of an innovation affect the adoption rate.

Relative advantage. The greater the perceived relative advantage the more rapid the innovation (Rogers, 2003) will occur. A relative advantage of the innovation may include the social prestige within the community of being associated with a program that results from the collaboration of the College of Agriculture with the academic health colleges at the University of Kentucky. The satisfaction of being able to address health issues in the local community is an intrinsic relative advantage. The convenience of having a packaged program to use in county programming is a time-management relative advantage. The possible increase in salary due to higher supervisor evaluations is an economic relative advantage.

Compatibility. Compatibility as defined by Rogers (2003) is the perception that the innovation is consistent with existing values and experiences. A new program design

similar to existing programs, utilizing the same protocols and media format, is more likely to diffuse. Cooperative Extension agents serve as advisors in the development of programs to ensure the accommodation of adopter needs. This is important as ideas incompatible with one's values hinder the adoption rate (Rogers, 2003; Kruger et al., 2011a).

Complexity. Complexity is the level of difficulty of understanding and use of the innovation as perceived by the potential adopters. A new Cooperative Extension program that incorporates in-service trainings for FCS Agents prior to the release of curricula to enhance the capacity of the agents to understand and use new curriculum are more likely to be diffused. New ideas that are easy to understand and use are adopted more rapidly (Rogers, 2003).

Trialability. Trialability is the ability to test an innovation on a limited basis. A new program having varying levels of modules that allow the FCS Agent to implement small increments of the curriculum before conducting large scaled health interventions will diffuse more rapidly. Being able to test the innovation is less threatening (Rogers, 2003).

Observability. Observability (Rogers, 2003) is the ability to see the results of the innovation and the ability for others to notice the innovation. Providing extensive reporting, media releases and recognition efforts of the FCS Agent involvement to state and local stakeholders will enhance the diffusion process. Visibility increases discussion of new ideas among peers (Rogers, 2003).

Communication and Influence Processes

The communication process as defined in the diffusion paradigm is the process of sharing and creating content about a new idea. Information about an innovation diffuses throughout a social system by this process. Rogers (2003) defines the communication process as a linear model involving an innovation, an individual experienced with the innovation, an individual without any experience with the innovation, and a means by which there is an information exchange, known as the communication channel (Rogers, 2003).

Most people do not rely on evidence-based information to adopt an innovation but do rely on the subjective peer influence (Granovetter, 2005). One of the barriers is communicating an innovation to a larger, more global community. Members of social systems within which the communication occurs are usually very similar. This occurs because social systems are homogenous in culture, race, socioeconomic status, and language. Communicating new ideas and programs between heterogeneous stakeholders is a challenge (Rogers, 2003).

Assimilation/implementation process. Time is an important aspect of the diffusion-decision process. Of interest to researchers is the time between an individual's initial introduction to an innovation to the time of adoption of the innovation. Rogers (1995) identifies five steps in the process of adopting a new idea or program: knowledge, persuasion, decision, implementation, and confirmation.

***Knowledge*.** The first step is knowledge which involves being introduced to an innovation and gaining an understanding of the new idea, technology, or program. Introducing new ideas through newsletters, in-service trainings, mass media news

releases, and personal face-to-face networking within the social system provides knowledge to the network on innovative programs.

Persuasion. Persuasion occurs through gaining a favorable attitude about the new program or idea that leads to the decision to either adopt or reject the new program. Persuasion is dependent on communicating the innovation through communication channels of the organization.

Implementation. Implementation occurs when the FCS agent actually conducts a new program or uses new ideas or materials in the county program. Implementation and adoption are often used interchangeably in the diffusion literature (Rogers, 2003).

Confirmation. Confirmation occurs when the programming reinforces more programming or the FCS Agent reverses his or her decision to continue using new programs. The FCS Agent association meetings and staff meetings are an important part of the diffusion-decision process. The norms of this social system can be a barrier to the adoption process as these associations and staff units tightly control what is acceptable FCS Agent behavior.

Organizational Diffusion of Innovation Processes

Organizational factors correlated to readiness to adopt an innovation include size, wealth, or availability of resources. Other predictor variables include informality, complexity and decentralization of the organizational structure, the breadth of the organizational goals, and the absence of dominance by a single professional ideology (Rogers, 2003; Mohr, 1969). Mohr (1969), in a study of health departments, found innovation to be a balance of the function of motivation to innovate and the balance between obstacles and resources bearing on the innovation.

External Environment. Historically successful organizations supported by taxpayers, such as Cooperative Extension, that do not change and adopt innovations to address stakeholder problems may find themselves no longer relevant to their clientele and out of business (Belasco, 1990). Systems theories provide a dynamic framework for understanding diffusion in organizations (Chance & Björk, 2006) because they tend to be "multidimensional, view organizations as being static… and continuously changing with the external environment" (p. 127). Systems thinking in complex organizations, such as Cooperative Extension, seeking to innovate, helps innovators in organizations view their work in a dynamic holistic framework with interdependent subsystems interacting with an ever-changing environment (Chance, 2006). Several systems theories are relevant to diffusion of innovation in organizations.

General Systems Model

The general systems model process (Bertalanffy, 1951) as described by Chance and Bjork (2006) and applied by Greenhalgh, et.al. (2005) to diffusion systems in service organizations has four components: 1) inputs, 2) organizational processes, 3) outputs, and 4) feedback.

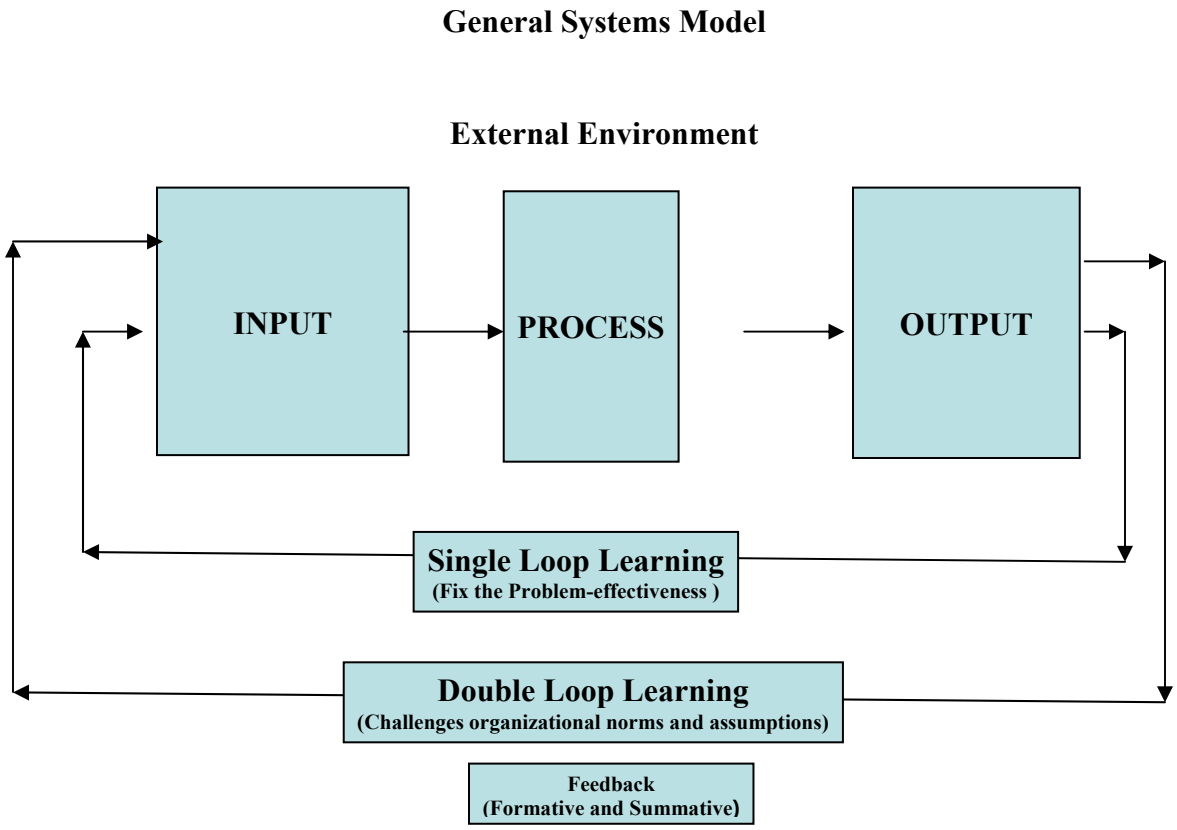
Inputs. The available resources, both human and capital, are instrumental in the mainstreaming of an innovative program (Greenhalgh, et al., 2005). Mohr (1969) in his diffusion research of health departments found that the environment of the organization is important to the diffusion process. A rapidly changing environment may encourage innovation. An organization whose norms favor change will be more likely to adopt innovations (Rogers, 2003). Greenhalgh et.al (2005) found that widespread involvement

of staff at all levels of the organization contributed to successful mainstreaming of innovative programs.

Processes. Organizations are generally cognizant of inputs and outputs but less aware of the organizational processes embedded in relationships, such as deliberations, consensus building, and problem solving activities (Chance, 2006). Organizations are reliant on the actors in the system network for the organizational processes.

Outputs. Outputs are the actions taken to address problems, inherently embedded in innovation. New ideas and new programs in Cooperative Extension develop to address specific issues relevant to its clientele. The concept of feedback is important in systems theory and to understanding diffusion processes in organizations. Single loop feedback is described as being trouble shooting; a reactive automatic process, focused on correcting errors (Argyris & Schõn, 1974; Chance, 2006). Double-loop feedback is concerned with continually monitoring inputs and processes and operating assumptions, such as those in diffusion theory; making changes or corrections in inputs and processes to reach the desired output, diffusion and sustenance of an innovation (Argyris, 1982; Chance, 2006). Bjork succinctly illustrates the systems process in Figure 2.3.

Figure 2.3. *General Systems Model (Björk, 2012).* [2]



Chaos theory. Organizations such as Cooperative Extension, take on a life of their own not controlled by leaders. These organic entities are interdependent and interconnected with relationships defining structures and work over time (Chance, 2006; Wheatley, 1996). Structure in the organizational system organizes over time into patterns, so it is important to observe organizations to look for patterns of behavior and identify those behaviors that lead to organizational change (Wheatley, 2006). Organizational leaders should then support those new behaviors. In learning organizations (Chance, 2006; Senge, 1990), the emphasis is on building organizational capacity for innovation.

[2] From EDL 702 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS II by Björk, 2012. Reprinted with permission.

Chaos theory makes a compelling argument for paying attention to the social networks that exist in organizational structures.

Argyris (1982) recognized that theories of action, or accepted ways of doing things, inhibit organizational change, making diffusion of innovation more difficult. The organization is influenced by many informal networks that form an external context within which decisions to diffuse a new idea, program, or innovation occur (Greenhalgh, et al., 2004). Individuals only adopt new programs perceived as the norm by the networks in the social system (Abrahamson & Rosenkopf, 1997; Fitzgerald, Ferlie, Wood & Hawkins, 2002; Greenhalgh, et al., 2004).

Social Networks in the Diffusion of Innovations

Rogers (2003) defines the social network as a group of interrelated units engaged in problem solving with a common goal. Social networks are complex and amorphous systems consisting of individuals, informal groups and organizations, formal groups and organizations, and/or subsystems. Valente (1995) describes a network more simply, as a pattern of friendship, advice, communication or support that exists among members of the social system.

Cooperative Extension often referred to as the Cooperative Extension System is a large organization consisting of a bureaucratic organizational structure within two larger structures, the College of Agriculture and the University of Kentucky. Within this social system at every level, there exists many formal and informal networks, specialist associations, agent associations, informal working groups of personnel, and personal alliances based upon professional and personal relationships.

At the core of this social system are formal and informal organizations of clientele organized in advisory groups, formal organizations such as the Extension Homemakers Association, 4-H Friends, commodity groups, and other affiliated organizations. The individuals in these groups are opinion leaders, influencers and in some cases change agents (Rogers, 2003) at all levels of local, regional, and state affairs.

Each of these units at all levels affects the communication structure in the diffusion process. In the bureaucratic units of the organization, there is an expectation that individuals of the organization follow the directions of the supervisors and managers of the program. The culture of the Cooperative Extension organization is such that there is a deep respect for authority. A strong protocol and chain of command provide a clear communication channel when the innovation is congruent with the system's norms.

Informal Networks

The informal networks within the organization, known as the communication structure of the social system, predict the behavior of the individual members (Rogers, 1995). This communication structure, or patterns of relationships among individual members, determines when members adopt an innovation (Wasserman & Faust, 1994). Rogers (2003) noted the difficulty in mapping the communication structure of a social system. Computer technology and new software programs have given researchers new tools to advance the knowledge base of diffusion theory (Abrahamson et al, 1997; Borgatti, 2002; Knoke & Yang, 2008; Valente, 1995).

Formal Networks

In Cooperative Extension, the social system's subsystems intertwine and form complex relationships between units. The system's members and units are similar in

culture, race, and social characteristics making change in organizational culture very difficult. The result is a system not open to new ideas and innovation other than the technical agriculture innovations that are a part of the culture of the organization. Rogers (2003) noted that the Cooperative Extension Service has been more effective in diffusing agricultural production technology than other subject-matter content to farm and non-farm audiences. His observation is due to the lack of research in the social science programs of Cooperative Extension. The Colleges of Agriculture around the country have not made documenting the diffusion of human social science interventions a priority, resulting in the paucity of such evidence. The MHAI study (Murray, 2007) provides evidence of a Family and Consumer Sciences program diffusing at the local level and the opportunity to study further the organizational social networks of those early adopters of MHAI.

Social system structure. The social system structure is an important but less studied diffusion factor (Valente, 1995; Rogers, 2003) to the innovation decision process. Rogers (2003) found that the channels of communication within the social system played different roles with different categories of adopters. It is important to understand the social network structure in order to facilitate the process of diffusion and the rate of adoption by the members of the social system. Because of the complexity of social structures, there is little empirical evidence on the impact of the social structure on the innovation decision process (Valente, 1995). The best known study (Valente, 1995) is the Coleman, Katz, and Menzel (1966) 1955-1956 study of the diffusion of the drug, tetracycline, among doctors in Illinois. Diffusion occurred more quickly among those doctors more integrated into the social system than those doctors isolated in the social

system. Rogers and Beal (1958) studied farmers and found that interpersonal communications were important to the diffusion of new farm practices. These two studies are the basis of the network models of diffusion (Valente, 1995).

Change Agents and Opinion Leaders

Lettl (2005) in a study of health care technology found that there were entrepreneurial qualities in the innovators of health care technology and they were active in the networking process involving the end users in the development of new products and bridging the cultures of the organization. The HEEL program staff, specialists and associates, act as change agents and linking agents to the FCS Agents who are change agents with their community partners at the local level (Rogers, 1995).

These important program staff members (change agents) bridge the culture of the University and the local communities and are knowledgeable in the languages of both cultures making it easy for them to navigate the two social and cultural networks. These change agents have used their social influence to encourage agent involvement. Through this involvement, they have attempted to identify those opinion leaders and early adopters who disseminate the innovation through the ranks of the Family and Consumer Sciences Agents.

The Client Systems

Cooperative Extension, traditionally viewed as a centralized bureaucratic system, and in the case of a diffusion network, is the client system for HEEL innovations. The classical diffusion model theorizes that innovations are more likely diffused through centralized systems that are expert driven (Rogers, 2003; Salveron, Arney, & Scott, 2006; Winick, 1961). The position of HEEL as a subsystem of a larger formal system requires

an intricate connection to the other subsystems within the client system. The concern of the HEEL program is the adoption of new health programs within the FCS Agent subsystem, ultimately affecting the local community social network systems.

Opinion leaders. Opinion leaders are important to the communication of an innovation. Rogers and Shoemaker (1971) defined opinion leaders as those who are able to exert influence generally upon those from the same social system and tend to reflect the norms of the community regardless of the community tradition or modernity.

Opinion leaders have been shown to be effective in public health interventions such as decreasing the rate of unsafe sexual practices and decreasing cesarean births (Valente, 1999). Valente and Davis (1999) examined the selection of opinion leaders and communication networks in the physician community using a set of methods known as network analysis to locate opinion leaders. Such a model for matching identified opinion leaders with those who nominate them or closely identify with them in a diffusion network perspective will accelerate the diffusion process through an optimal pairing of community members with influencers (Valente, 1999).

Sub-networks in Organizations

Social networks within organizations consist of sub-networks within the larger organization (see Appendix A). The FCS Agent network has embedded sub-networks that exist in seven Districts. FCS Agents have ties (connectedness) within each Extension District, and between each Extension District. FCS Agents with many ties within and between Extension Districts connect the different networks within the Extension diffusion system. Bridges are those actors who serve as connectors within a network that

overlap other networks, shortening the communication distance between sub-networks in larger networks (Granovetter, 1973, 1982; Valente, 2010).

Granovetter's (1973, 1982) strength of weak ties conceptualizes networks as interpersonal connections among individuals that are either weak or strong. Granovetter (1973, p. 1361) defined the strength of a tie as being a linear combination of amount of time, intensity, mutual confiding, and the reciprocal relationships which characterize the tie. A network of people with strong ties can be cliquish, as measured by the strength of the tie, with ideas only shared within the closed group. Actors have easier access to the individuals with strong ties in the network who are more motivated to support them, mainly because of homophily or similarities of the group (Granovetter, 1982), a barrier to diffusion (Rogers, 2003). Weak ties provide people with access to new ideas from outside their social circle that supports the diffusion of new health programs.

Relational diffusion theory. Relational network diffusion theory (Valente, 1995) suggests that direct contact between individuals influences the spread of an innovation. There are four models used to analyze relational networks: opinion leadership, group membership, personal and network density, and personal network exposure.

Opinion leadership model. The opinion leadership model (Valente, 1995) is the most powerful network model. The model uses the nominations by actors to determine who in the social system is an opinion leader. Theorists deem individuals with the highest number of nominations to be a significant influence on the adoption process. The model considers opinion leaders the early adopters who pass new ideas to opinion followers. This model remains one of the most useful models for network analysis (Valente 1995).

Group membership model. Other relational network models provide different perspectives for analyzing network data. The group membership model is useful when the investigator wants to determine whether an individual's personal network reaches out to the larger network or if it is constrained to itself.

Personal network model. The personal network density model is useful for determining if the interconnectedness of the network influences an actor's adoption behavior. The interconnectedness of the network defines density. "Tight-knit" (Valente, 1995, p. 40) describes a dense network. Personal network exposure is the degree of exposure an actor has to an innovation through a network. Exposure to an innovation does not necessarily predict adoption.

Valente (1995, p. 36) analyzed network data from three well-known diffusion studies using the four relational network models. Only the opinion leadership model provided moderate association for the three data sets between number of nominations received and innovativeness ($p<.01$; $p<.001$; $p<.001$).

Structural holes. Within a large network such as Cooperative Extension with seven Extension Districts each identified as an organizational network, it is expected there will be structural holes (Burt, 1992) in the network among these seven districts. Burt defines structural holes as gaps in the larger network embedding smaller more dense networks of individuals. Within these seven districts, the assumption is that there are gaps between the districts bridged by network actors who have connections with individuals from the other seven districts. These actors serve as bridges to the other six embedded district networks. Bridges are critical to the diffusion process; it is important that Cooperative Extension apply a method for locating those bridges, if new health

programs are to diffuse more rapidly through the Cooperative Extension network (Valente & Fujimoto, 2010).

An organizational social network model is important for illustrating the many linkages, contexts, and environments that influence the adoption of innovations. Organizational resistance can occur if there is not a clear understanding of the flow of communication within the diffusion networks. The adoption of innovations by individuals is influenced by organizational structure, leadership, and type of social networks that exist within the organization (Greenhalgh, et al., 2005).

Criticism of Innovation Diffusion Theory

A criticism of the innovation diffusion theory is the presumption that innovation is always positive (Rogers, 2003), and there is a need to determine if the programs are actually new or just improved and therefore not actually an innovation (Hartley, 2005). Other attributes of the MHAI program and/or diffusion of innovation processes might better explain the adoption of MHAI by FCS Extension Agents. Other diffusion attributes of relative advantage, compatibility, complexity, trialability, or observability (Rogers, 2003) of the MHAI program could influence the FCS Agents' decision to adopt the MHAI program:

1. Relative advantage: Do they see the program as increasing their effectiveness or providing economic benefit?
2. Compatibility: Is it a voluntary program that they choose to implement because of community needs or do they perceive it mandated by administration?

3. Complexity: Is MHAI compatible with other Extension programs or similar to other programs they are implementing? How easy do they perceive implementation of the MHAI program?
4. Trialability: Do they perceive MHAI as having choices of curriculum pieces that allow the FCS Extension Agent to try the program without adopting the entire program? Do they perceive MHAI as having limited risk to their careers or clientele?
5. Observability: Do they perceive the MHAI program as having high visibility with community members as well as with the administrators who evaluate their performance?

These attributes of diffusion (Rogers, 1995) affect whether an innovation will be implemented and may better explain the adoption of the MHAI program.

However, the perspective of this study centered on those FCS Agents in District 1, who chose to participate in the MHAI pilot study before the design of the program attributes. The study's assumption that MHAI was a new and innovative program is a limitation of the study. The flow of federal dollars for program support expects that innovation will occur and innovation is usually a criterion established by funding agencies in competitive grants; however, there is value in recognizing improvement in existing programs and not reinventing the wheel, even though funding sources are more interested in investing in potential innovations (Braddach, 2003).

Concentrating on attributes of successful innovations might prevent us from greater knowledge by concentrating on the attributes of failed innovative programs (Hartley, 2005). A limitation of this study was the concentration on a successful diffusion

program, the MHAI program. Another study on the failures of FCS Agents to adopt or to discontinue implementation of the MHAI program might have additional value to the Extension System, or failure to adopt other introduced programs.

Context for Change

Innovation can result in rejection, short-lived change, or sustained change. Sustained change must be internalized, substantial, stable, and affect all facets of the organization (Duke, 2004). Habit and inertia to change are barriers (Tichy & Devanna, 1990). According to Galbraith (2002), the structure of the organization determines the power in an organization. Tushman and O'Reilly (1997) described organizations, such as Cooperative Extension, that rely on social control systems as those with strong cultures having three characteristics in common: a rigorous selection system, an intensive socialization process, and a comprehensive reward and recognition system. These factors could present barriers to utilizing the FCS Agent Network to diffuse new health programs because the Extension System requires members of the FCS Agent Network adhere to organizational norms.

There is a dual nature to the diffusion process in Cooperative Extension. As new ideas and programs diffuse internally, they also transfer to local communities, another diffusion system. The failure of those within the organization to adopt new health programs result in communities not having access to important educational resources. The literature indicates a gap in the research on understanding how social networks within Cooperative Extension influence the diffusion of health programs.

CHAPTER THREE: METHODS

This chapter describes the social network research methodology (Wasserman & Faust, 1994) used in this analytical study of the social network structure of Family and Consumer Sciences (FCS) Extension Agents. The social network structure of early adopter FCS Agents implementing the diffusion of the Mental Healthiness in Aging Initiative (MHAI) were compared to their cohorts in Extension District 1. Measures of social network connectedness were compared in each of the seven Extension Districts. Measures of social network connectedness, defined as the pattern of direct contact, may explain the early adoption of the MHAI by FCS Agents located in the eleven (11) MHAI pilot counties in eastern Kentucky.

The social network approach may also be useful for conceptualizing processes of social influence and patterns of diffusion across the Cooperative Extension System. The obtained structure of this network analytical study can be viewed as an underlying organizational structure useful for studying the diffusion of new innovative health programs across the Cooperative Extension organization(s) (Quatman & Chelladurai, 2008). This study examined the successful diffusion of MHAI within the communities of the eleven (11) pilot counties through better understanding the social networks of the early adopter FCS Agents.

Research Questions

1. Are there similarities in the organizational social network connectedness and attributes of FCS Agent early adopters of the Mental Healthiness in Aging Initiative (MHAI) and the FCS Agent non-early adopters in the Extension District 1 organizational social network?

2. Are the organizational social network connectedness and attributes of the FCS Agents in the seven (7) Extension Districts similar?
3. Are there bridges in the social networks of the FCS Agents that could influence the early adoption of new health programs across District networks?

Scientific Methods and the Emergence of the Social Network Approach

Modern science was born during the 1830s, when researchers applied the scientific method to human behavior and thought (Bernard, 2000). One hundred years later, in the 1930s, universities began to develop disciplines and departments to distinguish the disciplines, with distinctions being based upon the methods used to answer questions (Bernard, 2000). Diffusion research traditions in the United States began in the 1930s with the Iowa Corn Studies' identification of a social process in the adoption of new hybrid corn (Ryan, 1943). Variables found to be associated with innovation provides a measure of the concept that diffusion embeds in social networks (Scott, 2000; Valente, 1995; Wasserman & Faust, 1994).

Over the past 60 years, advances in social theory and computer technology have developed methods that test hypotheses about network structural properties known as social network analysis (Valente, 1995; Wasserman, 1994). These recent advancements as well as new computer technology provide diffusion scholars powerful tools for analyzing the social networks within which diffusion of new ideas and programs occur.

Fundamental Differences

The social network approach is a strategy for structural analysis of the social environment concerned with understanding ties or linkages between individual actors within the social network (Carrington, Scott, & Wasserman, 2005; Wasserman, 1994).

The social network approach draws on social science theory framed in non-network terms; it is not a conceptual framework but an integration of theories and methods (Wasserman, 1994). The social network researcher is generally not interested in the attributes of variables or the actors themselves, but in the relationships that exist between and among the actors. In this study of the FCS Agent network in the Kentucky Cooperative Extension Service, the interest is also in the attributes of the variables of the FCS Agents that may predict the communication ties of the FCS Agent network.

Equations identify patterns and regularities that measure structural properties of networks, and/or relational properties of actors within networks (Marsden, 2005). Elements of structural properties of networks include the concepts of centralization and centrality of the actors within the networks. Centrality is a measure of the actor's position or prominence within a network based upon the ties or linkages that actor has with others in the network (Knoke & Yang, 2008; Wasserman, 1994). Although most researchers are interested in the concept of centrality (Wasserman, 1994), group-level measurements result in the property known as centralization. According to Wasserman and Faust (1994), centralization is a measure of variability, dispersion or spread of the actors in the network. It helps the researcher understand the inequality of different actors within the network.

Research Design

This study used a quantitative research design to gather data on the communication patterns in the social network of the Family Consumer Sciences (FCS) Agents employed by the University of Kentucky Cooperative Extension Service. Network analysis uses the social network approach. This approach is appropriate because

the interest is in knowing the communication patterns through which health information and health programs spread within a network of Kentucky Family and Consumer Sciences Extension Agents. Diffusion occurs within a social system (Rogers, 2003; Valente, 1995) and traditional quantitative and qualitative methods are not sufficient for answering the research questions in this study. This study utilized a network model based in network analysis assumptions, network theories, and methodology for analyzing collected data to answer the research questions.

Network studies generally use either whole-network or egocentric designs utilizing surveys and questionnaire data in which the investigator decides what relationships one wants to measure in a particular network of actors (Marsden, 2005; Valente, 2005; Wasserman, 1994). Whole network designs examine sets of interrelated actors bounded by a social identity or organization; while egocentric designs assemble data on the actor and the clusters of relationships of that actor (Marsden, 2005). Although the distinction appears to be slight because they are interrelated, social network analysts have very different approaches. The whole network approach begins with a known network and collects egocentric data on each member or actor in the network, while the egocentric approach defines the network through the collection of data from a densely sampled population (Marsden, 2005).

Underlying Assumptions

There are some assumptions of social network analysis that differentiates it from other research methods. The network perspective's key assumptions are the following:

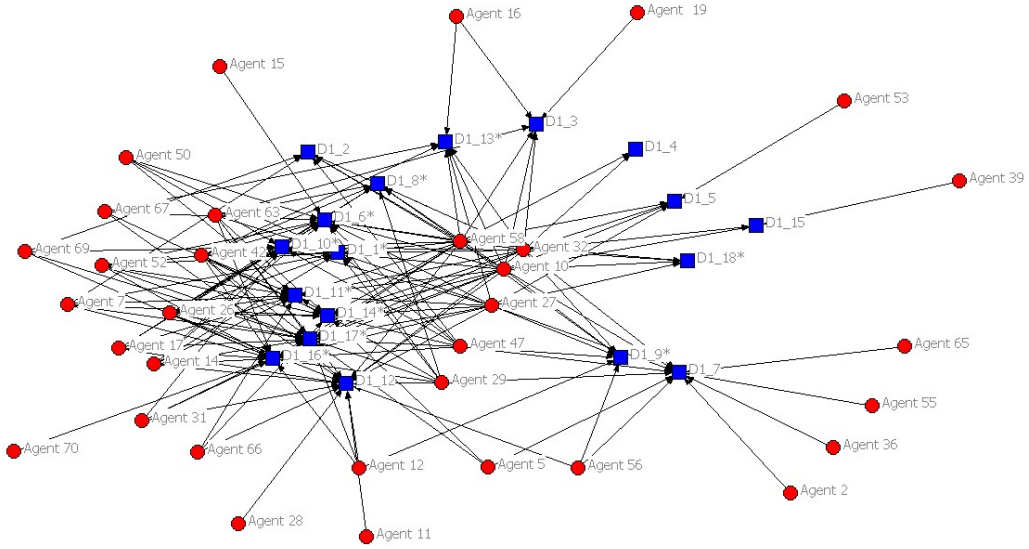
1. Structural relations of objects or actors within a social structure have regularities of patterns of relations between and among entities within a social system.

2. Social networks affect the behavior of actors through a variety of structural socially constructed relations among the entities of the network.
3. Structural relations are a dynamic process, continually changing (Knoke, 2008; Scott, 2000; Wasserman, 1994).

These assumptions and key concepts of these assumptions make social network analysis a distinct perspective within the social and behavioral sciences with its own terminology differentiated from quantitative or qualitative methods (Wasserman, 1994). These differences in concepts include a fundamental difference in the inclusion of information on relationships between and among units in the study.

Social network analysis is concerned with relational data that includes the contacts, ties, and connections that relate one actor to another. Relations are not properties of the actors but of systems of actors (Scott, 2000). Network analysis expresses these relations as linkages that connect actors in mathematical measurements of these relations in sociometric graphs and matrices of binary data (See Appendix F). Nodes of a graph represent actors and lines represent the ties between actors. Figure 3.1 shows the network of 18 FCS Agents and the observed ties that exist within that district and with other FCS Agents in Districts 2-7 in the FCS Agent network as reported in the FCS Health Education Information Network Survey. The total number of potential ties possible is represented by the formula $\frac{N(N-1)}{2}$.

Figure 3.1. *Sociogram of Ties and Nodes in the Social Network of District 1 FCS Agents. Ucinet Data.*

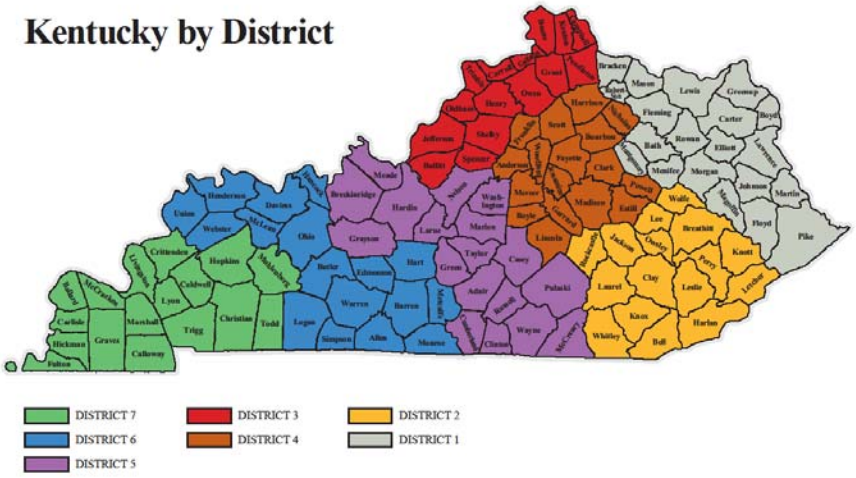


District 1 FCS Agents

FCS Agents in Districts 2-7

The location of the Extension districts is depicted in Figure 3.2.

Figure 3.2. *Extension Districts*



This quantitative analytical approach uses mathematical models to explain the complex representation of social networks. Even the smallest network can yield a large number of ties that exist among actors in the socal network. Figure 3.1 illustrates this complexity. Graph theory, statistical and probablity theory, and algebraic models are foundations of social network analysis (Wasserman, 1994). Statistical models for analyzing relational data are based on work of Holland and Leinhardt (1981). These models provide a precise way of testing theories about structured social networks, and provide a defined language for describing social concepts.

Definition of Terms

This study employed language that is unique to the social network analysis approach and different from the other social sciences. It is important to define this language to prevent misinterpretation of the research design discussed through the other chapters of this study. Table 3.1 defines the social network terms used throughout this study.

Table 3.1.

Social Network Terminology

Term	Definition
Social Network	A social network (Hanneman & Riddle, 2005) is a theoretical construct for studying communication relationships among people. The social network of interest in this study is the Family and Consumer Sciences network of Extension Agents located in every county of the Commonwealth of Kentucky.
Social Entities	Social entities (Hanneman, 2005) are the actors or individuals within an identified social network. For purposes of this study, the social entity is the individual Family and Consumer Sciences (FCS) Extension Agent.
Relational Ties (Edges)	Relational ties or edges (Hanneman, 2005) are actions that link social entities in a social network. For purposes of this study, the relational tie of interest is who talks to whom about health information and health educational programs within the FCS organization of FCS Extension Agents organized into seven (7) Extension Districts across the state.
Dyad	The dyad is the unit of analysis (Borgatti, 2002); a pair of actors and the possible ties between them. For purposes of this study, the dyad is two FCS Extension Agents and the communication tie between them.
Dyadic Statistical Model	A dyadic statistical model (Borgatti, 2002) analyzes the set of all possible relations in a social network and is expressed in an algebraic equation, where n is the size of the population, the total possible relations is $\frac{115(115-1)}{2}$ removing self-nomination. In this study of the whole FCS Extension Agent network, the census as of July 1, 2011, was 115 FCS Agents with total possible dyadic ties of 6,555 [$\frac{115(115-1)}{2}$].
Bounded Population	Social network studies often draw the boundaries around a population that is known. For purposes of this study, the whole FCS Extension Agent network as of July 1, 2011.

Study Context

The Cooperative Extension Service is the most extensive outreach program of the University of Kentucky. The Associate Dean and Director for Extension, Dr. Jimmy Henning, administers Cooperative Extension in the College of Agriculture. Within Cooperative Extension there are three assistant directors for Agriculture, 4-H and Youth Development, and Family and Consumer Sciences. The Assistant Director, Dr. Ann Vail, who also holds the position of Director of the School of Human Environmental Sciences within the College of Agriculture, administers the FCS program. A state staff of

specialists and middle managers provides statewide program management and coordination for the FCS program. The local FCS program is managed and coordinated by a field staff of professional agents with educational degrees in Family and Consumer Sciences or related fields of study.

Study population. The study target population was all Cooperative Extension employees with the title of County Family and Consumer Sciences (FCS) Agents employed by the University of Kentucky's College of Agriculture (N=115) between June 30, 2010 and July 1, 2011. The FCS Agents are community based in every county of the Commonwealth of Kentucky and are classified as field staff of the College of Agriculture.

This study involved a bounded population, a known population of the University of Kentucky FCS Agents (census number of 115 as of July 2011; see Appendix G). Social network analysts do not sample a population independently. Investigators are generally concerned with the census of the population and members. This study viewed the FCS Agents (nodes) as embedded in the seven Extension Districts further embedded in the larger FCS Extension organizational network. This structure is described as being uni-modal (Hanneman, 2005) in that each node represents an FCS Agent, and each edge represents a communication tie between two FCS Agents (nodes) in the network . The focus of this analysis involved calculating local statistics of each District Network (N=7) and global network statistics (FCS Extension Network) to help interpret network relationships for communicating health information.

This study employed full network data collection because it was necessary to fully define and measure the structural communication concepts and attributes of the FCS

Agent network (Hanneman, 2005; Wasserman, 1994). Social network analysts are generally concerned with the census of the population; not sampled members.

This study viewed the FCS Agents as embedded in the seven Extension Districts embedded in the larger FCS Extension organizational network. Because this was a known identified (bounded) population selected because they belonged to the network of FCS Agents, who were similar in education, race, and almost all female, there were no criteria for race, gender, and/or age.

Data Collection Procedures

This study employed full network data collection because it was necessary to fully define and measure the structural concepts of the FCS Extension Agent network (Wasserman, 1994; Hanneman, 2005) to understand fully the complete communication network. FCS Agents were identified through the FCS Agent listserv managed by the College of Agriculture and accessible to all employees of the Kentucky Cooperative Extension Service. The study recruited FCS Agents via email distributed through the FCS Agent listserv (See Appendix C) to participate in a researcher created online survey FCS Health Education Information Network Survey (Appendix G) from July 1, 2011 – July 30, 2011. The email included a direct link to the FCS Health Information Communication Network survey website on the secured UK Qualtrics server. The data were collected using a list of all FCS Extension Agents from the public listing of all Extension Agents in the Field Staff Directory (See Appendix D). The survey instrument instructed the FCS Agents to check their level of education completed, the year they earned their highest degree, the length of time in their current county, the Extension District they are currently in and other Extension Districts in which they have worked.

Recruitment began with an email to FCS Agents sent by Dr. Ann Vail, the Director of the School of Human Environmental Sciences, and with another email sent by Deborah Murray, the principal investigator (See Appendix C). Follow up weekly recruitment emails were sent three weeks in a row by the study investigator.

All responses were numerically coded and no one in the study is identified by name. The survey data is stored on the University of Kentucky Qualtrics secured server. One hard copy of the data is kept under lock and key in the office of the principal investigator. Only the principal investigator has access. The data will be stored for five years and will be destroyed following the completion of the dissertation study and the publishing of results. Data is presented in mathematical graphs and matrices used to show the flow of health information within the county FCS Agent network. Individual responses are combined with the responses from other FCS Agents taking part in the survey.

Informed Consent

When FCS Agents clicked on the FCS Health Information Communication Network Survey, they were directed to the Informed Consent Form (See Appendix H). In order to participate in the survey, they must have answered that they had read, understood, and printed a copy of the consent form and desired of their own free will to participate in this study. They were informed that no one else would see their responses and that data would only be reported in numerical values and graphed representations of communication patterns. If they answered yes, they were directed to the online survey. If they answered no, they received a thank you message and did not have access to the

survey form. They were informed that they could quit at any time during the survey. Incomplete surveys were not analyzed.

Relational Data

Each FCS Agent participating in the survey was asked to rate each agent in each of the seven (7) Extension Districts, on how often they go to each person for health information. The survey asked the same question for each Extension District.

> FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District X**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. (Names appear in the same order as they appear in the staff directory.) **If you are in District X, click NA beside your name**.

The names of FCS Agents were only used for the purposes of the survey participants rating their communication with all agents (nodes) in the survey (See Appendix I). The study was not interested in identifying the FCS Agent instead the patterns of communication that may show similarities in the diffusion of health information among FCS Agents.

The survey values were reported in numerical values in an online survey created with the Qualtrics software. Qualtrics is secure online survey software that is available to faculty, students, and staff at the University of Kentucky. It allows one to design and deploy a survey completely online from any computer with an internet connection. It uses SSL (Secure Sockets Layer) protocol to securely collect and deliver the data.

Data Analysis Procedures

Numerical data was downloaded as an Excel file and imported into IBM SPSS 20 software, and UNICET 6 (Borgatti, 2002) social network analysis software.

Mathematical functions identified patterns and regularities that measure structural properties of networks, and/or relational properties of actors within networks (Marsden, 2005). NETDRAW (Borgatti, 2002), a visualization software package, was used to graph the survey data.

This study has 115 nodes with possible observed ties that are not redundant using the formula $\frac{N(N-1)}{2}$ $\frac{115(115-1)}{2}$ equals 6,555. A computer software program, such as UNICET, is necessary to analyze the patterns of the many links within and among the 7 Extension Districts and the 115 FCS Agent nodes.

Social network analysis methods include centrality measures, subgroup identification, role analysis, elementary graph theory, and permutation-based statistical analysis. Social network analysts use descriptive statistics to summarize key facts about the distributions of actors, attributes, and relations; statistical tools can describe the statistical relationships between ties and the attributes of the nodes. Statistical tools have been particularly helpful in describing, predicting, and testing hypotheses about the relations between network properties. The UNICET package has strong matrix analysis routines, such as matrix algebra and descriptive statistics.

Research Procedures

FCS Agents were asked to indicate how often they go to each FCS Extension Agent in their district and in each of the other seven districts directly for health information. Each FCS Agent listed in the survey was numerically coded and each of the responses were scaled from 0 = ego, 0= no contact, 1 = every few months contact, 2 = every few weeks contact, 3 = weekly contact, and 4 =daily contact.

Variables

Attribute data were collected in the FCS Health Education Information Agent Network Survey. The attributes (variables) measured included education and tenure data, both variables that the Extension organization tracks and values as documented by the School of Human Environmental Sciences Directory (2011).

Variable 1: Education. The FCS Agents were asked to answer the following questions regarding their education. *What is your level of education completed? Year you earned your highest degree?* The hypothesis was that level and currency of education would be a predictor of the communication ties an agent has within the FCS Agent Network.

Although the study did not include a question on alma mater, data from the HES Directory and the College of Agriculture's personnel office were collected on the FCS Agent alma maters. The hypothesis was that having a degree from the employing institution would be a predictor of the communication ties an agent has within the FCS Agent Network.

Variable 2: Tenure. The FCS agents were asked to answer the following questions regarding their tenure. How many years of experience do you have in Extension? The hypothesis being that tenure in the Extension System would be a predictor of the communication ties an agent has within the FCS Agent Network. The FCS agents were also asked: *Length of time in current county? What Extension District are you in? and Have you worked in other Extension Districts? If they responded yes to the latter question, they were directed to the next question: What other Extension Districts have you worked? Select as many as apply.* The hypothesis being that tenure in

more than one Extension District would be a predictor of communication ties in the FCS Agent Network. Data on tenure was not useful because of overlap of tenure groups used in the survey making the data unreliable. Tenure data were collected from the HES Directory and the College of Agriculture's personnel office

Attributes of the Population

The population was the group of FCS Agents (N-115) employed between June 30, 2010 and July 1, 2011. The population was primarily homogenous with the population primarily being female (N=114) and male (n=1) with the following attributes.

Table 3.2.

FCS Agent Demographics

District	# of FCS Agents	Average Tenure in Years	Median Tenure in Years	Range Tenure	Number with UK Degrees
1	18	21	24.5	40	12
2	15	19.2	21	40	6
3	20	16.4	14	36	6
4	17	14.65	13	41	10
5	16	10.5	8	24	6
6	15	10.6	6	33	5
7	14	14.25	13	29	2
Total	115				47

Table 3.3.

District 1 MHAI Pilot Project Agent Demographics

MHAI Project	# of FCS Agents	Average Tenure in Years	Median Tenure in Years	Range Tenure	Number with UK Degrees
MHAI Agents	11	24.55	26	39	10
NON-MHAI Agents	7	15.43	11	33	2

These attributes were correlated with the communication ties to see if they predict the number of communication ties reported by the FCS Agent respondents to the FCS Health Education Information Network Survey (see Appendix G).

Research Validity and Reliability

In social network theory, validity is a measure of construct validity (Wasserman, 1994), when measures behave as expected in a range of theoretical prepositions. Construct validity is measured by the number of ties an actor has as related to the attributes of the actor, such as tenure and education, demonstrating the construct validity of these sociometric measures (Mouton, Blake, & Frucchter, 1955b; Wasserman, 1994).

One common measure for testing reliability is the test-retest measures, but this method is not appropriate for social network analysis, since one cannot assume that social network relationships remain the same over time. There are three approaches of reliability suitable for social network analysis: (a) test-retest comparisons, (b) comparison of alternative question format, and (c) the reciprocity of sociometric choices. Sociometric questions using ratings are more reliable than fixed choice designs (Mouton, 1955a; Wasserman, 1994). This study employed the reciprocity of sociometric choices approach,

asking the FCS Agents to rate their frequency of communication with other agents on health education information.

Limitations to this Study

This study was limited to the FCS Agent network in the Kentucky Cooperative Extension Service between June 30, 2010 and July 1, 2011. The communication of health education information and programs among the FCS Agents in the seven Extension Districts during the time of July 1, 2011 and July 31, 2011 is very specific and may not apply to other subject matter areas that FCS Agents provide programs. The study is not generalizable to any other group of Extension Agents in Kentucky or other states. The most severe limitation of this study concerns the limitation of data collected from 64% of the FCS Agent population and not the full population of FCS Agents. Although the present data is useful for creating a threshold model for the Kentucky FCS Agent network, the model would benefit from more data collection.

Diffusion research traditions have studied particular innovations with many diverse disciplines. Cooperative Extension research primarily has focused on individual farmers and the diffusion process through individuals, mainly from University Extension Specialists and County Extension Agents to individual farmers.

Cooperative Extension, identified as a grass roots organization, has the expectation that local communities identify the issues they want Extension to address. Much of the decision-making process is guided by County Extension Agents, who are autonomous in their decisions regarding curricula and programs they choose to conduct within their communities and counties. This study was limited to one aspect of the decision-making process - the influence of organizational social networks on early

adopter FCS Extension Agents adopting the MHAI program. Cooperative Extension has a diverse group of county extension agents, many who are involved in implementing parts of health programming; this study focuses on the Family and Consumer Sciences (FCS) Extension Agents within the larger Kentucky Cooperative Extension Service field staff. The purpose of this study was to examine diffusion social networks within one subsystem of a larger diffusion system.

The context of this study was the University of Kentucky Cooperative Extension Service's Family and Consumer Sciences program goal to improve the diffusion of new innovative programs through the network of FCS agents in every county of the state. The study contributes to the organization's knowledge of how the organizational social networks of FCS Agents implementing new programs affects the diffusion of new programs in local communities. A limitation of this study is it may not be descriptive of agriculture or youth-development agent organizational social networks. This study is particular to the State of Kentucky and the Cooperative Extension organization. It is not descriptive of other organizational networks, or other states Cooperative Extension System.

Another limitation of this study was the failure to take into consideration the impact of other networks within the Extension System that could affect the networks of the FCS Agents, for example, the Extension Administration Network, the FCS Leadership Network, the FCS Specialist Network, and the faculty network in the many departments that support the FCS Agent Network. The Kentucky Association of Family and Consumer Sciences Extension Agents is a professional organization that supports the FCS Agent. This network of FCS Agents may be more significant than the formal

organizational networks tied to the Extension Districts because it is a professional development organization that is self-directed by leadership elected by the membership of the FCS Agent Network.

If innovations in the Kentucky Cooperative Extension Service are not reinforcing and shifts in perceptions and behaviors are not changing because of the implemented programs, diffusion will not be sustained. Because such behaviors are very slow to change, other environmental factors can influence the change process more dramatically than program changes.

In organizational design, the reward system is used as a strategy and incentive for influencing the direction of the organization (Galbraith, 2002). The performance evaluation system for county extension agents is complex and comprehensive and may be more predictive of early adoption because what gets rewarded controls what gets done in the organization. The performance evaluation system is a strategy for moving the organization forward and nurturing the leaders of change and innovation. Actions and behaviors that are measured are empowered and produced, and those actions and behaviors rewarded get produced (Belasco, 1990). The performance evaluation system is a measurement. A limitation of this study is the failure to look at the performance evaluation scores as an attribute of the FCS Agent in predicting early adoption.

Study data set. A limitation to the analysis of the data collected in the FCS Agent Survey was the failure to achieve an 80% completion rate of all FCS Agents in the FCS Agent Network considered by social network analysts as a complete network within a larger network data set that would more adequately generalize the findings to the whole network (Marsden, 2005). Findings were used to construct the network from the

egocentric network, which is not as robust as having data from the entire FCS Agent network. Although the completed survey rate was 64% of all FCS Agents and was representative of the whole network of FCS Agents, inferences from the relational analysis and the network structure can only be made in terms of the population of FCS Agents who completed the FCS Agent Network Survey.

Collecting data about early adopters prior to the introduction of new programs, and then re-testing the FCS Agent network after the introduction of new programs, would be more predictive of the attributes of the FCS Agents and their communication ties (Valente, 2005).

CHAPTER FOUR: RESULTS

The purposes of this study were threefold. One purpose was to describe the attributes and communication ties of the early adopters of the Mental Healthiness in Aging Initiative (MHAI) by early adopter FCS Agents located in the eleven MHAI pilot counties in Eastern Kentucky. The second purpose was to compare the findings to the non-early adopters in Extension District 1; and look for similar FCS Agent attributes and communication structures in the other six Extension Districts. Thirdly, this study sought to identify attributes and communication ties of FCS Agents that might predict early adoption of new health education programs. Doing so will provide better understanding of the role of the social network structure of Family and Consumer Science Extension (FCS) Agents in the processes of diffusing health information and health education programs in the Cooperative Extension Service System (Cooperative Extension). Following are the research questions that guided this study.

Research Questions

1. Are there similarities in the organizational social network connectedness and attributes of FCS Agent early adopters of the Mental Healthiness in Aging Initiative (MHAI) and the FCS Agent non-early adopters in the Extension District 1 organizational social network?
2. Are the organizational social network connectedness and attributes of the FCS Agents in the seven Extension Districts similar?
3. Are there bridges in the social networks of the FCS Agents that could influence the early adoption of new health programs across District networks?

FCS Agent Health Education Information Network Survey Respondents

The survey respondents were members from the FCS Extension Agent employees listed in the college's listserv database during the time period July 1, 2011 to July 30, 2011. The FCS Extension Agent job is described by the College of Agriculture as providing management, leadership, and educational expertise to the Family and Consumer Sciences program in the geographical area to which the agent is assigned (Thompson, 2011). Each FCS Agent has at least a bachelors or masters degree in the field of Family and Consumer Sciences such as Family and Consumer Sciences Education, Family Studies, Dietetics/Nutrition, or closely related field. Eighty-two FCS Agents started the survey, with one declining to consent to participate and 74 completing the survey for a 64% completion rate.

The participation dispersion around the state was representative of the agent population as illustrated in Tables 4.1, 4.2 and 4.3. Districts 1 and 3 had the largest response rates of the agent population; and Districts 2 and 7 had the lowest response rates.

Table 4.1.

FCS Agent Health Education Information Network Survey Respondents: District Demographics

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
1	15	20.3	20.3	20.3
2	7	9.5	9.5	29.7
3	14	18.9	18.9	48.6
4	10	13.5	13.5	62.2
5	10	13.5	13.5	75.7
6	11	14.9	14.9	90.5
7	7	9.5	9.5	100.0
Total	74	100.0	100.0	

Table 4.2.

FCS Agent Response Rate to the FCS Agent Health Education Information Network Survey

District	Response Rate	District FCS Population	Percent of Total Population Responding
1	15	18	83
2	7	15	46
3	14	20	70
4	10	17	59
5	10	16	63
6	11	15	73
7	7	14	50
Total	74	115	64

Table 4.3.

FCS Agent Network District Demographics

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
1	18	15.7	15.7	15.7
2	15	13.0	13.0	28.7
3	20	17.4	17.4	46.1
4	17	14.8	14.8	60.9
5	16	13.9	13.9	74.8
6	15	13.0	13.0	87.8
7	14	12.2	12.2	100.0
Total	115	100.0	100.0	

FCS Agent Education Level

The number of those FCS Agents with masters degrees and advanced education responding to the survey is representative of the agent population as depicted in Tables 4.4 and 4.5. A slightly lower percentage of those with undergraduate degrees only and a slightly higher percentage of those with masters and advanced education responded than the percentages of those holding such degrees in the total population.

Table 4.4.

FCS Agent Health Education Information Network Survey Respondents: Masters/Advanced Degrees

	Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Respondents	No	24	32.4	32.4	32.4
	Yes	50	67.6	67.6	100.0
Total		74	100.0	100.0	
FCS Agent Population	No	42	36.5	36.5	36.5
	Yes	73	63.5	63.5	100.0
Total		115	100.0		

FCS Agent Tenure

The tenure of those FCS Agents responding to the survey was representative of the FCS agent population as shown in Table 4.5. The standard deviation in both data sets shows similar dispersions in the data set in tenure and similar in variance indicating the similarities between the two data sets and providing evidence that the FCS Agent Survey Respondents data is representative of the FCS Agent Network.

Table 4.5.

FCS Agent Health Education Information Network Survey Respondents' Tenure Compared to FCS Agent Network Tenure

		Tenure	
		FCS Agent Survey Respondents	FCS Agent Network
N	Valid	74	115
	Missing	0	0
Mean		14.84	15.31
Median		13.00	13.00
Std. Deviation		10.461	11.181
Variance		109.425	109.024

Degree from the University of Kentucky

The percentage of FCS Agent respondents (41.9%) holding an undergraduate or advanced degree from the University of Kentucky is representative of the percentage of the total FCS Agent population (41.7%) holding such degrees (Table 4.6).

Table 4.6.

FCS Agent Health Education Information Network Survey Respondents with an Undergraduate or Advanced Degree from the University of Kentucky

	Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Respondents	No	43	58.1	58.1	58.1
	Yes	31	41.9	41.9	100.0
	Total	74	100.0	100.0	
FCS Agent Population	No	67	58.3	58.3	58.3
	Yes	48	41.7	41.7	100.0
	Total	115	100.0	100.0	

The Mental Healthiness in Aging (MHAI) FCS Agents

The percentage population of those FCS Agents in District 1 responding to the FCS Agent Health Education Information Network Survey is greater than the percentage response of FCS Agents in any of the other six districts. Several factors may explain this phenomenon. Prior to conducting this study, the principal investigator supervised approximately 50% of agents in District 1, which has the greatest number of agents with tenure similar to that of the investigator indicating a potential relationship between the investigator and the FCS Agents in District 1. District 1 FCS Agents also have the largest population of FCS Agents with an undergraduate or advanced degree from the University of Kentucky indicating a potential familiarity or influence of University research on this population of FCS Agents as indicated in Table 4.7. Almost forty-two percent (41.7%) of

the 115 FCS Agents in the FCS Agent Network (n = 48) have an undergraduate or advanced degree from the University of Kentucky, and almost forty-two percent (41.9%) of the 74 FCS Agents responding to the survey (n = 31) had an undergraduate or advanced degree from the University of Kentucky as shown in Table 4.8. Table 4.7 shows the FCS Agent network tenure and UK Degree characteristics for each district in the state. These data show the demographic similarities and differences among the seven districts. District 1 has the greatest mean, median, and range in tenure of all seven districts and the greatest number of FCS Agents with UK Degrees. District 5 has the least mean and range in tenure, and District 6 the least median in tenure. District 7 has the least number of FCS Agents with UK Degrees. These demographic data are important to answering the research question *Are the organizational social network connectedness and attributes of the FCS Agents in the seven Extension Districts similar?*

Table 4.7.

FCS Agent Network Characteristics by District

District	# of FCS Agents	Mean Tenure in Years	Median Tenure in Years	Range Tenure	Number with UK Degrees
1	18	21	24.5	40	12
2	15	19.2	21	40	6
3	20	16.4	14	36	6
4	17	14.65	13	41	10
5	16	10.5	8	24	6
6	15	10.6	6	33	5
7	14	14.25	13	29	2
N	115				47

Table 4.8 shows the demographic similarities and differences among the FCS Agent survey respondents in each of the seven Districts. District 1 FCS Agent respondents had the greatest mean, median, and range in tenure and the greatest number of UK Degrees. District 6 FCS Agent respondents had the least mean and median tenure, while District 2 and 7 FCS Agent respondents had the least median tenure. Districts 2 and 7 FCS Agent respondents had the least range in tenure. All Districts had FCS Agent respondents with UK Degrees, with District 7 having one FCS Agent respondent with a UK Degree.

Table 4.8.

FCS Agent Health Education Information Network Survey Respondents Characteristics by District

District	Number FCS Agents	Mean Tenure in Years	Median Tenure in Years	Range Tenure	Number with UK Degrees
1	15	20.6	23	40	9
2	7	18.7	21	18	4
3	14	17.29	10.5	36	3
4	10	11	10.5	27	5
5	10	11.5	11	24	4
6	11	10.27	6	33	5
7	7	11.14	10	18	1
N	74				31

Within the total population of District 1 FCS Agents, there are differences among those FCS Agents who participated in the MHAI pilot and those who did not as indicated by Table 4.9. Those with more tenure and an undergraduate or advanced degree from the University of Kentucky populated the Mental Healthiness and Aging Initiative pilot.

Table 4.9.

District 1 MHAI Early Adopters and Non-Adopter Characteristics

MHAI Project	# of FCS Agents	Average Tenure in Years	Median Tenure in Years	Range Tenure	Number with UK Degrees
MHAI Agents	11	24.55	26	39	10
NON-MHAI Agents	7	15.43	11	33	2

In the following sections, the results are presented in the order of the study's three questions. First, variable data regarding the attributes and communication ties of those early adopters in District 1 of the MHAI pilot are described and compared with their peers in District 1 labeled non-adopters of the MHAI pilot. Next, variable data regarding the attributes and communication ties of the other six districts are described and compared with those of District 1. Finally, relational data will describe and compare the communication structure of the subsets of the seven Extension Districts and the FCS Agent Network as a diffusion network for health information and health programs.

Attributes of Opinion Leadership for Early Adoption

The initial data analysis focused on the data as being attributes of the individual FCS Agents in the FCS Agent network. Survey data from the FCS Agent Survey was downloaded into an Excel spreadsheet and coded according to agent identity, demographics, district, and agent participation in the Mental Healthiness and Aging Initiative. Although not all FCS Agents (N=115) responded to the FCS Agent Network Survey, each FCS Agent participating in the survey was asked to rate every agent

(N=115) in each of the seven Extension Districts, on how often they go to that person for health information. The same question was asked for each Extension District.

> FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District X**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. (Names appear in the same order as they appear in the staff directory.) **If you are in District X, click NA beside your name**.

The survey instrument required the responding agent to answer this question for every agent in the survey. The responses were scaled in the following manner: 0= NA and Never, indicating no communication tie was present: 1 = every few months, 2 = every few weeks, 3 = every week, and 4 = daily. These scores were summed for each FCS Agent and used as the variable of communication ties and considered an opinion leadership attribute of the actor and not a value of the communication structure. The other variables were district, tenure, masters/advanced education, and having an undergraduate or advanced degree from the University of Kentucky.

MHAI Pilot Early Adopters and Non-Adopters

IBM SPSS 20 software was used to conduct multiple regression analyses to predict the adoption of the MHAI Pilot with the predictor variables tenure, masters/advanced education (Advanced Ed), having an undergraduate or advanced degree from the University of Kentucky (UK Grad), and communication ties (Ties). Having a degree from the University of Kentucky was the strongest predictor of early adoption of MHAI, with an advanced degree, and communication ties also being strong predictors. All three predictor variables were statistically significant. Tenure approached significance but was not statistically significant (Table 4.10.).

Table 4.10.

Predictor Variables of Adoption of the MHAI Pilot in Extension District 1

		Correlations				
		MHAI	**UK Grad**	**Advanced Education**	**Tenure**	**Ties**
Pearson Correlation	MHAI	1.000	.645	.561	.352	.461
	UK Grad	.645	1.000	.632	.205	.589
	Advanced	.561	.632	1.000	.567	.557
	Tenure	.352	.205	.567	1.000	.350
	Ties	.461	.589	.557	.350	1.000
Sig. (1-tailed)	MHAI	.	.002	.008	.076	.027
	UK Grad	.002	.	.002	.207	.005
	Advanced	.008	.002	.	.007	.008
	Tenure years	.076	.207	.007	.	.077
	Ties	.027	.005	.008	.077	.
N		18				

Opinion Leadership

Relational network diffusion theory (Valente, 1995) suggests that direct contact between individuals influences the spread of an innovation. The model uses the nominations by actors to determine who in the social system is considered an opinion leader. Opinion leaders (Rogers, 2003) are considered to be the early adopters who pass new ideas to opinion followers. This model remains one of the most useful models for network analysis (Valente, 1995). This study theorized that the FCS Agents responding to the FCS Agent Survey identified opinion leaders through their selection of FCS Agents, listed in the survey, who they went to directly for health education information. If one theorizes that the number of communication ties is a measure of opinion leadership, then the number of communication ties (opinion leadership) an FCS Agent has is conditional on other attributes of the FCS Agent. Opinion leadership becomes a dependent variable

that can be predicted by independent variables such as district, tenure, an advanced degree, or being a UK Graduate.

Having an undergraduate or advanced degree from the University of Kentucky was the strongest predictor of having communication ties as a measure of opinion leadership (Table 4.11) with the predictors of an advanced degree, tenure, and district strongly predicting communication ties.

Table 4.11.

Predictors of Opinion Leadership

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	508.704	4	127.176	4.637	.002[b]
	Residual	3016.688	110	27.424		
	Total	3525.391	114			

a. Dependent Variable: # Communication Ties
b. Predictors: (Constant), UK Grad, Tenure, District, Advanced Ed.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.380[a]	.144	.113	5.237

a. Predictors: (Constant), UK Grad, Tenure, District, Education Level

Table 4.11. (cont.)

		Correlations				
		Opinion Leadership	**Advanced Ed**	**Tenure**	**UK Grad**	**District**
Pearson Correlation	Opinion Leadership	1.000	.266	.222	.294	-.225
	Advanced Ed	.266	1.000	.317	.386	-.183
	Tenure	.222	.317	1.000	.168	-.293
	UK Grad	.294	.386	.168	1.000	-.246
	District	-.225	-.183	-.293	-.246	1.000
Sig. (1-tailed)	Opinion Leadership	.	.002	.009	.001	.008
	Advanced Ed	.002	.	.000	.000	.025
	Tenure	.009	.000	.	.036	.001
	UK Grad	.001	.000	.036	.	.004
	District	.008	.025	.001	.004	.
N		115				

FCS Agent Network Structure

Social network analysis (Scott, 2000) is concerned with relational data that includes the contacts, ties and connections that relate one FCS Agent to another. Relations are not properties of the FCS Agents but of systems of FCS Agents, i.e. the seven Extension Districts embedded in the FCS Agent Network. We can measure the communication ties of the FCS Agents in the districts, and use analysis techniques to infer the presence of a network structure beyond the District level. Network analysis expresses these relations as linkages that connect actors in mathematical measurements of these relations in sociometric graphs and matrices of binary data. It is the intersection of the communication ties in the FCS Agent Network that defines the FCS Agent's position within the FCS Agent Network (Brass, 2011).

The data from the FCS Agent Network Survey (n=74) was downloaded into an Excel database, and all non-respondent nodes were removed from the data set creating a node-by-node square (74x74) matrix, a record of the communication ties between pairs of responding FCS Agents. UCINET Social Network Analysis software (Borgatti, 2002) was used to transform the data set into a UCINET binary data set (See Appendix F: FCS Agent Network Binary Data Output) and NETDRAW was used to graph the data (Figure 4.1). FCS Agents (n=74) participating in the survey were asked to rate each agent in each of the seven Extension Districts, by indicating how often they go to each person for health information. The same question was asked for each Extension District.

> FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District X**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. (Names appear in the same order as they appear in the staff directory.) **If you are in District X, click NA beside your name**.

The survey instrument required the FCS agent to answer this question for every FCS agent in the survey. Responses were scaled in the following manner: 0 = NA and Never, indicating no communication tie was present, 1 = every few months, 2 = every few weeks, 3 = every week, and 4 = daily. A matrix of absolute values of district, tenure, education, and UK affiliation was generated in a similar matrix. The matrices were combined in which pairs of data are treated as one observation. Inferential statistics were not appropriate for relational data. The statistical formulas do not work on relational data as the error terms in the regression will be correlated across observations (Hanneman, 2005). Observations in the same row or column will be positively correlated, and the

standard errors will compute too small and the p-values too optimistic for the prediction of the FCS Agent position within the FCS Agent Network structure.

Quadratic Assignment Procedure and Hypothesis Testing

Quadratic assignment procedure (QAP) is a statistical procedure used in social network analysis and is useful for analyzing dyadic data sets (i.e. data sets where pairs of entities are analyzed). In the case of this study, the dyadic pairs are FCS Agents connected to other FCS Agents. These pairs are more likely to have communication ties if they share similar affiliations such as being affiliated with a District or having an undergraduate or advanced degree from the University of Kentucky.

If FCS Agent 1 communicates with FCS Agent 2, and FCS Agent 2 communicates with FCS Agent 3, it may be relatively likely that FCS Agent 1 communicates with FCS Agent 3. The observations are not independent of each other. The independent observations are either attributes of each of one or both members of the pairs (i.e. FCS Agent 1 and FCS Agent 2 or FCS Agent 1 and FCS Agent 3) or similarities or matches between the pairs. Moreover, the fact that there are repeating observations means that observations in the same column or row will be correlated. Because observations are not independent they tend to be highly correlated with the standard error computed wrong.

In the QAP procedure in UCINET (Borgatti, 2002; Hanneman, 2005) for network analysis, the standard errors are estimated using permutations of the data set. Essentially, what the QAP does is to "scramble" (Simpson, 2001, p. 6) the dependent variable data through several permutations; by taking the data, and scrambling it repeatedly, resulting in multiple random datasets with the dependent variable. Those datasets and analyses

form an empirical sampling distribution and can be used to compare a coefficient with this sampling distribution of coefficients from all the permuted datasets. QAP permutes the rows and columns—but for a single node, the row and column remain the same, and are permuted in the same way, so that the rows and columns for a single node are not separated. The coefficients and statistics will be values from the empirical sampling distribution under the null hypothesis, but the sampling distribution correctly takes into account the correlation among observations (Simpson, 2001).

The FCS Agent Respondent Network Structure

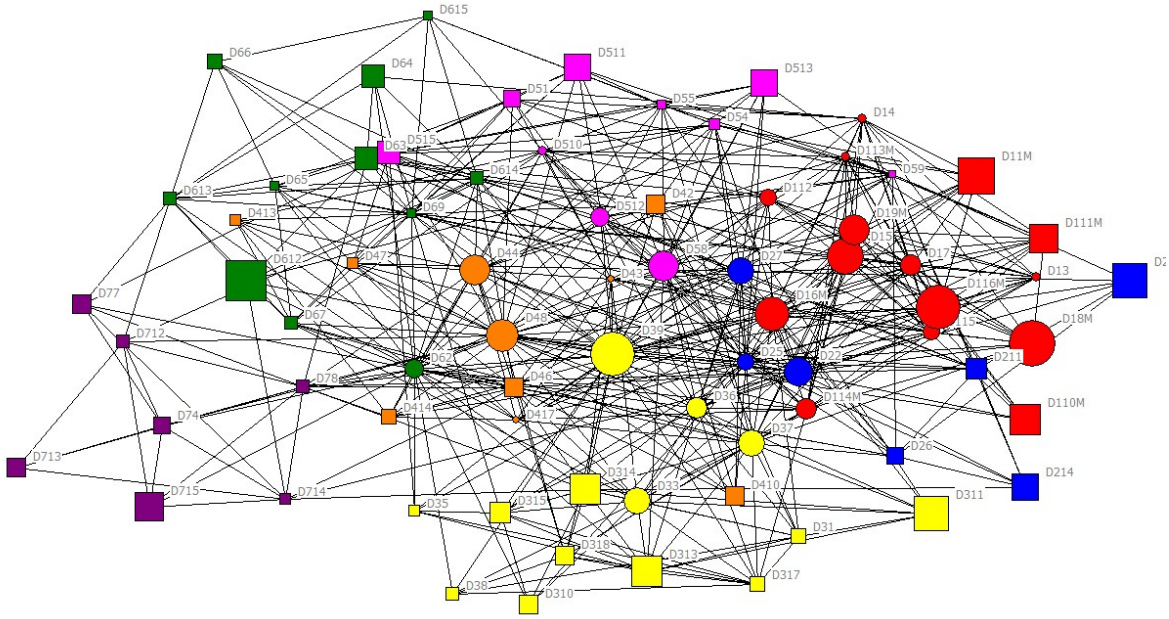
In the FCS Agent Health Education Information Network Survey Respondents, communication appears to occur mostly between members of the same district (Figure 4.1). FCS Agents with more tenure appear to be more central in the network. The network is connected (rather than fragmented) and relatively core-periphery in structure. This indicates that extension agents do communicate outside their district, at least at the every few months' level. District 1 appears to dominate the core (indicated by circular nodes) of the network (Figure 4.1).

Core Periphery

When one applies the core-periphery model to FCS Agent-by-FCS Agent data, the model identifies (a) a set of FCS Agents who have high density of communication ties among themselves (the core) by sharing many communication ties, and (b) another set of FCS Agents who have very low density of communication ties among themselves (the periphery) by having few communication ties in common. FCS Agents in the core are able to coordinate their communication ties, while those FCS Agents in the periphery

are not. As a consequence, FCS Agents in the core are at a structural advantage in exchanging communication ties with the FCS Agents in the periphery.

Figure 4.1. *FCS Agent Opinion Leadership Network (Contact occurs at least every few months)*



● Those agents in the core of the network

●Size of circle indicates tenure. Larger circle = greater tenure

■ Those agents in the periphery of the network

■ Size of square indicates greater tenure. Larger square = greater tenure

■ District 1 ■ District 2 ■ District 3 ■ District 4
■ District 5 ■ District 6 ■ District 7

Every district has FCS Agents in the core of the network as well as FCS Agents in the periphery of the network structure. The questions regarding the network structure are what affiliations might lead to FCS Agents having a central position in the FCS Agent Network? There are two affiliations of concern in this study, one is the FCS Agent affiliation with the District network and the other is the affiliation of having a degree from the University of Kentucky.

District affiliation is strongly correlated significantly to having a central communication position in the FCS Agent Network Structure while the UK affiliation is neither statistically nor practically significant (Table 4.12).

Table 4.12.

Affiliation and Communication Ties

Correlations[a]		
Variables	1	2
Communication Ties		
District Affiliations	.54**	
UK Affiliation	0.01	-.04*

Note. [a] N 74
*p <.05
**p <.01
Used QAP permutation to calculate significance

Centrality and coreness. The concepts of degree, closeness, and betweenness describe the locations of FCS Agents in the network in terms of how close they are to the center or core of the FCS Agent Network. FCS Agents who have more communication ties to other FCS Agents may have an advantaged position over agents not in the center of the FCS Agent Network. Because they have many communication ties, they may have alternative ways to manage and develop their health education programs and thus may be less dependent on others in the FCS Agent Network. This advantage position may give them more access to the resources of the network as a whole. Because they have many ties, they are often third parties and deal makers in exchanges among others and they are able to benefit from this brokerage. A very effective measure of an actor's centrality and power potential is the measurement of degree.

In the previous opinion leadership analysis, the communication ties as a measure of opinion leadership were undirected data. The FCS Agents differed from one another only in how many incoming communication ties they had. This second analysis of the FCS Agent Health Education Information Network Survey Respondents uses the data as directed between pairs of respondents so it is important to distinguish centrality based on in-degree (number of nominations received by an FCS Agent) from centrality based on out-degree (the number of nominations an FCS Agent makes). If a FCS Agent receives many nominations (ties), they hold a prominent position in the network. Many other FCS Agents seek to communicate with them directly, and this may indicate their importance in the FCS Agent Network. FCS Agents who have unusually high out-degree are FCS Agents able to exchange information with many other FCS Agents. FCS Agents who display high out-degree centrality are referred to as *influential* FCS Agents and are important in the diffusion of health information and programs.

Centrality and power. Centrality and power are functions of the connections of the FCS Agents in the FCS Agent Network. The more connections the FCS Agent, the more central the agent is in the network. The fewer the connections the other FCS Agents have in the network, the more powerful the central FCS Agent is said to be. The FCS Agent's power depends on other FCS Agents' power.

Bonacich Power (Hanneman, 2005) is a procedure of estimating centrality by giving each FCS Agent an estimated centrality equal to his or her own degree, plus a weighted function of the degrees of the FCS Agents to whom the individual FCS Agent is connected. This computation uses the first estimates (i.e. again; each FCS Agent is given an estimated centrality equal to his/her own first score plus the first scores of those to

whom they are connected). This is computed numerous times, the relative sizes (not the absolute sizes) of all FCS Agent scores come to be the same. The scores can then be re-expressed by scaling by constants.

The Bonacich approach to degree-based centrality and degree-based power are based on adjacencies; taking into account the connections of the FCS Agents' connections, in addition to the FCS Agent's own connections. FCS Agent power arises from connections to other FCS Agents with weak ties, as opposed to connections with FCS Agents with strong ties; it is another way in which the positions of the FCS Agent in the FCS network structure endow them with different potentials. The attenuation factor .5 beta indicates the effect of the FCS Agent's peer FCS Agent's connections on the FCS Agent's power.

Closeness centrality. Degree centrality measures the immediate communication ties of an FCS Agent, or the ties of the other FCS Agents in the Agent network, rather than indirect ties to all others. One FCS Agent might be tied to a large number of others in the District, but those others might be disconnected from the FCS network as a whole. The FCS Agent could be quite central, but only in the district in which he or she works. Simply said, centrality is the degree of connections (number of connections), betweenness (number of shortest paths a FCS Agent has in communication ties with other FCS Agents), and closeness (the relative distance to all other FCS Agents).

Closeness centrality approaches (Hanneman, 2005) emphasize the distance of the FCS Agent to all others in the network by focusing on the distance from each FCS Agent to all others. Another way of thinking about how close an FCS Agent is to all others is to ask what portion of all others the FCS Agent can reach in one step, two steps, three steps,

etc. Closeness Centrality measures how close each FCS Agent is to all other FCS Agents. The core periphery model estimates the degree of closeness of each FCS Agent to the core of the FCS Agent Network. A number of measures assess the degree to which the FCS Agent Network falls into a core/periphery structure for different sizes of core calculated. Each measure starts with the FCS Agent with the highest coreness score and places them in the core and all other actors are placed in the periphery

The core is increased successively by moving the FCS Agent with the highest coreness score from the periphery into the core. This process continues until the periphery consists of a single FCS Agent. nDiff is a generalization of centralization and sums the differences between the FCS Agent in the core with the lowest coreness score with all those in the periphery and adds to this the sum of the difference between the actor with the highest score in the periphery and all the actors in the core (Borgatti, 2002). This value is then normalized. Diff is similar but places a weighting on the size of the core. This weighting is equal to the square root of the core size, and so the measure gives greater value to smaller cores. The correlation measure correlates the given coreness scores with the ideal scores of a one for every core member and a zero for actors in the periphery. Tables 4.13 and 4.14 detail the descriptive statistics predicting centrality and coreness in the FCS Agent network.

Table 4.13.

Standardized Regression Coefficients from Analyses Predicting Beta Centrality

Standardized Regression Coefficients from Analyses Predicting Beta Centrality	
Independent Variable	**Model 1[a]**
Tenure	0.23
Education Level	0.15
R^2	0.13
Adjusted R^2	0.08
Model F	3.95*

Note. [a] N = 74
*p<.05
**p <.01

Table 4.14.

Standardized Regression Coefficients from Analyses Predicting Coreness

Standardized Regression Coefficients from Analyses Predicting Coreness	
Independent Variable	**Model 1[a]**
Tenure	0.31*
Education Level	0.11
R^2	0.13
Adjusted R^2	0.011
Model F	5.29**

Note. [a] N = 74
*p<.05
**p <.0.01

FCS core periphery. All Districts have FCS Agents in the core of the FCS Agent Network. There are attributes of the FCS Agents that are predictors of central positions

within the FCS Agent Network. This study looked at tenure, education level, and district affiliation as predictors of central positions in the FCS Agent Network. Tables 4.15. and 4.16. detail the descriptive statistics of the core periphery of the FCS Agent Network for respondents of the FCS Agent Health Education Information Network Survey.

Table 4.15.

Attributes that Lead to Central Positions in the FCS Agent Network

Means, Standard Deviations and Correlations[a]										
Variable	**M**	**SD**	**1**	**2**	**3**	**4 5**		**6**	**7**	**8**
1	14.85	10.46								
2	1.73	0.58	.32**							
3	8.05	6.22	-0.04	0.07						
4	8.05	5.29	.33*	0.16	-0.05					
5	14.8	6.99	0.21	0.17	.69**	.66**				
6	2727.07	1511.77	.28*	0.23	.61**	.68**	.94**			
7	61.9	10.31	0.1	0.2	.39**	.49**	.67**	.70**		
8	119.30	132.76	0.02	0.13	.66**	.31**	.69**	.63**	.50**	
9	0.10	0.06	.34**	0.21	.56**	.65**	.86**	.96**	.61**	.57**

Note. Variables: 1 = Tenure, 2= Education, 3 = Out-going ties, 4 = In-coming ties, 5= Number of Ties, 6= Beta Centrality, 7 = 2-Step Reach, 8 = Betweeness, and 9 = Coreness.

[a] N =74

* $p<.01$

**$p<.05$

Table 4.16.

Standardized Regression Coefficients from Analyses Predicting In-coming Ties

Standardized Regression Coefficients from Analyses Predicting In-coming Ties	
Independent Variable	**Model 1[a]**
Tenure	.32*
Education Level	0.11
R^2	0.13
Adjusted R^2	0.11
Model F	5.29**

Note. [a] N = 74
*p<.05
**p <.01

Tenure was a statistically significant predictor of incoming ties, coreness and position in the FCS Agent Network. More tenure was associated with a larger number of incoming ties and more tenure was associated with a larger coreness score, education level was not a statistically significant predictor of network position.

District 1 appears to be central to the core of the FCS Agent Network. Using District 1 as the baseline variable, individuals in districts 6 and 7 have significantly fewer incoming ties than those in district 1, but the overall regression model is not statistically significant Table 4.17.

Table 4.17.

FCS Agent Network Centrality Prediction Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.345[a]	.119	.040	5.184

Note: [a] Predictors: (Constant), District1, District2, District 3, District4, District5, District6, District 7

Anova [b]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	243.171	6	40.528	1.508	.180[a]
	Residual	1800.613	67	26.875		
	Total	2043.784	73			

a. Predictors: (Constant), District1, District2, District 3, District4, District5, District6, District 7
b. Dependent Variable: InDegree

Correlations[a]

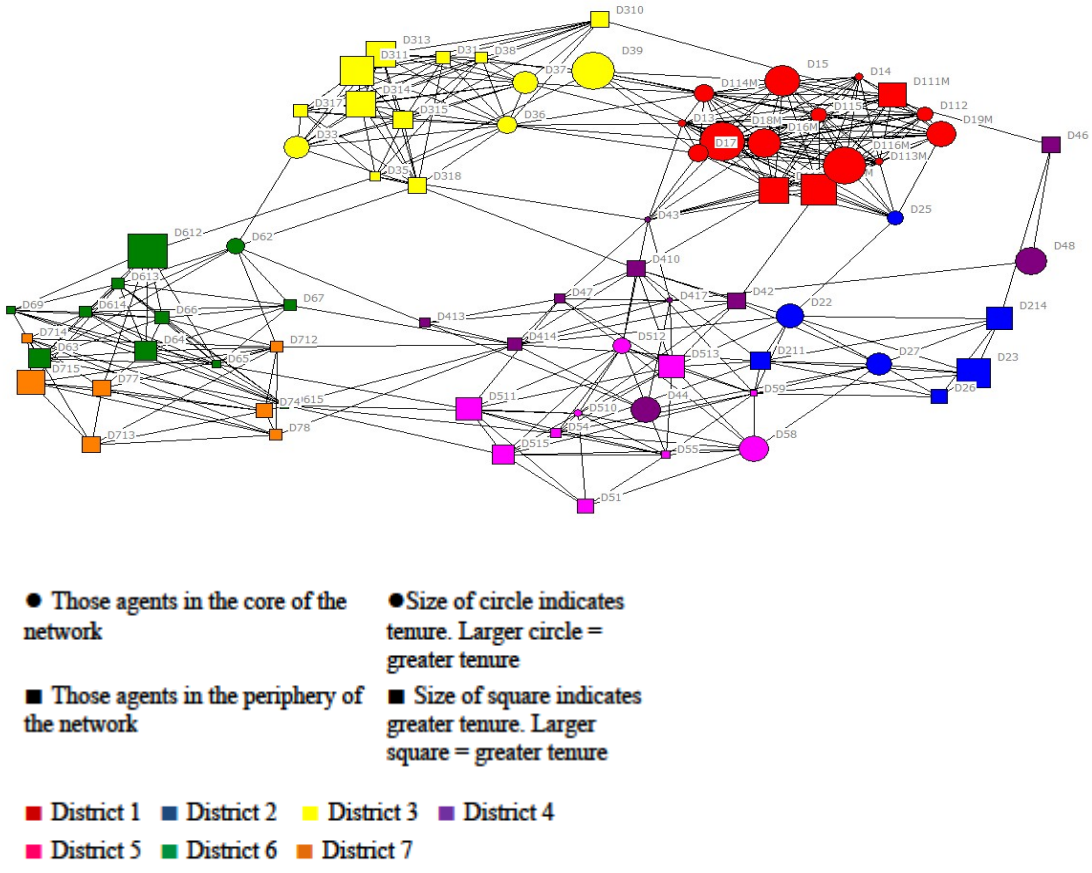
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	9.800	1.339		7.321	.000
District 2	-2.657	2.373	-.148	-1.120	.267
District 3	-1.157	1.926	-.086	-.601	.550
District 4	-.100	2.116	-.007	-.047	.962
District 5	-1.000	2.116	-.065	-.473	.962
District 6	-4.255	2.058	-.288	-2.067	.043
District 7	-5.229	2.373	-.291	-2.203	.031

Note. [a]Dependent Variable: InDegree
District 1 is baseline variable

Similarities in FCS Agent District Networks

Similarities exist among the individuals in the FCS Agent District Network structure as shown in Figure 4.2. Individuals in the same district tend to have similar individual networks. There is a great deal of similarity in the networks of individuals in District 6 and District 7, and those in District 2, District 4, and District 5. The networks of connected individuals correlate at the .25 level. Early adoption has been positively correlated with network structural centrality with members of the network being influenced by other adopters earlier. Structural centrality is positively associated with innovativeness (Valente & Fosados, 2006). In every district, there are members of the core periphery who are connected to FCS Agents in every district. These bridges provide links to the other districts for the rapid diffusion of health information and programs.

Figure 4.2. *Similarities in District Networks*



Chapter Summary

The purposes of this chapter were (a) to present the findings of the FCS Agent Network Survey; (b) describe the attributes and communication ties of the early adopters of the Mental Healthiness in Aging Initiative (MHAI) located in the 11 MHAI pilot counties in Eastern Kentucky; (c) compare them to the non-early adopters in Extension District 1; and (d) look for similar FCS Agent attributes and communication structures in the other six Extension Districts. This chapter identified attributes and communication ties as a measure of opinion leadership of FCS Agents that predict early adoption of new health education programs. Several interesting patterns of network structure influence

how the FCS Agent Network communicates health information. One surprising finding was the centrality of Extension District 1 in the core of the FCS Agent Network. The results of the study provide a better description of the role of the social network structure of FCS Agents in the processes of diffusing health information. Chapter 5 discusses findings from this study, including potential explanations of the findings and implications for the practice of Extension work, as well as the implications for future research.

CHAPTER FIVE: DISCUSSION

This chapter begins with a review of the statement of the problem, the purpose of the study, and the specific questions addressed in the study. Then, survey results are discussed for each of the three research questions followed by possible explanations of the findings. In addition, implications of the findings and limitations for future research are presented.

Understanding the organizational structures through which diffusion of new ideas and new programs are expected to take place is important to education leaders. The specialists and faculty at the University of Kentucky have the expectation that FCS Agents will help them introduce new programs to communities. Historically, experienced FCS Agents, trained to identify local people who could help diffuse programs at the local level, modeled diffusion practices for new FCS Agents. Training for all agents included getting to know the community and locating the key influencers at all levels of the community. As Extension has changed over the years and focused more on adult education, less attention has been given to the use of early adopters and influential network members for diffusing innovations in targeted populations.

The Mental Health and Aging Initiative (MHAI) (Murray, 2007) tested the theory that complex health messages could be diffused more rapidly by utilizing the Extension Diffusion System. This initiative aimed to improve the health of elder rural adults (persons aged 65+ years of age) by developing community relationships in rural areas of Kentucky through partnership with Family Consumer Sciences (FCS) Extension Agents, creating discussion in the community regarding mental health and aging, and implementing a community mental health and aging awareness intervention program.

The MHAI awareness intervention program strived to communicate key messages and increase knowledge surrounding positive mental health and aging. When comparing three groups from a random telephone survey (N=774) in 27 control counties, 29 media intervention counties, and 11 full intervention counties, results indicated the full intervention counties agreed more with being able to assist elders who may have a potential mental illness when necessary (Zanjani, 2011). The MHAI also demonstrated that community interventions on mental health could occur within majority rural regions. It provided evidence supporting the effective use of the Extension Diffusion System for the diffusion of complex health messages (Kruger, 2011).

The results of this current study support the notion that FCS Agents in other Extension Districts of Kentucky have similar network characteristics for potentially diffusing key health messages and programming rapidly to the local communities. Being able to better utilize the informal networks of the FCS Agents in the Extension Diffusion Network more efficiently for diffusing health programs could result in significant impacts in improved health for Kentuckians and provide for better use of tax dollars in the support of Cooperative Extension programs both at the local, state, and federal level.

The study target population was all Cooperative Extension employees with the title of County Family and Consumer Sciences (FCS) Agents employed by the University of Kentucky's College of Agriculture (N=115) between July 1, 2011 and July 31, 2011 (duration of the study). The FCS Agents are community based in every county of the Commonwealth of Kentucky and are classified as field staff of the College of Agriculture.

The diffusion of innovation theory, grounded in Cooperative Extension work, provides a foundation for how the organization interacts with those whom it serves. Based on research conducted from the 1940s through the 1960s, the focus of Extension scholars has been on the adoption of innovations in farming operations (Stephenson, 2003). Rogers (1963) referred to the diffusion process as the Extension Agents' "strategy for change" (p. 69).

Early references in Extension programs focusing on youth, families, and communities addressed the influence of neighbors in the adoption of the innovation process. Extension scholars viewed the community as an extension of the farm community, and research in the social science disciplines of Extension work is very limited to this day (Rogers, 1963, 2003). This study adds to the body of literature of diffusion studies in Family and Consumer Sciences Extension as well as to the literature on organizational diffusion. Extension research primarily focused on individual farmers and the diffusion process through individual adopter attributes. There has been no focus on how the diffusion process occurs within the formal and informal networks of the Cooperative Extension organization with the mandate for diffusing new research, programs, and technology to local people, and this study contributes to that particular body of literature.

Purpose of the Study

The purposes of this study were to (a) describe the attributes and communication ties of the early adopters of the Mental Healthiness in Aging Initiative (MHAI) pilot by early adopter FCS Agents located in the eleven MHAI pilot counties in eastern Kentucky; (b) compare the findings to the non-early adopters in Extension District 1, and (c) look

for similar FCS Agent attributes and communication structures in the other six Extension Districts. This study also sought to identify attributes and communication ties of FCS Agents that may predict early adoption of new health education programs and to provide better understanding of the role of the social network structure of Family and Consumer Science Extension (FCS) Agents in the processes of diffusing health information and health education programs in the Cooperative Extension Service System (Cooperative Extension).

State specialists and university faculty and staff typically do not have experience at the local county level. Often, the expectation is for agents to adopt new programs or ideas just because they emanate from the state or university offices. In order to better facilitate the diffusion of essential new health programs for changing the health status of Kentuckians, it is imperative that a systematic method for assessing the networks for particular new programs and ideas be developed, allowing even the most inexperienced specialist or faculty the ability to assess the potential adoption of any new program or idea.

Research Questions and Findings

The research questions that guided this study and the findings are presented in Table 5.1. The significance of these findings are discussed in this chapter as well as the implications for Kentucky Cooperative Extension, Kentucky, and the knowledge base of diffusion on innovation.

Table 5.1.

Research Questions and Findings

Research Question	**Findings**
Are there similarities in the organizational social network connectedness and attributes of FCS Agent early adopters of the Mental Healthiness in Aging Initiative (MHAI) and the FCS Agent non-early adopters in the Extension District 1 organizational social network?	Having a degree from UK (p = .002) and an advanced degree (p = .008) were the strongest predictors of early adoption of MHAI. Communication ties as a measure of opinion leadership and early adoption was the next strongest predictor (p= .027) of early adoption of MHAI. Tenure as a predictor of early adoption of MHAI p = .076 was approaching significance but was not statistically significant.
Are the organizational social network connectedness and attributes of the FCS Agents in the seven (7) Extension Districts similar?	Having an undergraduate or advanced degree from the University of Kentucky was the strongest predictor (p=.001) of having communication ties as a measure of opinion leadership with the predictors of an advanced degree p=.002, district p=.008, and tenure p=.009, strongly predicting communication ties. Tenure was a statistically significant predictor of incoming ties (p < .01), coreness (p <.05), and position (p <.01) in the FCS Agent Network.
Are there bridges in the social networks of the FCS Agents that could influence the early adoption of new health programs across District networks?	Every district has FCS Agents positioned in the core of the FCS network as well as FCS Agents in the periphery of the network structure. The networks of connected FCS Agents correlate at the .25 level.

FCS Agent Early Adopters and Non-adopters of MHAI

Education, tenure, communication ties, and having an undergraduate or graduate degree from the University of Kentucky were predictors of FCS Agents in District 1 being an early adopter of the Mental Healthiness in Aging Initiative pilot. These measures are important because diffusion of innovation theory generalizes that FCS

Agent opinion leaders (early adopters) have characteristics that differ from their peer FCS Agents.

Education

Having a degree from UK (p = .002) and an advanced degree (p = .008) were the strongest predictors of early adoption of MHAI. Ten of the eleven early adopter FCS Agents held degrees from the University of Kentucky compared to two of the seven non-adopters.

Political alliances in the organization are a source of power that comes from having close contact with the "sponsors" (Kanter, 1979, p. 66), which in this study the sponsoring organization was UK. Having an undergraduate or advanced degree from the University of Kentucky could provide alliances with specialists and administrators at the institution that builds the network of the FCS Agent and gives greater access to the resources.

Communication Ties

Communication ties as a measure of opinion leadership, and early adoption was the next strongest predictor (p= .027) of early adoption of MHAI. Opinion leadership is not an attribute of formal position, because all of the FCS Agents have the same formal position within the organization. According to Rogers (2003), opinion leadership is earned through competence, social accessibility, and conforming to the organization's culture, which has its basis in the University of Kentucky. The significance of opinion leadership is the position that the FCS Agent holds in the center of the FCS Agent communication network and their ability to connect with many other agents (Rogers, 2003;Valente, 1995) .

Opinion leadership is a strong predictor of FCS Agent early adoption of MHAI. Using communication ties among the FCS Agent as the dependent variable, the investigator looked at the independent variables of tenure, advanced education, and having an undergraduate or advanced degree from the University of Kentucky as the status attributes that are generalized by diffusion theory.

A generalization of diffusion of innovation theory (Rogers, 2003) is that the opinion leaders (FCS Agents) have greater contact with change agents (UK specialists and faculty) than their peers. FCS Agent opinion leaders on average have higher status than their peers, with having an advanced degree being a measure of status. Tenure, having an advanced degree, and having a degree from the University of Kentucky were strong predictors of opinion leadership as measured by the number of communication ties related to the attribute of competence. This relates to the power that comes from being an opinion leader giving the FCS Agent opinion leader access to resources, information, and support which empowers the FCS Agent.

Tenure

Tenure as a predictor of early adoption of MHAI $p = .076$ was approaching significance but was not statistically significant. Early adopter FCS Agents median tenure was 26 years compared to 11 years for non-adopters. This is important because diffusion occurs in social systems that are homogenous in culture, race, socioeconomic status, and language (Rogers, 2003). The implications of tenure predicting adoption of new health programs is important as one of the barriers, communicating an innovation to a larger community and diffusing programs between heterogeneous FCS Agents, is a challenge.

Age creates the barrier in diffusing new health programs and information in the FCS Agent network.

Organizational Social Network Connectedness and Attributes

Predictors of Having a Communication Tie

Having an undergraduate or advanced degree from the University of Kentucky was the strongest predictor (p=.001) of having communication ties as a measure of opinion leadership with the predictors of an advanced degree p=.002, district p=.008, and tenure p=.009, strongly predicting communication ties. This is important because FCS Agents who have more communication ties to other FCS Agents may have an advantaged position over less connected FCS Agents. Because connected FCS Agents have many communication ties, they may have alternative ways to manage and develop their health education programs, and may be less dependent on others in the FCS Agent Network. This advantaged position may give them more access to more of the resources of the network as a whole. Because they have many ties, they are often third party and deal makers in exchanges among others, and are able to benefit from this brokerage, an example of referent power (French, 1959).

If an FCS Agent receives many nominations (ties), they hold a prominent position in the network (Valente, 2006; Valente & Fujimoto, 2010). Many other FCS Agents seek to communicate directly with these FCS Agents, and this may indicate their importance in the FCS Agent Network.

UK degree. This finding has implications for how we train and assimilate FCS Agents without a UK undergraduate or graduate degree into the organizational structure of the Cooperative Extension Service and the Family and Consumer Science Extension

Network. Mintzberg (1983) provides an explanation for better understanding this phenomenon in organizational theory in that organizational behavior is a power game and that opinion leaders use different levers of influence to control organizational actions through having a source or basis of the power. Having a degree from UK could provide the basis of power for the FCS Agent, bestowing an attribute of opinion leadership in the FCS Network. Having a degree from UK provides the FCS Agent with a broader network at the University level and more connections to access the resource base, important to being successful as an FCS Agent.

Advanced degree. Early adopters are often those in the social system who have higher status (Rogers, 2003). Advanced education does provide more technical expertise and knowledge but also provides status within the organization and an aspect of normative isomorphism, which creates homogeneity in the organization. Diffusion occurs more rapidly in homogeneous populations (Rogers, 2003). The implication for this finding is education is an important factor for diffusing new innovative programs. Education level was not a statistically significant predictor of network position (coreness).

District. Every district has FCS Agents positioned in the core of the FCS network as well as FCS Agents in the periphery of the network structure. The networks of connected FCS Agents correlate at the .25 level. District as a predictor of having a communication tie is a serious implication for Cooperative Extension as a statewide diffusion system. District 1 appears to be central to the core of the FCS Agent Network. Using District 1 as the baseline variable, individuals in districts 6 and 7 who were very similar had significantly fewer incoming ties than those in district 1, but the overall

regression model is not statistically significant. The District 3 FCS Agent Network was not similar to any of the other districts. The FCS Agent networks in districts 2, 4 and 5 were similar. District 1 FCS Agents have the potential to diffuse health information to others in the whole FCS Network through their influence with their peers. The challenge to Cooperative Extension is to create a more connected statewide diffusion network.

Tenure. Tenure was a statistically significant predictor of incoming ties ($p < .01$), coreness ($p < .05$), and position ($p < .01$) in the FCS Agent Network. More tenure was associated with a larger number of incoming ties and more tenure was associated with a larger coreness score, and position relative to other FCS Agents in the network. One would expect to find a positive correlation between the number of communication ties of FCS Agents and the number of years of service.

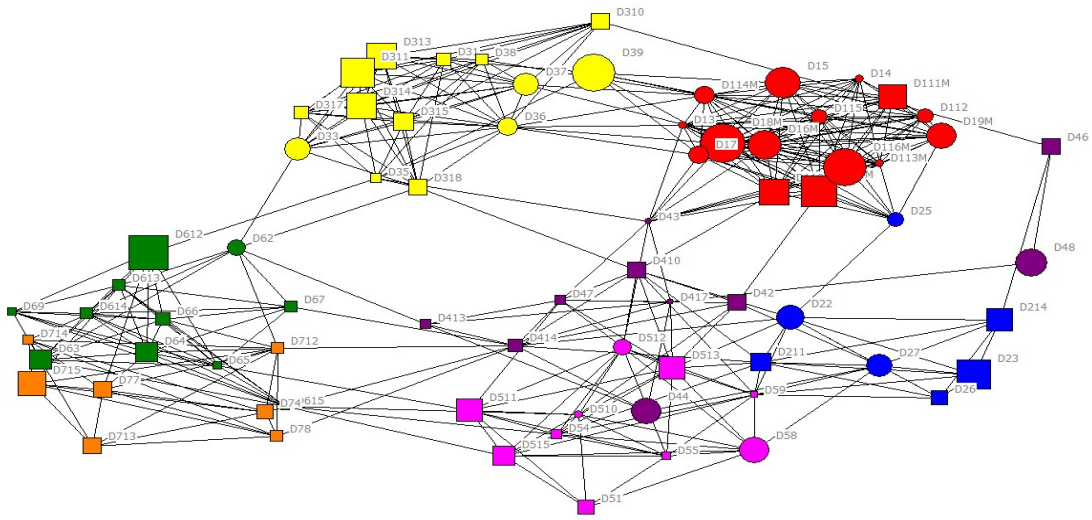
The concepts of degree, closeness, and betweenness describe the locations of FCS Agents in the network in terms of how close they are to the center or core of the FCS Agent Network (Hanneman, 2005). Centrality and power are a function of the connections of the FCS Agents in the FCS Agent Network. The more connections the FCS Agent, the more central the agent is in the network. The fewer the connections the other FCS Agents have in the network, the more powerful the central FCS Agent is said to be. The FCS Agent's power depends on other FCS Agents power.

Cooperative Extension has a large population of tenured FCS Agents. As these agents retire, the communication network may weaken resulting in a less effective diffusion system. The implications of this are important to the viability of the diffusion systems.

Social Network Bridges in the FCS Agent Networks

The FCS Agent Network has a core peripheral structure, meaning there are two sub-sets of FCS Agents. There are FCS Agents in the core of the network with many communication ties and FCS Agents on the periphery of the network with fewer communication ties. According to Valente (1995), FCS Agents who are in central positions of the network will have similar adoption times. The FCS Agent Network has a core of agents who are densely tied to each other (Scott, 2000) and a periphery of other agents who have more ties to the core members than to each other. All Districts have FCS Agents in the core of the FCS Agent Network as shown in Figure 5.1.

Figure 5.1 *FCS Agent Network Core Periphery*



● Those agents in the core of the network

●Size of circle indicates tenure. Larger circle = greater tenure

■ Those agents in the periphery of the network

■ Size of square indicates greater tenure. Larger square = greater tenure

■ District 1 ■ District 2 ■ District 3 ■ District 4
■ District 5 ■ District 6 ■ District 7

This study looked at tenure, education level, and district affiliation as predictors of central positions in the FCS Agent Network. This is significant to diffusing new health programs through the FCS Agent Network. The FCS Agents in the core of the network can play a significant role in diffusing new health information and programs to the FCS Agents in the periphery of the network.

FCS Agent power arises from connections to weak other FCS Agents, as opposed to strong FCS Agents, and is another way in which the positions of the FCS Agent in the FCS network structure endow them with different potentials. The attenuation factor .5 beta, indicates the effect of the FCS Agent's peer FCS Agent's connections on the FCS Agent's power (Borgatti, 2002; Hanneman, 2005)

Degree centrality measures the immediate communication ties of an FCS Agent, or the ties of the other FCS Agents in the Agent network, rather than indirect ties to all others. One FCS Agent may be tied to a large number of others in the District, but those others might be disconnected from the FCS network as a whole. The FCS Agent could be quite central, but only in the district in which he/she works (Hanneman, 2005).

Implications for Practice in the Kentucky Cooperative Extension

One of the most surprising results was the strong predictor of having an undergraduate or advanced degree from the University of Kentucky to opinion leadership in the organization. From these findings, emerge some important questions for Cooperative Extension leadership.

What does it mean to have a degree from UK? Having a degree from UK, the sponsoring institution of Cooperative Extension, could bestow power to the FCS Agent. Kanter (1979) noted that having close contact with the sponsor was a source of power. If

those FCS Agents who are not UK graduates have fewer connections with their peer FCS Agents with a UK degree, the Family and Consumer Sciences program leadership should look at ways to better connect those non-graduates with the campus staff and faculty, and build better connections with their peers. This has implications for training of FCS Agents without a UK degree. Can we do a better job training new agents and purposefully build better connections to their UK counterparts?

Mentoring programs have been used successfully in Extension (Smith & Beckley, 1985; Smith, Hoag, & Peel, 2011) and could be an effective tool for integrating FCS Agents into the University of Kentucky culture. A study of Midwestern extension agents (Weyhrauch, Culbertson, Mills, & Fullagar, 2010) looked at various organizationally meaningful constructs. The study found psychological variables associated with highly engaged agents such as increased work-family facilitation, positive affectivity, and psychological capital. Engaging the FCS Agents into the University of Kentucky network more fully could provide benefits not only to the organization but also to the FCS Agent.

Extension District 1, in Eastern Kentucky, had the largest number of FCS Agents with a UK Degree. What makes UK special to people in Eastern Kentucky? Both public regional universities serving Eastern Kentucky, Eastern Kentucky University (EKU) and Morehead State University (MSU) graduate a large number of first time college graduates, while often graduates from these Universities send their children to UK and other public and private institutions of higher education. According to the Kentucky Council on Postsecondary Education (2006) several counties in District 1report having more UK graduates than graduates from the other public universities including EKU and MSU. Magoffin County in 2006 had more UK alumni than EKU and MSU combined. If

having a degree from UK predicts opinion leadership in the FCS Agent Network, what kind of effect does having a degree from UK have on other peer networks within Kentucky. Up to 1989 (Cone) all but three Kentucky Governors have been UK graduates. Since 1989, four of the five Governors have been UK graduates.

Do we aggressively link to alumni from the School and UK? Building social networks with alumni from across the Kentucky could build a stronger link to the School and the University, providing support for FCS Agents who are not graduates of UK. The School of Human Environmental Sciences should also explore the potential that exists in alumni networks for diffusing innovation in the field. Can the social networks of alumni groups be mapped and used to build stronger networks?

Implications for Kentucky

Kentucky continues to fall behind the improvements of other states, ranking 44th in the nation according to the United Health Foundation (2010) in the health status of citizens. The United States Department of Health and Human Services (Office of Disease Prevention and Health Promotion, 2011) new ten-year guidelines for 2010-2020 for improving this country's health status will require attention directed to the social environment. Rural areas attempting to implement a health intervention face unique difficulties, such as limited access to existing resources due to geographical distance, lack of transportation, or economic hardship (Hawley, 2006).

Community Structure and Organizational Structure

Rogers (2003) defines the social network as a group of interrelated units engaged in problem solving with a common goal, a definition that applies to community structures. Community networks are also complex and amorphous systems consisting of

individuals, informal groups and organizations, formal groups and organizations, and/or subsystems. Valente (1995) describes a network more simply, as a pattern of friendship, advice, communication or support that exists among members of the community (social system).

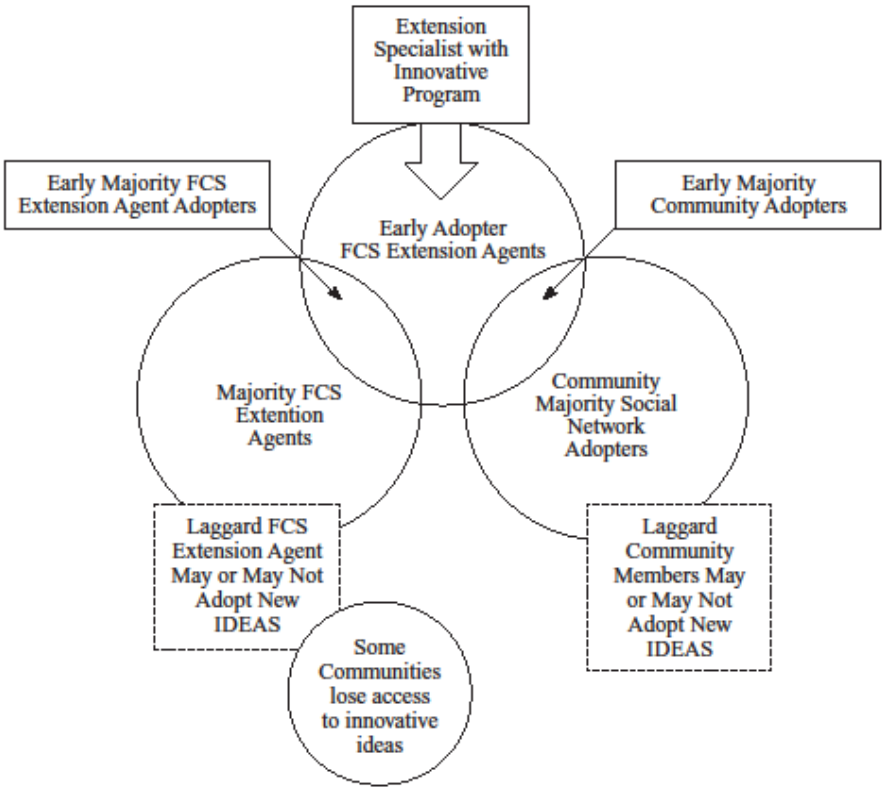
At the core of community structure in which Cooperative Extension works are formal and informal organizations of clientele organized in advisory groups, formal organizations such as the Extension Homemakers Association, 4-H Friends, commodity groups, and other affiliated organizations. The individuals in these groups are opinion leaders, influencers and in some cases change agents (Rogers, 2003) at all levels of local, regional, and state affairs.

Each of these units at all levels affects the communication structure in the diffusion process. The informal networks within the community, known as the communication structure of the social system, predict the behavior of the individual members (Rogers, 1995). This communication structure, or patterns of relationships among individual members, determines when members adopt an innovation (Wasserman, 1994). Rogers (2003) noted the difficulty in mapping the communication structure of a social system.

At the community level are opinion leaders important to the communication of an innovation. Rogers and Shoemaker (1971) defined opinion leaders as those who are able to exert influence generally upon those from the same social system and tend to reflect the norms of the community regardless of the "community tradition or modernity" (pp. 199-200).

There is a dual nature to diffusion in Cooperative Extension, with an overlap of processes that are occurring simultaneously at the organizational and community level. FCS Agent early adopters of new health programs, become change agents in their local communities seeking out opinion leaders and early adopters to spread the innovation in community structures. Figure 5. 2 shows the overlap of dual diffusion processes.

Figure 5.2. *The Dual Nature of Organizational Structure and Community Structure in the Diffusion Process*



If Cooperative Extension will be successful, in changing the health status of Kentuckians, the leadership must recognize these processes and utilize the existing organizational and community networks to be more cost effective in its approaches. The current economic climate and budget constraints require program administrators to work smarter and be more efficient in the use of tax dollars.

Because of the connection to the University of Kentucky, the 120 county extension offices are in an instrumental position to affect the health status of the state. Understanding the factors that influence the adoption of health curricula by county extension agents can provide Cooperative Extension administrators with a model for introducing other issue-driven programs and curricula to address effectively the innovation adoption patterns within the Cooperative Extension Diffusion System. Being able to frame the network attributes in a systems' perspective will provide a better understanding of the organizational dynamics that impact the diffusion process and allow for a better focus of organizational resources (Bolman, 1997).

Implications for Diffusion of Innovation Knowledge Base

Diffusion research traditions have studied particular innovations from many diverse disciplines. Cooperative Extension research primarily has focused on individual farmers and the diffusion process through individuals, mainly from University Extension Specialists and County Extension Agents to individual farmers.

Cooperative Extension, identified as a grassroots organization, has the expectation that local communities identify the issues they want Cooperative Extension to address. Much of the decision-making process is guided by County Extension Agents, who are autonomous in their decisions regarding curricula and programs they choose to conduct within their communities and counties. This study was limited to one aspect of the decision-making process, that of the influence of organizational social networks on early adopter FCS Extension Agents adopting the MHAI program. The Extension system has a diverse group of county extension agents, many of them involved in implementing parts of health programming. This study focused on the Family and Consumer Sciences (FCS)

Extension Agents within the larger Kentucky Cooperative Extension Service field staff. The purpose of this study was to examine diffusion social networks within one subsystem of a larger diffusion system.

The context of this study was the University of Kentucky Cooperative Extension Service's Family and Consumer Sciences program goal to improve the diffusion of new innovative programs through the network of FCS agents in every county of the state. The study contributes to the organization's knowledge of how the organizational social networks of FCS Extension agents implementing new programs impacts the diffusion of new programs in local communities. This study may not be descriptive of agriculture or youth-development agent organizational social networks. This study is particular to the State of Kentucky and the Cooperative Extension organization. It is not descriptive of other organizational networks, or other states' Cooperative Extension Systems.

Criticism of Innovation Diffusion Theory

A criticism of the Innovation Diffusion Theory is the presumption that innovation is always positive (Rogers, 2003), and there is a need to determine if the programs are actually new or just improved and therefore not actually an innovation (Hartley, 2005). Other attributes of the MHAI program such as relative advantage, compatibility, complexity, trialability, or observation attributes of the diffusion of innovation processes might better explain the adoption of MHAI by FCS Agents. Other attributes (Rogers, 2003) of the MHAI program could influence the FCS Agents' decision to adopt the MHAI program:

1. Relative advantage: Did they see the program as increasing their effectiveness or providing economic benefit?

2. Compatibility: Is it a voluntary program that they choose to implement because of community needs or do they perceive it mandated by administration?
3. Complexity: Is MHAI compatible with other Extension programs or similar to other programs they are implementing? How easy do they perceive the implementation of the MHAI program?
4. Trialability: Do they perceive MHAI as having choices of curriculum pieces that allows the FCS Extension Agent to try the program without adopting the entire program? Do they perceive MHAI as having limited risk to their careers or clientele?
5. Observability: Do they perceive the MHAI program as having high visibility with community members as well as with the administrators who evaluate their performance?

These attributes of diffusion (Rogers, 1995) affect whether an innovation will be implemented and may better explain the adoption of the MHAI program. However, the perspective of this study centered on those FCS Extension Agents in District 1, who chose to participate in the MHAI pilot study before the design of the program attributes. The study's assumption that MHAI was a new and innovative program is a limitation of the study. The flow of federal dollars for program support expects that innovation will occur and innovation is usually a criterion established by funding agencies in competitive grants; however, there is value in recognizing improvement in existing programs and not reinventing the wheel, even though funding sources are more interested in investing in potential innovations (Braddach, 2003).

Concentrating on attributes of successful innovations might prevent us from greater knowledge by concentrating on the attributes of failed innovative programs (Hartley, 2005). A limitation of this study is the concentration on a successful diffusion program, the MHAI program. Another study on the failures of FCS Extension Agents to adopt or to discontinue implementation of the MHAI program might have additional value to the Extension System, or failure to adopt other introduced programs.

Sustaining Innovation and Change

Innovation can result in rejection, short-lived change, or sustained change. Sustained change must be internalized, substantial, stable, and affect all facets of the organization (Duke, 2004). Habit and inertia to change are barriers (Tichy & Devanna, 1990). According to Galbraith (2002) the structure of the organization determines the power in an organization. Tushman and O'Reilly (1997) described organizations such as Cooperative Extension that rely on social control systems as those with strong cultures having three characteristics in common: a rigorous selection system, an intensive socialization process, and a comprehensive reward and recognition system. These factors could present barriers to utilizing the FCS Agent Network to diffuse new health programs.

This study failed to take into consideration the impact of other networks within the Cooperative Extension System that could affect the networks of the FCS Agents, including the Extension Administration Network, the FCS Leadership Network, the FCS Specialist Network, and the faculty network in the many departments that support the FCS Agent Network. The Kentucky Association of Family and Consumer Science Extension Agents is a professional organization that supports the FCS Agent. This

network of FCS Agents may be more significant than the formal organizational networks tied to the Extension Districts.

If innovations in the Kentucky Cooperative Extension Service are not reinforcing and shifts in perceptions and behaviors are not changing because of the implemented programs, diffusion will not be sustained. Because such behaviors are very slow to change, other environmental factors can influence the change process more dramatically than program changes.

In organizational design, the reward system is used as a strategy and incentive for influencing the direction of the organization (Galbraith, 2002). The performance evaluation system for county extension agents is complex and comprehensive and may be more predictive of early adoption. The performance evaluation system is a strategy for moving the organization forward and nurturing the leaders of change and innovation. Actions and behaviors that are measured are empowered and produced, and those actions and behaviors rewarded get produced (Belasco, 1990). The performance evaluation system is a measurement. A limitation of this study is the failure to look at the performance evaluation scores as an attribute of the FCS Agent in predicting early adoption.

The Study Data Set

A limitation to the analysis of the data collected in the FCS Agent Survey is the failure to achieve an 80% completion rate of all FCS Agents in the FCS Agent Network that would more adequately generalize the findings to the whole network. Findings were used to construct the network from the egocentric network, which is not as robust as having data from the entire FCS Agent network. Although the completed survey rate was

64% of all FCS Agents, and was representative of the whole network of FCS Agents, this study can only make inferences from the relational analysis and the network structure in terms of the population of FCS Agents who completed the FCS Agent Network.

Implications for Future Research Questions

The diffusion network model easily generates research questions about the FCS Agent Network — such as, how does communication flow between FCS Agent 1 and FCS Agent 3 if FCS Agent 2 is in the communication path and brokers the flow of information between the two sets of other FCS Agents? How does this information brokerage occur and what is the time element involved in the brokerage activity?

Another research question relates to other areas of FCS Agent programming such as parenting programming, money management programs, clothing and textiles or community development programs. Would the network look differently if the survey question was asked differently? The question asked on the FCS Agent Survey was:

> FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District X**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. (Names appear in the same order as they appear in the staff directory.) **If you are in District X, click NA beside your name**.

Do the agents have more or less communication ties regarding other programming areas? What would the network structure look like if we asked very specific questions such as:

> In **District X**, how often do you go to each person listed, **directly** for information on physical activity programming? Physical Activity information includes information about Get Moving Kentucky, a Matter of Balance, or Families on the Move obtained by face to face contact, phone, email, and/or other social media contacts.

On a program evaluation level, asking this kind of question could provide the specialist with a good idea of the communication structure for diffusing any program.

There are other questions that the findings of this study present that are of importance to the Family and Consumer Sciences Extension program such as Why is District 1 in the center of the core of the FCS network? The district has the highest tenure rate of all of the districts as well as the largest number of FCS Agents holding undergraduate or graduate degrees from the University of Kentucky but perhaps other attributes of the district that could better explain this phenomenon.

If the expectation is for innovation to occur at the University level and diffused among the FCS Agent Network, what are those communication ties between the FCS Agent Network and the FCS Specialist Network? We assume that FCS Specialists are change agents, but are they? What are the attributes of the FCS Specialist that could predict their effectiveness as a change agent in the FCS support network?

Then there are the other networks connected to the FCS Agent Network that support the overall effectiveness of Extension work and the diffusion of Extension programs. How do the communication networks of Agriculture/Natural Resource Agents and 4-H/Youth Development Agents connect with the FCS Agent Network?

The most interesting finding was the connection between having communication ties (opinion leadership) and having an undergraduate or advanced degree from the University of Kentucky. With the University of Kentucky being the employer, and less than half (41.7%) of the FCS Agents having a degree from UK, how do we explain this phenomenon? What is it about having that degree from UK that predicts opinion leadership?

Concluding Thoughts

Considerable interest has been directed toward Cooperative Extension methodology and processes, not only among other agencies and entities wanting to emulate the Cooperative Extension model, but also from program developers and administrators within the Cooperative Extension System. Cooperative Extension professionals are highly engaged in changing the nature of the organization to address more effectively the needs of the people the organization serves. Some concern exists in doing this, spending too much time on initiating and implementing change has inherent dangers of losing focus on the customer base of the Cooperative Extension Service. In business, there is a trend on organizing and designing the organization around the customer (Galbraith, 2002).

The findings of this study brings us back to the overall question "Is the Cooperative Extension Service customer-centric" (Galbraith, 2002, p. 91) and has the Health Education through Extension Leadership (HEEL) focused on the needs of the customer less than the needs of the internal organization? The system takes pride in being grassroots focused but concentrating on internal structural issues diverts the energy of the organization that should focus on the customer.

Since the implementation of HEEL, many changes have occurred in the management team of Cooperative Extension with the 2005 retirement of Dr. Bonnie Tanner, Assistant Director for Family and Consumer Sciences, and the 2006 death of Dr. Larry Turner, Director of the Cooperative Extension Service; the original leaders of the HEEL program.

One of the challenges for administration is to change the nature of the organization to continue to push the innovations in the organization. The change effort, generated by authority is powerful only as it is pushed (Senge, 1990). The culture of the organization and the socialization process in the bureaucracy will produce the same kind of management of the past unless a strategy to encourage level-five executive leadership focused on goals (Collins, 2001), creating a context for change that becomes part of the overall organizational strategy for innovation.

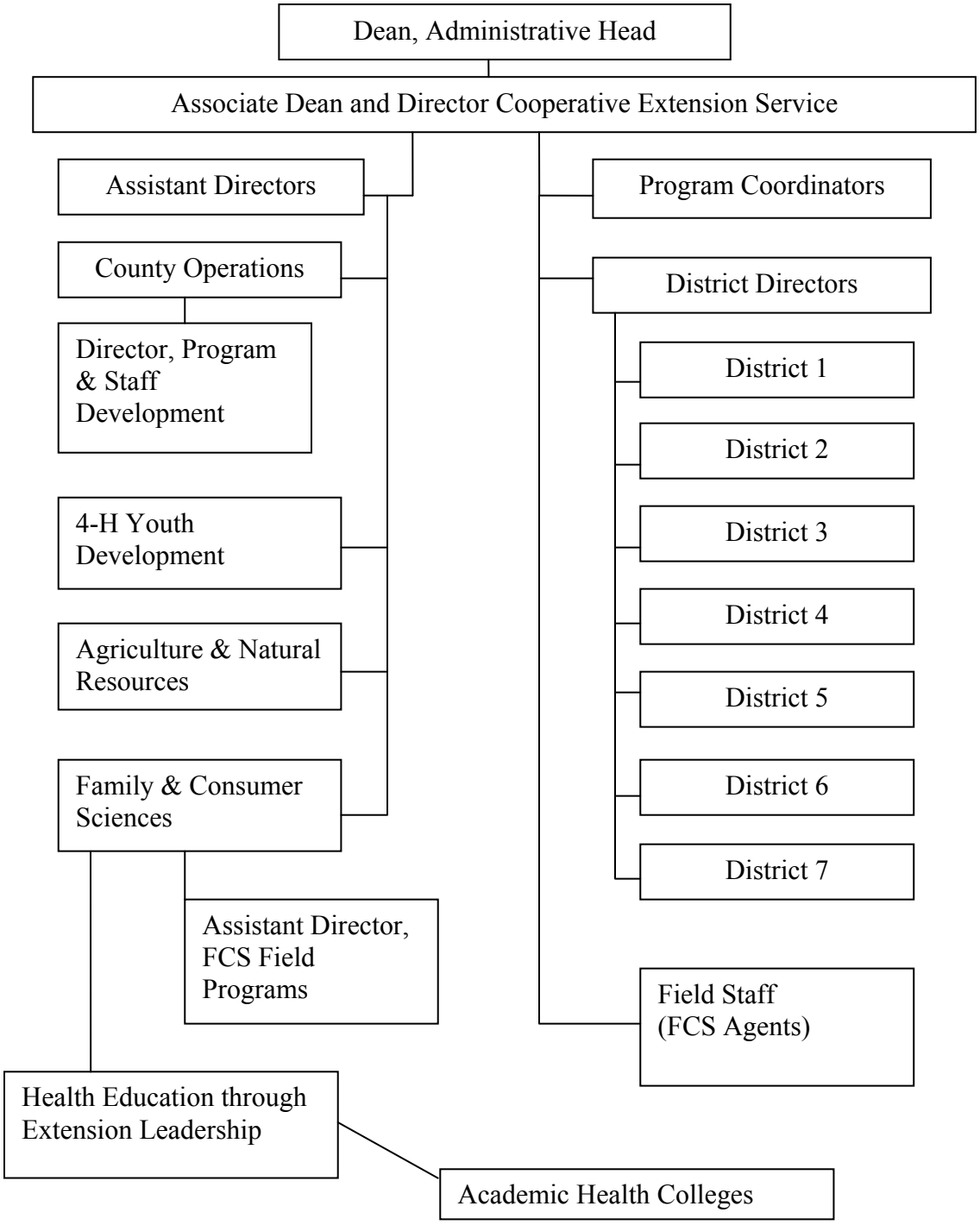
An organizational change study conducted in 1998 of thirty-four state Cooperative Extension Service programs and personnel (Betz et al, 1998) found a positive environment of organizational learning noted by Senge (1990) as an important component of organizational change. Organizational learning defines an organization's worldview. This 1998 change study identified a gap in what the system does versus what it should be doing. This feedback, as defined by Senge (1990) between what is and what should be, in systems thinking results in a change in structure to serve at-risk audiences better.

It is within this environment of institutional change at the federal agency and university level that the Health Education through Extension Leadership (HEEL) program came into existence; a result of an institutional/organizational innovation decision process. The decision by a system to adopt a new program, such as the HEEL program, does not lead to implementation directly (Rogers, 2003).

The findings of this study reinforce the idea that we have the structure to diffuse new programs and ideas, the FCS Agent Network, we need to utilize the structure we have to better serve the people of Kentucky.

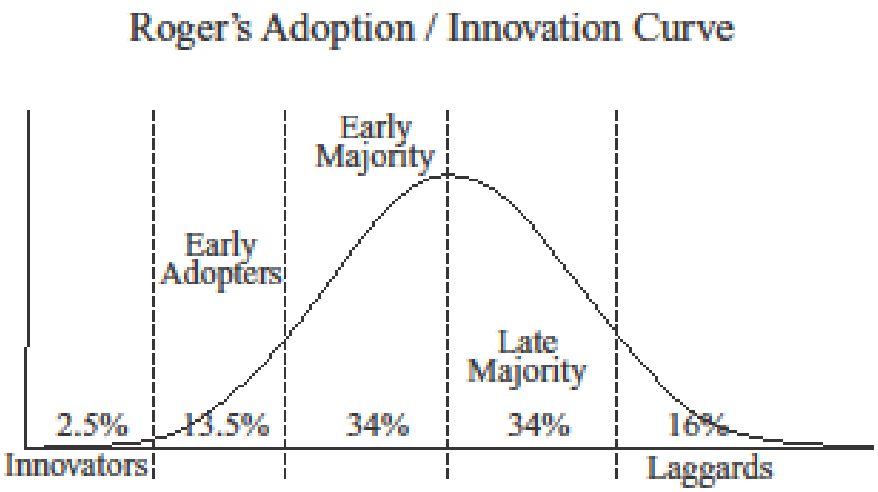
APPENDIX A

Organizational Chart
University of Kentucky College of Agriculture
Cooperative Extension Service



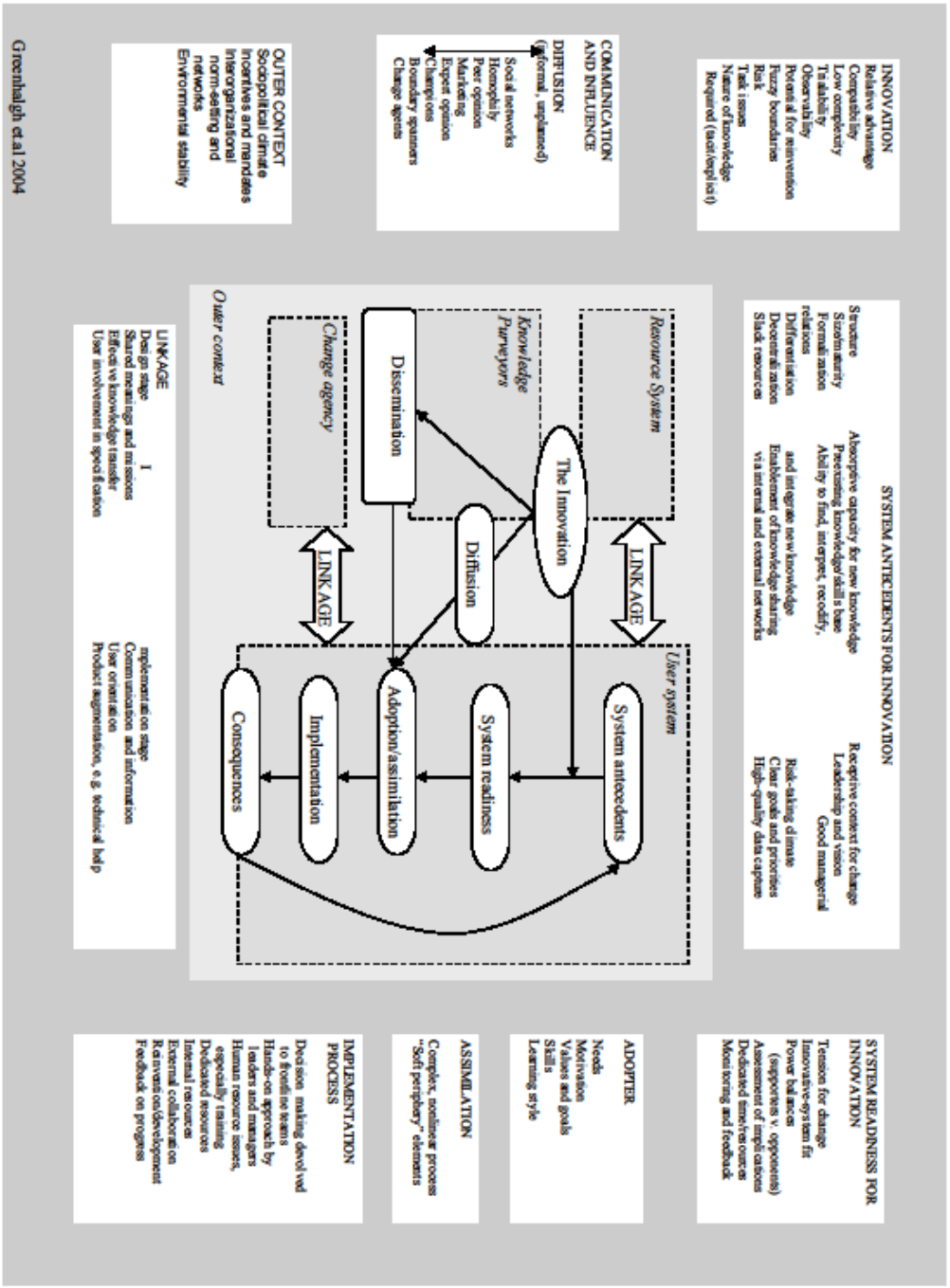
APPENDIX B

Rogers Diffusion Curve



APPENDIX C

Greenhalgh et al. Conceptual Model[3]
2004



[3] From "Diffusion of Innovations in Service Organizations: Systematic Review and Recommendation" by Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. *The Milbank Quarterly 82*(4). Copyright 2004 by John Wiley & Sons. Printed with permission.

APPENDIX D

Cooperative Extension Service Field Staff Directory
Family and Consumer Sciences Agents
April 2011

District 1			David Adams, District Director
County	FCS Agent	County	FCS Agent
Bath	Martha Perkins	Boyd	Suellen Zornes
Bracken	Shannon Smith	Carter	Whitney Morrow
Elliott	Gwenda Adkins	Fleming	Donna Fryman
Floyd	Theresa Scott	Greenup	Rita Spence
Johnson	Brenda Cockerham	Lawrence	Stephanie Derifield
Magoffin	Brooke Jenkins	Martin	Eugenia Wilson
Mason	Debra Cotterill	Menifee	Justin Thomas FCS/4H
Montgomery	Peggy Powell	Morgan	Nellie Buchanan
Pike	Vacant	Robertson	Terry Whalen
Rowan	Vacant		

District 2			Louise Moore, District Director
County	FCS Agent	County	FCS Agent
Bell	Rebecca Sharp	Breathitt	Martha Yount
Clay	Lora Lee Frazier	Harlan	Theresa Howard
Jackson	Vacant	Knott	Linda Combs
Knox	Matti Daniels	Laurel	Judith O'Bryan
Lee	Crystal Osborne	Leslie	Nanette Banks
Owsley	Natasha Lucas	Perry	Glenna Wooten
Rockcastle	Hazel Jackson	Whitley	Peggy Helton
Wolfe	Ann Hollon		

District 3			Jeffery Young, District Director
County	FCS Agent	County	FCS Agent
Boone	Diane Mason Katie Smallwood	Bullitt	Ruth Chowning

Campbell	Ronda Rex Katie Vaught	Carroll	Grace Angotti
Gallatin	Rosie Allen	Grant	Patty Poor
Henry	Maryellen Garrison	Jefferson	Nelda Moore
Kenton	Joan Bowling Linda Brown-Price Kathy Byrnes	Oldham	Christine Duncan
Owen	Judith Hetterman	Pendleton County	Kenna Knight
Shelby	Sheila Fawbush	Spencer	Allison Lewis
Trimble	Jane Proctor		

District 4			Roger Sparrow, District Director
County	FCS Agent	County	FCS Agent
Anderson	Sara Talbott	Bourbon	Liz Kingsland
Boyle	Natasha Saunders	Clark	Jennifer Howard
Estill	Tammy Howard	Fayette	Diana Doggett
Franklin	Tamera Thomas	Garrard	Mary Hixson
Harrison	Cheryl Case	Jessamine	Marisa Fitzgerald
Lincoln	Rita Stewart	Madison	Gina Noe
Mercer	Luci Hockersmith	Nicholas	Kim Adams Leger
Powell	Pamela Dooley	Scott	Constance Minch
Woodford	Lori rice		

District 5			Anna Smith, District Director
County	FCS Agent	County	FCS Agent
Adair	Kelli Bonifer	Breckinridge	Katherine Alexander
Casey	Deborah Shepherd	Clinton	Christy Nuetzman
Cumberland	Debbie Messenger	Grayson	Vacant
Green	Audrey Myers	Hardin	Teran Ransom
LaRue	Theresa G. Howard	McCreary	Anastasia Wheeler
Marion	Mary Creed	Meade	Jennifer Bridge
Nelson	Vacant	Pulaski	Edith Lovett
Russell	Pamela York	Taylor	Rebecca Nash
Washington	Kay Kennedy	Wayne	Jody Paver

District 6			David Herbst, District Director
County	FCS Agent	County	FCS Agent
Allen	Janet Johnson	Barren	Melinda McCulley
Butler	Tracy Thornton	Daviess	Christy Ramey
Edmonson	Suzan Nunn	Hancock	Vacant
Hart	Patricia Margolis	Henderson	Amanda Hardy
Logan	Rachel Hance	McLean	Amber Meeks
Metcalfe	Lynn Blankenship	Monroe	Laura Savage
Ohio	Vacant	Simpson	Kathy Jump
Union	Melanie Bealmear	Warren	Betsy Ann Tracy
Webster	Whitney Dodson		

District 7		Matt Fulkerson, District Director	
County	FCS Agent	County	FCS Agent
Ballard	Debbie Temple	Caldwell	Vacant
Calloway	LaDawn Hale	Carlisle	Sara Bogle
Christian	Marsha Parker	Crittenden	Nancy Hunt
Fulton	Vacant	Graves	Virginia Langford
Hickman	Melissa Goodman	Hopkins	Nancy Kelley
Livingston	Annie Kingston	Lyon County	Vacant
McCracken	Denise Wooley	Marshall	Vicki Wynn
Muhlenberg	Laura Holt	Todd	Jill Harris
Trigg	Cecelia Hostilo		

APPENDIX E

IRB Approval Letter

Initial Review

Office of Research Integrity
IRB, IACUC, RDRC
315 Kinkead Hall
Lexington, KY 40506-0057
859 257-9428
fax 859 257-8995
www.research.uky.edu/ori/

Approval Ends
June 26, 2012

IRB Number
11-0447-P4S

TO: Deborah Murray,
Unassigned
107 Erikson Hall
CAMPUS 0050
PI phone #: (855)257-8900

FROM: Chairperson/Vice Chairperson
Non-medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol Number 11-0447-P4S

DATE: June 29, 2011

On June 28, 2011, the Non-medical Institutional Review Board approved your protocol entitled:

Diffusion of Key Health Messages in the Community Utilizing the Cooperative Extension Service: Are Social Networks Among Family and Consumer Science Extension Agents a Factor in the Diffusion of Health Information Dynamic?

Approval is effective from June 28, 2011 until June 26, 2012 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, attached is the IRB approved consent/assent document(s) to be used when enrolling subjects. **[Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.]** Prior to the end of this period, you will be sent a Continuation Review Report Form which must be completed and returned to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigators responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's Guidance and Policy Documents web page [http://www.research.uky.edu/ori/human/gp_idance.htm#PIresp]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [http://www.research.uky.edu/ori]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

N. Van Zuberyn, Ph.D.
Chairperson/Vice Chairperson

1

Default Question Block

Q1.
Informed Consent Form
FCS Health Education Information Network Survey

WHY ARE YOU BEING INVITED TO TAKE PART IN THIS RESEARCH?
As a County FCS Extension Agent, you have been asked to take part in a survey about the exchange of health education information within the FCS Extension Agent network within your Extension District and across district lines. You will be asked to check off the names of those FCS Extension Agents with whom and how often you communicate health education information and information about health resources obtained by face to face contact, phone, and/or email or other social media contacts. These names appear in the survey in the same order they are publicly listed on the College of Agriculture Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms.

WHO IS DOING THE STUDY?
The person in charge of this study is Deborah Murray, a doctoral student in the College of Education at the University of Kentucky. She is being guided in this research by her faculty advisor, Dr. Wayne D. Lewis, Department of Educational Leadership Studies. There may be other people on the research team assisting at different times during the study.

WHAT IS THE PURPOSE OF THIS STUDY?
Ms. Murray is conducting a network study of Kentucky County FCS Extension Agents in partial fulfillment of the requirements for the degree of Doctor of Education in the College of Education at the University of Kentucky. The following survey is part of a study on social networks of FCS Extension Agents in the diffusion of health education information within the Kentucky Cooperative Extension Service. With the results of this survey, Ms. Murray hopes to gain a better understanding of how FCS Extension Agents share health education information.

ARE THERE REASONS WHY YOU SHOULD NOT TAKE PART IN THIS STUDY?
If you are not a County FCS Extension Agent in the Kentucky Cooperative Extension Service, you should not take this survey.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The survey is an online survey using Qualtrics Survey Software, a licensed product of the University of Kentucky. It uses SSL (Secure Sockets Layer) protocol to securely collect and deliver the data. Numerical data will be download as an Excel file and downloaded into UNICET social network analysis software. Mathematical equations will identify patterns and regularities that measure structural properties of communication networks for health education information, and/or relational properties of FCS Extension Agents within networks. It will take approximately 15 – 30 minutes.

WHAT WILL YOU BE ASKED TO DO?
You will be asked to check yes to agree to participate in the survey, check your Extension District number, level of education, and range of years of service as an FCS Extension Agent. You will be asked to check the names of FCS Extension Agents and whether you go to that person for health education information, including information about health programs and information about health resources obtained by face to face , phone, and/or email or other social media contacts never, every few months, every few weeks, every week, or every day. You will be asked to do this with every FCS Extension Agent in every district. You will be asked to check N/A next to your name in the survey. All responses and identities will be coded and all results will be reported anonymously through mathematical formulas and graphed data describing the health education information networks within the FCS Extension Agent Network.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?
To the best of Ms. Murray's knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life.

WILL YOU BENEFIT FROM TAKING PART IN THIS STUDY?
There is no guarantee that you will get any benefit from taking part in this study. Results of the study may help the FCS Extension program better serve your health education information needs through better understanding how

APPENDIX F

Recruitment Emails

First Recruitment Email to FCS Extension Agents (July 5, 2011)
I am requesting your participation in an on-line survey about the exchange of health education information within the FCS Extension Agent network within your Extension District and across district lines. I am conducting a network study of Kentucky County FCS Extension Agents in partial fulfillment of the requirements for the degree of Doctor of Education in the College of Education at the University of Kentucky. With the results of this survey, I hope to gain a better understanding of how FCS Extension Agents share health education information within and between their Extension Districts.

The survey should take you between 15 and 30 minutes. The survey is located online on a secured University of Kentucky server at the following location: http://

Thank you for taking the time to participate in this survey.

Second Recruitment Email to FCS Extension Agents (July 12, 2011)

Dear Family and Consumer Science Extension Agent,
If you have already participated in the on-line survey about the exchange of health education information within the FCS Extension Agent network within your Extension District and across district lines, thank you.

If you missed my first email, I am conducting a network study of Kentucky County FCS Extension Agents in partial fulfillment of the requirements for the degree of Doctor of Education in the College of Education at the University of Kentucky. With the results of this survey, I hope to gain a better understanding of how FCS Extension Agents share health education information within and between their Extension Districts.

The survey should take you between 15 and 30 minutes. The survey is located online on a secured University of Kentucky server at the following location: http://

Thank you for taking the time to participate in this survey.

Third Recruitment Email to FCS Extension Agents (July 19, 2011)

Dear Family and Consumer Science Extension Agent,
I want to thank those of you who have participated in my on-line survey about the exchange of health education information within the FCS Extension Agent network within your Extension District and across district lines.

this survey, I hope to gain a better understanding of how FCS Extension Agents share health education information within and between their Extension Districts.

The survey should take you between 15 and 30 minutes. The survey is located online on a secured University of Kentucky server at the following location: http://

Thank you for taking the time to participate in this survey.

Fourth and Final Recruitment Email to FCS Extension Agents (July 26, 2011)
Dear Family and Consumer Science Extension Agent,
This is the last chance you will have to participate in my on-line survey about the exchange of health education information within the FCS Extension Agent network within your Extension District and across district lines. Your response is very important to my network study of Kentucky County FCS Extension Agents in partial fulfillment of the requirements for the degree of Doctor of Education in the College of Education at the University of Kentucky. With the results of this survey, I hope to gain a better understanding of how FCS Extension Agents share health education information within and between their Extension Districts.

I appreciate your taking the time to assist me with my dissertation study and survey. It should take you between 15 and 30 minutes. The survey is located online on a secured University of Kentucky server at the following location: http://

Thank you for taking the time to participate in this survey.

APPENDIX G

FCS Health Education Information Network Survey

Q1. Informed Consent Form
FCS Health Education Information Network Survey

WHY ARE YOU BEING INVITED TO TAKE PART IN THIS RESEARCH?
As a County FCS Extension Agent, you have been asked to take part in a survey about the exchange of health education information within the FCS Extension Agent network within your Extension District and across district lines. You will be asked to check off the names of those FCS Extension Agents with whom and how often you communicate health education information and information about health resources obtained by face to face contact, phone, and/or email or other social media contacts. These names appear in the survey in the same order they are publicly listed on the College of Agriculture Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms.

WHO IS DOING THE STUDY?
The person in charge of this study is Deborah Murray, a doctoral student in the College of Education at the University of Kentucky. She is being guided in this research by her faculty advisor, Dr. Wayne D. Lewis, Department of Educational Leadership Studies. There may be other people on the research team assisting at different times during the study.

WHAT IS THE PURPOSE OF THIS STUDY?
Ms. Murray is conducting a network study of Kentucky County FCS Extension Agents in partial fulfillment of the requirements for the degree of Doctor of Education in the College of Education at the University of Kentucky. The following survey is part of a study on social networks of FCS Extension Agents in the diffusion of health education information within the Kentucky Cooperative Extension Service. With the results of this survey, Ms. Murray hopes to gain a better understanding of how FCS Extension Agents share health education information.
ARE THERE REASONS WHY YOU SHOULD NOT TAKE PART IN THIS STUDY?
If you are not a County FCS Extension Agent in the Kentucky Cooperative Extension Service, you should not take this survey.
WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The survey is an online survey using Qualtrics Survey Software, a licensed product of the University of Kentucky. It uses SSL (Secure Sockets Layer) protocol to securely collect and deliver the data. Numerical data will be download as an Excel file and downloaded into UNICET social network analysis software. Mathematical equations will identify patterns and regularities that measure structural properties of communication networks for health education information, and/or relational properties of FCS Extension Agents within networks. It will take approximately 15 – 30 minutes.

WHAT WILL YOU BE ASKED TO DO?

You will be asked to check yes to agree to participate in the survey, check your Extension District number, level of education, and range of years of service as an FCS Extension Agent. You will be asked to check the names of FCS Extension Agents and whether you go to that person for health education information, including information about health programs and information about health resources obtained by face to face , phone, and/or email or other social media contacts never, every few months, every few weeks, every week, or every day. You will be asked to do this with every FCS Extension Agent in every district. You will be asked to check N/A next to your name in the survey. All responses and identities will be coded and all results will be reported anonymously through mathematical formulas and graphed data describing the health education information networks within the FCS Extension Agent Network.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

To the best of Ms. Murray's knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life.

WILL YOU BENEFIT FROM TAKING PART IN THIS STUDY?

There is no guarantee that you will get any benefit from taking part in this study. Results of the study may help the FCS Extension program better serve your health education information needs through better understanding how health education information flows through the FCS Extension Agent network.

DO YOU HAVE TO TAKE PART IN THE STUDY?

You do not have to participate in the survey. If you decide to take part in the survey, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the survey and still keep the benefits and rights you had before volunteering. Even if you do not respond to the survey, others can select you as someone who provides health education information and you will be represented in a network map (coded identity).

IF YOU DON'T WANT TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES?

If you do not want to be in the study, there are no other choices except not to take part in the study.

WHAT WILL IT COST YOU TO PARTICIPATE?

The only cost to you to participate in this study is your time.

WILL YOU RECEIVE ANY REWARDS FOR TAKING PART IN THIS STUDY?

No. The only rewards will be intrinsic in knowing you helped a doctoral student complete a dissertation study and that results might benefit the FCS Extension health education information network.

WHO WILL SEE THE INFORMATION THAT YOU GIVE?

Ms. Murray will make every effort to keep private all research records that identify you to the extent allowed by law. All responses will be numerical coded and no one in the study will identified by name. The survey data will be stored on a University of Kentucky secured server. Any hard copies will be kept under lock and key and destroyed following the completion of the dissertation study. Data will be presented in mathematical graphs and matrices that will be used to show the flow of information within the county FCS Extension Agent network. Your responses will be combined with

the responses from other FCS Extension Agents taking part in the survey. You will not be personally identified in any written materials. Ms Murray may publish the results of this study; however, she will keep identifying information private. Researchers looking at the data will only see the group norms/averages rather than individual demographics.
CAN YOUR TAKING PART IN THE SURVEY END EARLY?
If you decide to take part in the survey you still have the right to decide at any time that you no longer want to continue. You will not be treated differently if you decide to stop taking part in the survey.
WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS, CONCERNS, OR COMPLAINTS?
Before you decide whether to accept this invitation to take part in the survey, please ask any questions that might come to mind now by contacting the investigator, Deborah Murray, at 859-608-0366 or deborah.murray@uky.edu. Ms. Murray will provide a hard copy of the survey questions upon request. If you have questions, comments, suggestions or complaints contact Ms. Murray at the above phone number or email. If you have any questions about your rights as a volunteer in this research, contact the staff in the Office of Research Integrity at the University of Kentucky at 859-257-9428 or toll free at

1-866- 400-9428 .

Q2. I have read, understood, and **printed a copy** of the above consent form and desire of my own free will to participate in this study.

- ☐ Yes
- ☉ No

Q3. What is your level of education completed?

- ☉ Bachelor's Degree
- ☐ Master's Degree
- ☐ Specialist in Education
- ☐ Post Masters Degree

Q4. Year you earned your highest degree?

- ☉ 2000 -present
- ☐ 1990-1999
- ☐ 1980-1989
- ☐ 1970-1979

Q5. How many years of experience do you have in Extension?

- [ ] Less than one year
- [ ] 1-5 years
- [ ] 5-10 years
- [ ] 10-15 years
- [ ] 15-20 years
- [x] more than 20 years

Q6. Length of time in current county?

- [ ] less than 5 years
- [ ] 5-10 years
- [ ] 11-15 years
- [ ] 16-20 years
- [x] more than 20 years

Q7. What Extension District are you in?

- [ ] District 1
- [ ] District 2
- [ ] District 3
- [ ] District 4
- [ ] District 5
- [ ] District 6
- [x] District 7

Q8. Have you worked in other Extension Districts?

- [ ] Yes
- [x] No

Q9. What other Extension Districts have you worked? Select as many as apply.

- [ ] District 1
- [ ] District 2
- [ ] District 3

☐ District 4

☐ District 5

☐ District 6

Q10. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 1**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. Do not include list serv emails. (Names appear in the same order as they appear in the staff directory.) **If you are in District 1, click NA beside your name**.

	NA	Never	Every few months	Every few weeks	Every Week	Daily
Martha Perkins	☐	☐	☐	☐	☐	☐
Suellen Zornes	☐	☐	☐	☐	☐	☐
Shannon Smith	☐	☐	☐	☐	☐	☐
Whitney Morrow	☐	☐	☐	☐	☐	☐
Gwenda Adkins	☐	☐	☐	☐	☐	☐
Donna Fryman	☐	☐	☐	☐	☐	☐

	NA	Never	Every few months	Every few weeks	Every Week	Daily
Theresa Scott	☐	☐	☐	☐	☐	☐
Rita Spence	☐	☐	☐	☐	☐	☐
Brenda Cockerham	☐	☐	☐	☐	☐	☐
Stephanie Derifield	☐	☐	☐	☐	☐	☐
Sally Mineer	☐	☐	☐	☐	☐	☐
Brooke Jenkins	☐	☐	☐	☐	☐	☑

	NA	Never	Every few months	Every few weeks	Every Week	Daily
Eugenia Wilson	☐	☐	☐	☐	☐	☐
Debra Cotterill	☐	☐	☐	☐	☐	☐
Justin Thomas	☐	☐	☐	☐	☐	☐
Peggy Powell	☐	☐	☐	☐	☐	☐
Nellie Buchanan	☐	☐	☐	☐	☑	☐
Terry Whalen	☐	☐	☐	☐	○	○

Q11. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 2**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. Do not include list serv emails (Names appear in the same order as they appear in the staff directory.) **If you are in District 2, click NA beside your name**.

	NA	Never	Every few months	Every few weeks	Every week	Daily
Rebecca Sharp	☐	☐	☐	☐	☐	☐
Martha Yount	☐	☐	☐	☐	☐	☐
Lora Lee Frazier Howard	☐	☐	☐	☐	☐	☐
Theresa B. Howard	☐	☐	☐	☐	☐	☐
Linda Combs	☐	☐	☐	☐	☐	☐

	NA	Never	Every few months	Every few weeks	Every week	Daily
Mattie Daniels	☐	☐	☐	☐	☐	☐
Judith O'Bryan	☐	☐	☐	☐	☐	☐
Crystal Osborne	☐	☐	☐	☐	☐	☐
Nanette Banks	☐	☐	◉	☐	☐	☐
Alice Bradley	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Natasha Lucas	☐	☐	☐	☐	☐	☐
Glenna Wooten	☐	☐	☐	☐	☐	☐
Hazel Jackson	☐	☐	☐	☐	☐	☐
Peggy Helton	☐	☐	☐	☐	☐	◉
Ann Hollon	☐	☐	☐	☐	◉	○

Q12. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 3**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. Do not include list serv emails(Names appear in the same order as they appear in the staff directory.) **If you are in District 3, click NA beside your name**.

	NA	Never	Every few months	Every few weeks	Every week	Daily

	NA	Never	Every few months	Every few weeks	Every week	Daily
Diane Mason	☐	☐	☐	☐	☐	☐
Katie Smallwood	☐	☐	☐	☐	☐	☐
Ruth Chowning	☐	☐	☐	☐	☐	☐
Ronda Rex	☐	☐	☐	☐	☐	☐
Katie Vaught	☐	☐	☐	☐	☐	☐
Grace Angottti	☐	☐	☐	☐	☐	☐
Rosie Allen	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Patti Poor	☐	☐	☐	☐	☐	☐
Maryellen Garrison	☐	☐	☐	☐	☐	☐
Valerie Holland	☐	☐	☐	☐	☐	☐
Nelda Moore	☐	☐	☐	☐	☐	☐
Joan Bowling	☐	☐	☐	☐	☐	☐
Linda Brown-Price	☐	☐	☐	☐	☐	☐
Kathy Byrnes	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Christine Duncan	☐	☐	☐	☐	☐	☐
Judith Hetterman	☐	☐	☐	☐	☐	☐
Kenna Knight	☐	☐	☐	☐	☐	☐
Sheila Fawbush	☐	☐	☐	☐	☐	☐
Allison Lewis	☐	☐	☐	☐	☐	☐
Jane Proctor	☐	☐	☐	☐	☐	○

Q13. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 4**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts.Do not include list serv emails (Names appear in the same order as they appear in the staff directory.) **If you are in District 4, click NA beside your name**.

.

	NA	Never	Every few months	Every few weeks	Every Week	Daily

.

	NA	Never	Every few months	Every few weeks	Every Week	Daily
Sara Talbott	☐	☐	☐	☐	◉	☐
Liz Kingsland	☐	☐	☐	☐	☐	☐
Natasha Saunders	☐	☐	☐	☐	☐	☐
Jennifer Howard	☐	☐	☐	☐	☐	☐
Tammy Howard	☐	☐	☐	☐	☐	☐
Diana Doggett	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every Week	Daily
Tamera Thomas	☐	☐	☐	☐	☐	☐
Mary Hixson	☐	☐	☐	☐	☐	☐
Cheryl Case	☐	☐	☐	☐	☐	☐
Marisa Fitzgerald	☐	☐	☐	☐	☐	☐
Rita Stewart	☐	☐	☐	☐	☐	☐
Gina Noe	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every Week	Daily
Luci Hockersmith	☐	☐	☐	☐	☐	☐
Kimberly Adams Leger	☐	☐	☐	☐	☐	☐
Pamela Dooley	☐	☐	☐	☐	☐	☐
Constance Minch	☐	☐	☐	☐	☐	☐
Lori Rice	☐	☐	☐	☐	☐	○

Q14. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 5**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email, and/or other social media contacts. Do not include list serv emails (Names appear in the same order as they appear in the staff directory.) **If you are in District 5, click NA beside your name**.

	NA	Never	Every few months	Every few weeks	Every week	Daily

	NA	Never	Every few months	Every few weeks	Every week	Daily
Kelli Bonifer	☐	☐	☐	☐	☐	☐
Katherine Alexander	☐	☐	☐	☐	☐	☐
Deborah Shepherd	☐	☐	☐	☐	☐	☐
Christy Nuetzman	☐	☐	☐	☐	☐	☐
Debbie Messenger	☐	☐	☐	☐	☐	☐
Audrey Myers	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Teran Ransom	☐	☐	☐	☐	☐	☐
Theresa G. Howard	☐	☐	☐	☐	☐	☐
Anastasia Wheeler	☐	☐	☐	☐	☐	☐
Mary Creed	☐	☐	☐	☐	☐	☐
Jennifer Bridge	☐	☐	☐	☐	☐	☐
Edith Lovett	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Pamela York	☐	◉	☐	☐	☐	☐
Rebecca Nash	☐	☐	☐	☐	☐	☐
Kay Kennedy	☐	☐	☐	☐	☐	☐
Jody Paver	☐	☐	☐	☐	☐	○

Q15. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 6**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email and/or other social media contacts. Do not include list serv emails (Names appear in the same order as they appear in the staff directory.) **If you are in District 6, click NA beside your name**.

	NA	Never	Every few months	Every few weeks	Every week	Daily
Janet Johnson	☐	☐	☐	☐	☐	☐
Melinda McCulley	☐	☐	☐	☐	☐	☐
Tracy Thornton	☐	☐	☐	☐	☐	☐
Christy Ramey	☐	☐	☐	☐	☐	☐

	NA	Never	Every few months	Every few weeks	Every week	Daily
Suzan Nunn	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Patricia Margolis	☐	☐	☐	☐	☐	☐
Amanda Hardy	☐	☐	☐	☐	☐	☐
Rachel Hance	☐	☐	☐	☐	☐	☐
Amber Meeks	☐	☐	☐	☐	☐	☐
Lynn Blankenship	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Every week	Daily
Lara Savage	☐	☐	☐	☐	☐	☐
Kathy Jump	☐	☐	☐	☐	☐	☐
Melanie Bealmear	☐	☐	☐	☐	☐	☐
Betsy Tracy	☐	☐	☐	☐	☐	☐
Whitney Dodson	☐	☐	☐	☐	☐	○

Q16. FCS Extension Agents are publicly listed in the College of Agriculture's Field Staff Directory located at http://ces.ca.uky.edu/cesdd/cesprograms. In **District 7**, how often do you go to each person listed, **directly** for health education information? Health education information includes information about health education programs and information about health resources obtained by face to face contact, phone, email and/or other social media contacts. Do not include list serv emails (Names appear in the same order as they appear in the staff directory.) **If you are in District 7, click NA beside your name**.

	NA	Never	Every few months	Every few weeks	Weekly	Daily
Debbie Temple	☐	☐	☐	☐	☐	☐
Courtney Heatherly	◉	☐	☐	☐	☐	☐
LeDawn Hale	☐	☐	☐	☐	☐	☐
Sara Bogle	☐	☐	☐	☐	☐	☐
Marsha Parker	☐	☐	☐	☐	☐	☐
Nancy Hunt	☐	☐	☐	☐	◉	○

	NA	Never	Every few months	Every few weeks	Weekly	Daily

Virginia Langford	☐	☐	☐	☐	☐	☐
Melissa Goodman	☐	☐	☐	☐	☐	☐
Nancy Kelley	☐	☐	☐	☐	☐	☐
Annie Kingston	☐	☐	☐	☐	☐	☐
Laura Wilson	☐	☐	☐	☐	☐	☐
Denise Wooley	☐	☐	☐	☐	☐	○

	NA	Never	Every few months	Every few weeks	Weekly	Daily
Vickie Wynn	☐	☐	☐	☐	☐	☐
Laura Holt	☐	☐	☐	☐	☐	☐
Jill Harris	☐	☐	☐	☐	☐	☐
Cecelia Hostilo	☐	☐	☐	☐	☐	☐

APPENDIX H

FCS Agent Forced Response

Sorry, you cannot continue until you correct the following:

- **Issue 1**
  - *Please answer this question.*
- **Issue 2**
  - *Please answer this question.*

Q3. What is your level of education completed?

- ☐ Bachelor's Degree
- ◉ Master's Degree
- ☐ Specialist in Education
- ☐ Post Masters Degree

Q4. Year you earned your highest degree?

- ☐ 2000 -present
- ☐ 1990-1999
- ☐ 1980-1989
- ☐ 1970-1979

Please answer this question

Q5. How many years of experience do you have in Extension?

- ☐ Less than one year
- ☐ 1-5 years
- ☐ 5-10 years
- ☐ 10-15 years
- ☐ 15-20 years
- ☐ more than 20 years

Q6. Length of time in current county?

- ☐ less than 5 years

- [ ] 5-10 years
- [ ] 11-15 years
- [ ] 16-20 years
- [ ] more than 20 years

Please answer this question.

Q7. What Extension District are you in?

- [ ] District 1
- [ ] District 2
- [ ] District 3
- [ ] District 4
- [ ] District 5
- [ ] District 6
- [ ] District 7

Q8. Have you worked in other Extension Districts?

- [ ] Yes
- [ ] No

0% 100%

>>

APPENDIX I

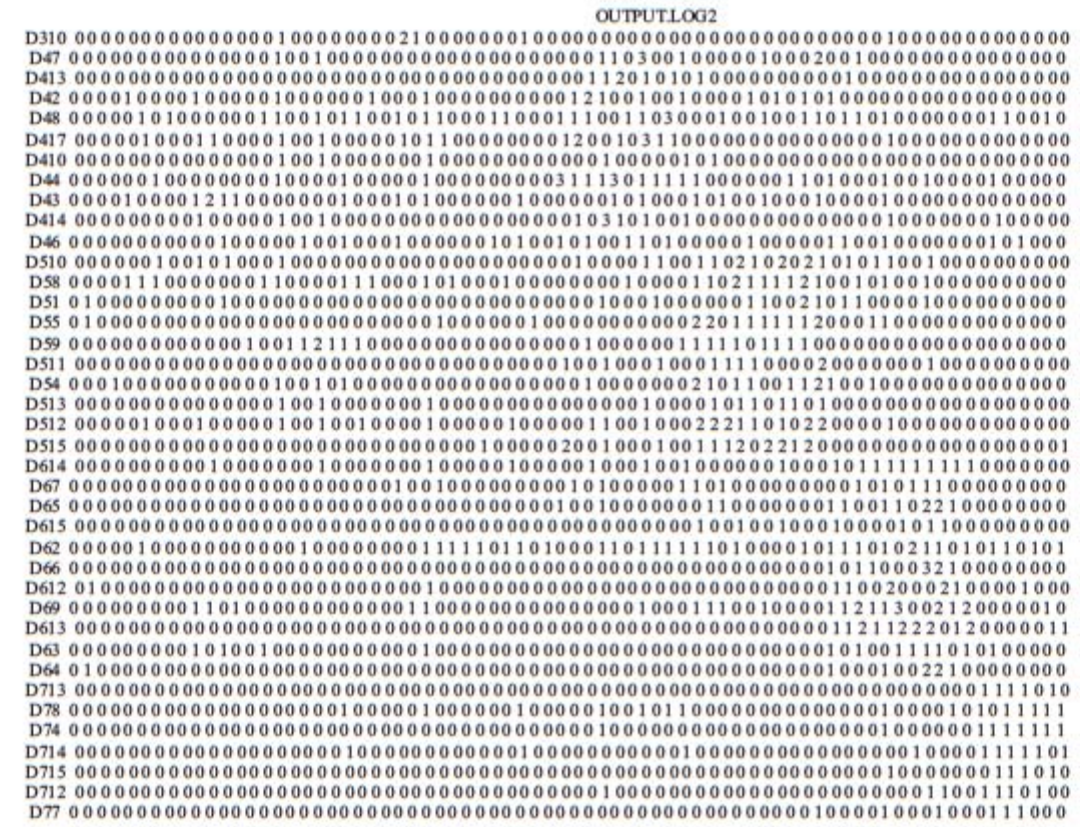
FCS Agent Survey Binary Data Output

IMPORT FROM EXCEL

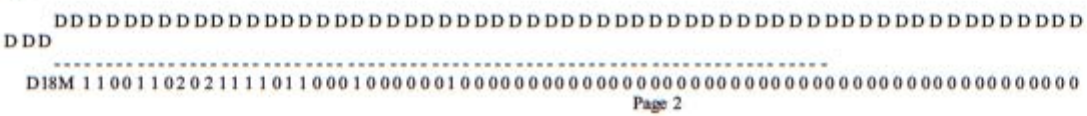
Input Excel file C:\Documents and Settings\Deborah Murray\Desktop\dissertation oct 2011.Data\Symmetrized Matrices.xlsx
Output UCINET dataset: Symmetrized Matrices (C:\Documents and Settings\Deborah Murray\Desktop\dissertation oct 2011.Data\Symmetrized Matrices)

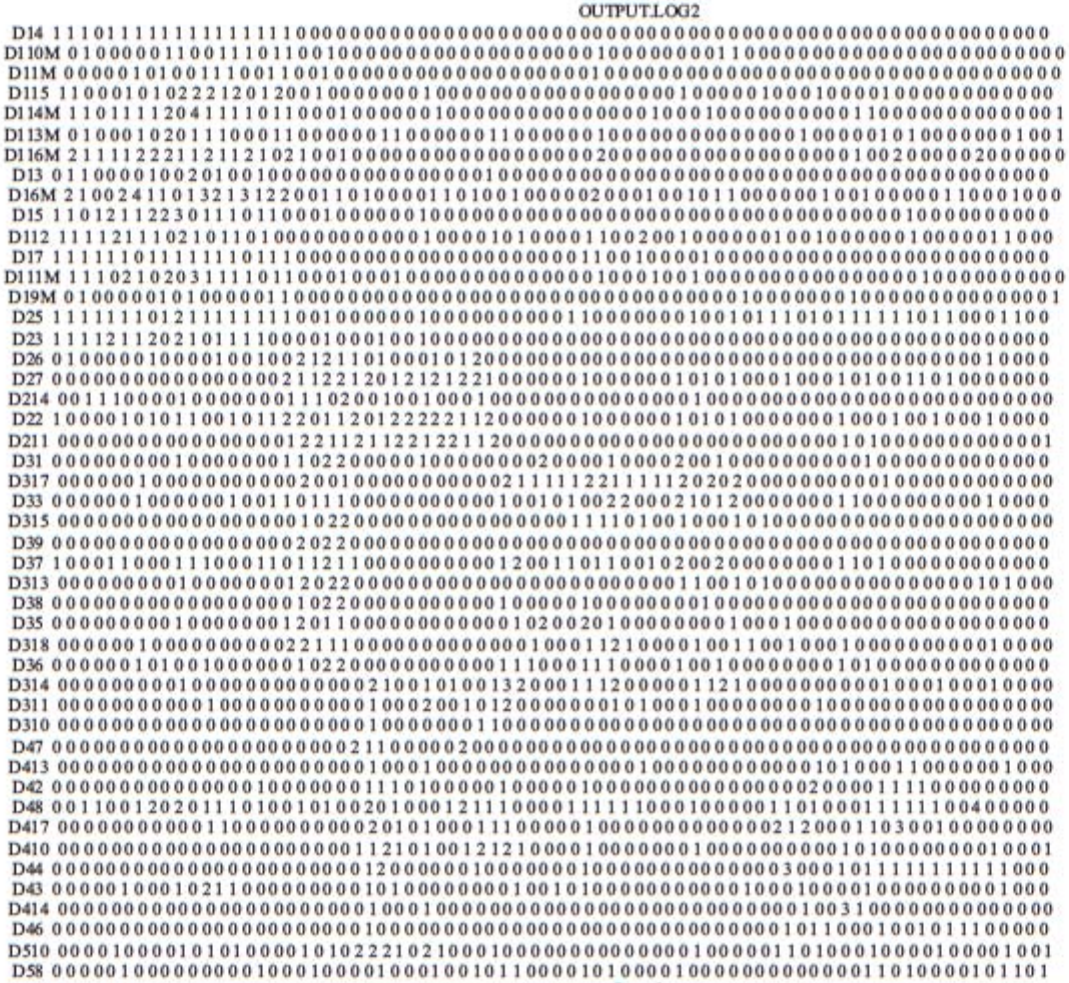
Respondents only

```
      DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D DD D D
D D D
      ----------------------------------------------------------------------------
  D18M 1 1 0 0 1 1 0 2 0 2 1 1 1 1 1 1 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D14  1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0
 D110M 0 0 0 0 0 0 0 1 0 0 1 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D11M 0 1 0 0 1 0 1 1 0 1 1 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D115 1 1 0 1 1 1 1 2 2 2 2 1 2 1 1 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 D114M 1 1 0 0 1 1 1 2 0 1 1 0 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
 D113M 0 1 0 1 1 1 0 2 1 1 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 D116M 2 1 1 1 2 2 2 1 1 2 2 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D13  0 1 0 0 2 0 1 1 0 1 2 1 1 0 1 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D16M 2 1 0 1 2 1 1 2 1 3 2 1 3 0 2 1 0 1 0 0 1 0 1 0 0 0 2 1 0 0 1 0 1 0 1 0 0 0 1 0 1 0 0 1 1 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0
  D15  1 1 1 1 2 1 1 2 2 2 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0
  D112 1 1 0 0 1 0 0 1 1 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
  D17  1 1 1 1 2 0 1 2 1 3 1 1 1 1 1 1 0 0 0 0 1 0 0 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0
 D111M 1 1 0 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D19M 1 1 1 1 1 1 1 0 1 2 1 0 1 1 1 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0
  D25  1 0 1 1 1 1 0 1 1 1 1 1 1 0 1 0 0 1 1 1 0 2 0 0 1 1 1 1 0 0 0 0 0 1 0 1 1 0 1 1 1 1 1 1 0 1 0 1 1 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D23  0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 2 2 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D26  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 2 1 1 1 2 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D27  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 0 2 2 0 0 0 0 1 0 0 0 0 0 1 0 0 0 1 0 0 1 1 1 0 0 1 0 0 0 0 0 2 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D214 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D22  1 0 0 0 1 0 0 0 1 1 0 0 1 0 1 0 1 2 2 1 2 2 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 1 1 0 1 0 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0
  D211 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 2 2 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D31  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 0 0 1 1 1 0 0 2 3 1 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D317 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 1 1 2 2 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D33  0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 1 1 0 1 0 1 2 2 0 0 2 1 1 2 0 0 0 1 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D315 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 1 1 1 1 1 0 1 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0
  D39  0 0 1 1 0 0 1 2 0 2 0 1 1 1 0 1 0 0 1 0 1 0 0 2 0 1 0 0 0 1 2 1 1 1 0 0 0 0 1 1 1 1 1 1 0 0 0 1 0 0 0 0 0 1 1 0 1 0 0 0 1 0 1 1 0 1 0 0 1 0 0 0 0 0
  D37  1 0 0 0 1 0 0 0 1 1 1 0 1 0 1 1 0 1 0 0 0 0 1 2 1 1 0 1 1 0 0 1 2 1 2 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
  D313 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 2 1 0 1 0 0 1 2 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
  D38  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 2 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
  D35  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
  D318 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 1 2 1 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  D36  0 0 0 0 1 1 0 1 0 1 1 1 0 1 0 0 0 0 1 0 1 0 2 2 2 1 1 2 1 0 0 0 1 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
  D314 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 3 0 1 1 1 1 2 0 0 1 0 0 2 1 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 1 0 0 0
  D311 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 2 1 0 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```



Ttl





D51 0 0 1 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 1 0 1 0 0 2 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0
D55 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 2 0 0 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2
D59 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 0 2 2 1 0 0 1 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 1 1 1 1 1
D511 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
D54 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
D513 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0
D512 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 3 0 0 1 1 0 0 0 0 1 0 0 0 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 2 0 1 2
D515 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 1 1 0 0 0 0 0 0 0 0 0 2 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0
D614 0 0 0 0 1 0 0 0 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 2 1 0 0 0 0 0 1 1 0 0 0 1 1 0 1 1 0 1 0 0 0 0 0 1 0 0 0 0 1 0 1 0 0 0 0
D67 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
D65 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 1 1 0 0 1 0 1 1 0 0 1 0 0 1 0 0 0 1 1 0 0 0 0 1 0 0 0 1 1 0 3 0 0 0 1 0 0 1 0 0 1 1 0 1 1 0 1 0 0 0 0 0 0 0 1 1 0 0 1 1
D615 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0
D62 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 1 1 1 0 0 1 1 0 0 1 0 0 0 0 0 0 0 1 1 0 1 1 0 1 1 1 0 0 1 1 0 0 1
D66 0 0 0 0 1 0 0 2 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
D612 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 1 0 0 0 0 1 0 0 0 0 0
D69 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 1 1
D613 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
D63 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 1 0 1 0 0 0 1 0 1 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
D64 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
D713 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
D78 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 4 0 0 1 0 0 1 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0
D74 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 1 0 1 0 0 0
D714 0 0 0 0 0 0 1 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 1 1 0 1 1 0 0 0 2 0 0 0 0 1 1 0 0 1 0 0 0 0 0 1 0 0 0 0
D715 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
D712 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
D77 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 1 0 2 1 0 0 0 2 0 0 0 1 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0

Running time: 00:00:06
Output generated: 17 Oct 11 10:38:55

APPENDIX J

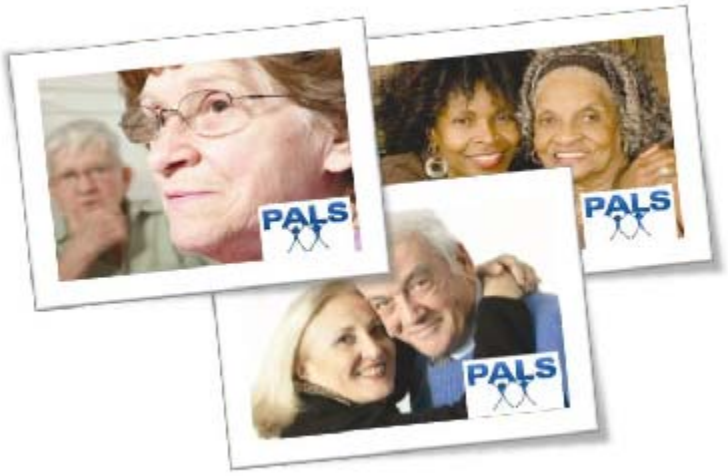
Overview of the Mental Healthiness in Aging Initiative

Aging in Kentucky: A Healthy State of Mind

Social Marketing Campaign with four key messages:

PALS System

1. Pay Attention
2. Ask Questions
3. Listen Actively
4. Show Support



BIBLIOGRAPHY

Abrahamson, E., & Rosenkopf, L. (1997). Social network effects on the extent of innovation diffusion: A computer simulation. *Organization Science, 8*(3), 289-309.

Argyris, C. (1982). *Reasoning, learning and action*. San Francisco, CA: Jossey-Bass.

Argyris, C., & Schon, D.A. (1974). *Organizational learning: A theory of action perspective.* Reading, MA: Addison Wesley.

Bull, N., Cote, L., Warner, P., & McKinney, M. (2004). Is extension relevant for the 21st century? *Journal of Extension, 42*(6). Retrieved from http://www.joe.org/joe/2004december/comm2.php

Belasco, J. A. (1990). *Teaching the elephant to dance : Empowering change in your organization*. New York, NY: Crown.

Bennis, W. G.,& Nanus, B. (1985). *Leaders : The strategies for taking charge*. New York, NY: Harper and Row.

Bernard, H. R. (2000). *Social research methods : Qualitative and quantitative approaches*. Thousand Oaks, CA.: Sage.

Bertalanffy, L., von (1951). General systems theory: A new approach to unity of science. *Human Biology*, 23, 303-361.

Betz, S. C., Marczak, M. S., Peterson, D. J., Sewell, M., & Lipinski, J. (1998). National results of the organizational change survey: Cooperative Extension's capacity to support programs for children, youth and families at risk: University of Arizona.

Bickman, L. (1987). The functions of program theory. In L. Bickman (Ed.), *New directions for program evaluation* (pp. 5-17). San Francisco,CA: Jossey-Bass.

Bolman, L. G., & Deal, T. E. (1997). *Reframing organizations: Artistry, choice, and leadership* (3rd ed.) San Francisco, CA: Josey-Bass.

Borgatti, S. P., Everett, M.G. & Freeman, L.C. (2002). Ucinet for Windows: Software for social network analysis (Version 6). Harvard, MA: Analytic Technologies.

Bradach, J. (2003). Going to scale: The challenge of replicating social programs. *Stanford Social Innovation Review,* Spring,19-25.

Brass, D. J. (2011). *A social network perspective on industrial/organizational psychology*. Links Center for Social Network Analysis of Organizations,

Lexington, KY. Retrieved from http://www.linkscenter.org/papers/brassoxford.pdf

Brownson, R. C., Ballew, P., Dieffenderfer, B., Haire-Joshu, D., Heath, G. W., Kreuter, M. W., & Myers, B. A. (2007). Evidence-based interventions to dissemination by state health departments. *American Journal of Preventive Medicine, 33*(1S), S66-S77.

Bull, N. H., Cote, L. S., Warner, P. D., & McKinnie, M. R. (2004). Is extension relevant for the 21st century? *Journal of Extension, 42*(6). Retrieved from http://www.joe.org/joe/2005april/comm1.php

Burt, R. S. (1992). *Structural holes: The social structure of competition*. Cambridge, MA: Harvard University Press.

Bush, C., Mullis, R., & Mullis, A. (1995). Evaluaiton: A afterthought or an integral part of program development. *Journal of Extension, 33*(2). Retrieved from http://www.joe.org/joe/1995april/a4.php

Carrington, P. J., Scott, J., & Wasserman, S. (Eds.). (2005). *Models and methods in social network analysis*. Cambridge, UK: Cambridge University Press.

Coleman, J. S., Katz, E., & Menzel, H. (1966). *Medical innovation: A diffusion study*. New York, NY: Bobbs Merrill.

Chance, P. & Bjork, L. (2006). Social dimensions of public relations. In T. Kowalski. (Ed.) *Public relations in schools*, (4th *edition,* pp. 126-130) Upper Saddle River, NJ: Merrill-Prentice Hall.

College of Agriculture. (2010). Extension reporting: Statistical contacts. Retrieved from https://warehouse.ca.uky.edu/AgWeb/pubreports/

Collins, J. (2001). *Good to great*. New York, NY: Harper Collins.

Commission on Country Life. (1909/1911). Report of the country life commission. New York, NY: Sturgis & Walton.

Cone, C. B. (1989). *The University of Kentucky: A pictorial history*. Lexington, KY: University Press of Kentucky.

Cooperative Extension Service. (2002). Environmental scan: Group data reports summarized and trended from county extension agents Retrieved from http://ces3.ca.uky.edu/re_envisioning_ces/EnviromentalScan.htm.

Damanpour, F., & Schneider, M. (2006). Phases of the adoption of innovation in organizations: Effects of environment, organization and top managers. *British Journal of Management, 17*, 215-236.

Duke, D. (2004). *The challenges of educational change*. Boston, MA: Pearson Education.

Extension Committee on Organization and Policy. (2002). The extension system: A vision for the 21st century. Washington, DC: National Association of State Universities and Land-Grant Colleges.

Extension Districts Authorized, KRS Ky. Acts ch. 275, sec. 4 § 164.620 (1962)

Fitzgerald, L., Ferlie, E., Wood, M., & Hawkins, C. (2002). Interlocking interactions, the diffusion of innovations in health care. *Human Relations, 55*(12), 1429-1449. doi: 10.1177/0018726021287822l3

French Jr., J. R. P., & Raven, B. (1959). The bases of social power. In J. M. Shafritz and J. S. Ott (Eds.), *Classics of Organizational Theory* (5th ed., pp. 319-328). Fort Worth, Tx: Harcourt College.

Futures Task Force to the Extension Committee on Organization and Policy. (1987). Extension in transition: Bridging the gap between vision and reality. Blacksburg, VA: Virginia Cooperative Extension Service.

Galbraith, J. R. (2002). *Organizing organizations: An executive guide to strategy, structure, and process*. San Francisco, CA: Jossey-Bass.

Gallagher, A. (1967). The agent as an analyst. *Journal of Extension, 4*(2), 214-222.

Gamson, W. A. (1968). *Power and discontent*. Homewood, IL: Dorsey Press.

Glasglow, N., Morton, L. W., & Johnson, N. E. (2004). Critical issues in rural health. Ames, IO: Blackwell.

Goldman, K. D. (1992). *Perceptions of a health education innovation as predictors of implementation: The march of dimes campaign for healthier babies.* Ph.D. Dissertation, New York, NY: New York University/

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78*, 1360-1380.

Granovetter, M. (1982). The strength of weak ties revisited. In P. V. Marsden and N. Lin (Eds.), *Social Structure and Network Analysis*. Newberry Park, CA: Sage.

Granovetter, M. (2005). The impact of social structure on economic outcomes. *The Journal of Economic Perspectives, 19*(1), 33-50.

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *The Milbank Quarterly, 82*(4): 581-629.

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., Kyriakidou, O., & Peacock, R. (2005). Storylines of research in diffusion of innovation: A meta-narrative approach to systematic review. [Print Electronic]. *Social Science and Medicine, 61*(2), 417-430.

Hanneman, R. A., & Riddle, M. (2005). Introduction to social network methods. Retrieved from http://faculty.ucr.edu/~hanneman/

Hartley, J. (2005). Innovation in governance and public services: Past and present. *Public Money and Management, 25*, 27-34.

Hawley, S. R., Beckman, H., & Bishop, T. (2006). Development of an obesity prevention and management program for children and adolescents in a rural setting. *Journal of Community Heath Nursing, 23*(2), 69-80.

Helfrich, C. D., Savitz, L. A., Swiger, K. D., & Weiner, B. J. (2007). Adoption and implementation of mandated diabetes registries by community health centers. *American Journal of Preventive Medicine, 33*(1S), S50-S65.

Helgesen, S. (1995). *The web of inclusion: A new architecture for building great organizations*. New York, NY: Currency/Doubleday.

Henning, J. (2011). 2010 Extension annual report (College of Agriculture Cooperative Extension Service, Trans.). Lexington, KY: University of Kentucky. Retrieved from http://www.ca.uky.edu/agcomm/magazine/2011/spring-2011/articles/ExtensionAnnualReport2010.html.

Holland, P. W., & Leinhardt, S. (1981). An exponential family of probability distributions for directed graphs. *Journal of the American Statistical Association, 76*, 33-65.

Holloway, R. E. (1977). *Perceptions of an innovation: Syracuse university's project advance.* Ph.D., Syracuse, NY: Syracuse University.

Holt, D. A. (2007). Agricultural research management in US land-grant universities:The state agricultural experiment station system. In G. T. Loebenstein, L. (Ed.), *Agricultural research management* (pp. 231-258). Dordrecht, The Netherlands: Springer.

Jackson, M. (2003). 2002 Extension annual report: *The magazine, 4*(1). Retrieved from http://www.ca.uky.edu/agcomm/magazine/2003/WinterSpring2003/Articles/htmlfiles/annual_report.htm

Kanter, R. M. (1979). Power Failute in Managment Circuits. *Harvard Business Review, 57*(July-August), 65-75.

Kellogg Commission on the Future of State and Land-Grant Universities, and National Association of State Universities and Land-Grant Universities. (2000). *Returning to our roots: Executive summaries of the reports of the kellogg commission on the future of state universities and land-grant colleges*. Washington, DC: NASULGC.

Kentucky Council on Postsecondary Education (2006) County profiles. Retrieved from http://cpe.ky.gov/info/county/.

Kipnis, D. (1976). *The powerholders*. Chicago, IL: University of Chicago Press.

Knoke, D., and Yang, S. (2008). *Social network nalysis* (2nd ed.). Los Angeles, CA: Sage.

Kruger, T. M., Murray, D., & Zanjani, F. (2011). The mental healthiness and aging initiative: Lessons from a social marketing-informed research campaign in Kentucky. *Social Marketing Quarterly, 17*(3), 18-38. doi: 10.1080/15245004.2011.595537

Lettl, C. (2005). The emergence of radically new health care technologies: Inventive users as innovation networkers. *Technology and Health Care, 13*(3), 169.

Mainous, A., & Kohrs, F. (1995). A comparison of health status between rural and urban adults. *Journal of Community Health, 20*(5), 423-431.

Marsden, P. V. (2005). Recent developments in network measurements. In P. J. Carrington, J. Scott and S. Wasserman (Eds.), *Models and methods in social network analysis*. Cambridge, UK: Cambridge University Press.

Mintzberg, H. (1979). *The structuring of organizations : a synthesis of the research*. Englewood Cliffs, NJ: Prentice-Hall.

Mintzberg, H. (1983). *Power in and around organizations*. Upper Saddle River, NJ: Prentice Hall.

Mohr, L. B. (1969). Determinants of innovation in organizations. *American Political Science Review, 63*, 111-126.

Mouton, J. S., Blake, R.R., Fruchter, B. (1955a). The reliability of sociometric measures. *Sociometry, 18*, 1-48.

Mouton, J. S., Blake, R.R., Fruchter, B. (1955b). The validity of sociometric responses. *Sociometry, 18*, 181-206.

Murphy, J., Louis, K. S., and American Educational Research Association. (1999). *Handbook of research on educational administration : A project of the American Educational Research Association* (2nd ed.). San Francisco,CA: Jossey-Bass.

Murray, D., & Zanjani, F. (2007). Mental health and aging initiative Eastern Kentucky: Washington, DC: USDA-NIFA Rural Health and Safety Education Competitive Program.

Napierkowski, C. M., & Parsons, R. D. (1995). Diffusion of innovation: Implementing changes in school counselor roles and functions. *School Counselor, 42*(5). 364-369.

National Association of State Universities and Land-Grant Colleges. (2002). The extension system: A vision for the 21st century. Washington, DC. Retrieved from http://www.aplu.org/NetCommunity/Document.Doc?id=152

National Association of State and Land-Grant Universities. (2008). The land-grant tradition. Washington, DC. Retrieved from http://www.aplu.org/document.doc?id=780

National Center for Health Statistics. (2001). Healthy people 2000: Final review. Hyattsville, MD: Public Health Service.

Office of Disease Prevention and Health Promotion. (2011). Healthy people 2020. *Healthy People* Retrieved from http://www.healthypeople.gov/2020/Consortium/HP2020Framework.pdf

Quatman, C., & Chelladurai, P. (2008). Social Network Theory and Analysis: A Complementary Lens for Inquiry. *Journal of Sport Management, 22*(3), 338-360.

Pfeffer, J. (1981). Power in organizations. Marshfield, MA: Pitman Publishing. 1-32.

Rauschkolb, R. S. (Winter 1988). Uncertainty: Condition normal for the future. *Journal of Extension, 26*(4). Retrieved from http://www.joe.org/joe/1988winter/tp1.php

Ritter, E. M. (1993). Editor's page: From practice to theory and back again. *Journal of Extension, 31*(2). Retrieved from http://www.joe.org/joe/1993summer/ed1.php

Rogers, E. M. (1962). *Diffusion of innovations* (1st. ed.) New York, NY: Free Press.

Rogers, E. M. (1963). The adoption process part I. *Journal of Extension, 1*(3), 16-22.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York, NY: Free Press.

Rogers, E. M. (2003). *Diffusion of innovations (5th ed.)*. New York, NY: Free Press.

Rogers, E. M. (2004). A prospective and retrospective look at the diffusion model. *Journal of Health Communications, 9*, 13-19.

Rogers, E. M., & Beal, G. M. (1958). The importance of personal influence in adoption of technological changes. *Social Forces, 36*(4), 329-334.

Rogers, E. M., & Shoemaker, F. F. (1971). *Communication of innovations; A cross-cultural approach* (2d ed.). New York,: Free Press.

Rowan, B., & Miskell, C. (2000). Institutional theory and the study of educational organizations. In J. Murphy and K. S. Louis (Eds.), *Handbook of research on educational administration* (2nd ed., pp. 359-384). San Francisco, CA: Jossey-Bass.

Ryan, B., & Gross, N. C. (1943). The diffusion of hybrid seed corn in two Iowa communities. *Rural Sociology, 8*, 15-24.

Safrit, R. D., Conklin, N., & Jones, J. M. (1995). Extension's values: A bridge across turbulent times. *Journal of Extension, 33*(1). Retrieved from http://www.joe.org/joe/1995february/a1.php

Salveron, M., Arney, F., & Scott, D. (2006). Sowing the seeds of innovation: Ideas for child and family services. *Family Matters, Autumn* (73), 38-45. doi: 21463671

Scheer, S. C., Ferrair, T. M., Earnest, G. W., and Connors, J. J. (2006). Preparing extension professionals: The Ohio State University's model of extension education. *Journal of Extension, 44*(4). Retrieved from http://www.joe.org/joe/2006august/a1.php

Scheirer, M. A. (1987). Implications for evaluators: New directions for program evaluation. In L. Bickman (Ed.), *Program theory and implementation theory: Implications for evlauators* (pp. 59-75). San Francisco, CA: Jossey-Bass.

School of Human Environmental Science (2011). Staff Directory. .Retrieved from http://www.ca.uky.edu/hes/internal/HES_Directory.pdf

Schön, D. A. (1971). *Beyond the stable state.* New York, NY: Random House.

School of Human Environmental Sciences. (2007). Family and Consumer Sciences Retrieved from http://www.ca.uky.edu/hes/?p=5

Scott, J. (2000). *Social network analysis: A handbook*. Los Angeles, CA: Sage.

Scutchfield, F. D., Harris, T., Tanner, B., & Murray, D. (2007). Academic health centers and cooperative extension service: A model for a working partnership. Journal of Extension, 45(1). Retrieved from http://www.joe.org/joe/2007february/a5.php

Seevers, B. S. (1999). Organizational Values of New Mexico Cooperative Extension Service Employees. *Proceedings of the 26th Annual Conference of the American Association of Agricultural Educators.* Orlando, FL. 26, 421-430.

Senge, P. M. (1990). The fifth discipline: A shift of mind. In J. M. Shafritz and J. S. Ott (Eds.), *Classics of organizational theory* (5th ed., pp. 451-459). Fort Worth, TX: Harcourt College.

Senge, P. M. (1999). *The dance of change : The challenges to sustaining momentum in learning organizations: A fifth discipline resource*. New York, NY: Currency Doubleday.

Sherwood, J. E. (2004). The role of the land-grant institution in the 21st century. *Research and Occasional Paper Series*. Retrieved from http://cshe.berkeley.edu/publications/docs/ROP.Sherwood.6.04.pdf

Simpson, W. (2001). *The Quadratic Assignment Procedure (QAP)* Paper presented at the North American Stata Users Group, Boston, Mass. Retrieved from http://www.stata.com/meeting/1nasug/

Smith, J. A. (1980). *College of Agriculture of the University of Kentucky : Early and middle years, 1865-1951*. Lexington, KY.: The College of Agriculture.

Smith, K. L., & Beckley, W. L. (1985). Mentoring: Is it for extension? *Journal of Extension, 23*(3). Retrieved August 29, 2011 from http://www.joe.org/joe/1985fall/a2.php

Smith Lever Act § 9, 372 Stat. 7 (May 8, 1914).

Smith, M. S. (2007). 2006 Extension Annual Report (College of Agriculture Cooperative Extension Service, Trans.). Lexington, KY: University of Kentucky. Retrieved from http://www.ca.uky.edu/agcomm/magazine/2007/SPRING-2007/Articles/htmlfiles/index.htm

Smith, S., Hoag, D., and Peel, K. (2011). Lessons from Outstanding County Agents. *Journal of Extension, 49.* Retrieved from http://www.joe.org/joe/2011august/a2.php

Stapleton, M., Caldwell, G, Kendell, C, Fazey, M, Robeson, S.Sewell, P., & Williams, P. (2000). Healthy Kentuckians 2010. Frankfort, KY: Kentucky Department of Public Health.

Stephenson, G. (2003). Somewhat flawed theoretical foundation of the extension service. *Journal of Extension, 41*(4). Retrieved from http://www.joe.org/joe/2003august/a1.php

Taylor, F. W. (1916, December). *The principles of scientific management*. [An abstract of the address given by Dr. Taylor before the Cleveland Advertising Club March 3, 1915]. Bulletin of the Taylor Society. Cleveland, OH.

The Carnegie Foundation for the Advancement of Teaching. (2010). The carnegie classification of institutions of higher education, Retrieved from http://classifications.carnegiefoundation.org/

Thompson, G. N., Estabrooks, C. A., & Degner, L. F. (2006). Clarifying the concepts in knowledge transfer: A literature review. *Journal of Advanced Nursing*, *53(6)*. pp. 691-701).

Thompson, M. (2011). Job Descriptions. *Careers in Extension* Retrieved from http://www.ca.uky.edu/extensionjobs/Job_Descriptions.php

Tichy, N. M., & Devanna, M. A. (1990). *The transformational leader : The key to global competitiveness*. New York, NY: Wiley.

Tushman, M., & O'Reilly, C. A. (1997). *Winning through innovation : A practical guide to leading organizational change and renewal*. Boston, Mass.: Harvard Business School Press.

United States Department of Agriculture. (1994). Shaping the future: A strategic plan for natural resources and environmental management education, cooperative extension system's base program in NREM. Washington, D.C.

United States Department of Agriculture. (2011). Extension Retrieved from http://www.csrees.usda.gov/qlinks/extension.html

University of Kentucky. (2002). Re-envisioning. Retrieved from http://ces3.ca.uky.edu/re_envisioning_ces/

University of Kentucky. (2005). University of Kentucky top 20 business plan. Retrieved from http://www.uky.edu/OPBPA/whytop20.htm

University of Kentucky. (2006). The dream and the challenge. Retrieved from http://www.uky.edu/Home/2003-06StrategicPlan/2003-06_Strategic_Plan.pdf

University of Kentucky College of Agriculture Cooperative Extension Service. (2011). Extension manual: A referrence on policies and procedures for extension agents. Retrieved from http://ces.ca.uky.edu/extensionmanual/

United States Department of Agriculture. (2011). Extension. Retrieved from http://www.csrees.usda.gov/qlinks/extension.html

United Health Foundation. (2010). America's health rankings Retrieved from http://www.americashealthrankings.org/Rankings

Valente, T. W. (1995). *Network models of the diffusion of innovations*. Cresskill, NJ: Hampton Press.

Valente, T. W. (2005). Network models and methods for studying the diffusion of innovations. In P. J. Carrington, J. Scott and S. Wasserman (Eds.), *Models and methods in social network analysis*. Cambridge, UK: Cambridge University Press.

Valente, T. W., & Davis, R. L. (1999). Accelerating the diffusion of innovations using opinion leaders. *Annals of the American Academy of Political and Social Science, 566, The Social Diffusion of Ideas and Things* (Nov.), 55-67.

Valente, T. W., & Fosados, R. (2006). Diffusion of innovations and network segmentation: The part played by people in promoting health. [Article]. *Sexually Transmitted Diseases, 33*, S23-S31. doi: 10.1097/01.olq.0000221018.32533.6d

Valente, T. W., & Fujimoto, K. (2010). Bridging: Locating critical connectors in a network. *Social Networks, 32*(3), 212-220. doi: DOI: 10.1016/j.socnet.2010.03.003

Van der Leeuw, S. E., & Torrence, R. (Eds.). (1989). Introduction: What's new about innovation? In:What's new? A closer look at the process of innovation. London, Eng: Unwin Hyman.

Warner, P. D., & Christenson, J. A. (1984). *The Cooperative Extension Service, A national assessment*. Boulder, CO: Westview Press.

Wasserman, S., & Faust, K. (1994). *Social network analysis; Methods and applications*. New York, NY: Cambridge University Press.

Way, W. L. (2001). The evolution of research in family and consumer sciences. *Family and Consumer Sciences Research Journal, 30*(2), 208.

Wheatley, M. (1996). *Leadership and the new science: Discovering order in a chaotic world*. San Francisco, CA: Berrett-Koehler.

Weyhrauch, W. S., Culbertson, S. S., Mills, M. J., & Fullagar, C. J. (2010). Engaging the engagers: Implications for the improvement of extension work design. *Journal of Extension, 48*(3). Retrieved from http://www.joe.org/joe/2010june/a5.php

Winick, C. (1961). The diffusion of an innovation among physicians in a large city. *Sociometry, 24*(4), 384-396.

Yukl, G. A. (2002). *Leadership in organizations* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Zanjani, F., Kruger, T., & Murray, D. (2011). Evaluation of the mental healthiness aging initiative: Community program to promote awareness about mental health and aging issues. *Community Mental Health Journal*, 1-9. doi: 10.1007/s10597-011-9373-1

VITA

Deborah Adkins Murray

Born: July 10, 1952

Birthplace: Grayson, Kentucky

Education

1997	Master of Arts, Home Economics Education, Eastern Kentucky University
1973	Bachelor of Science, Vocational Home Economics, Morehead State University

Professional Experience

2005–Present	Associate Director, Health Education through Extension Leadership, University of Kentucky, Lexington, Kentucky
2011-2012	Adjunct Faculty, School of Human Environmental Sciences, University of Kentucky, Lexington, Kentucky.
2003-2005	Regional Coordinator, eastern Kentucky, Cooperative Extension Service
1997-2003	Area Program Director, northeastern Kentucky, Cooperative Extension Service
1995-1997	Laurel County Extension Agent, 4-H and Youth Development, Cooperative Extension Service
1991-1995	Educator, Laurel County Schools, London, Kentucky
1980-1991	Business Owner, Laurel County, Kentucky
1973- 1980	Laurel County Extension Agent, Home Economics, Cooperative Extension Service

Honors

2010-present	Health Literacy Kentucky, Steering Committee, Louisville, Kentucky
2009-present	National Advisory Committee, America on the Move, USDA, Washington, D.C.
2007-present	University of Kentucky, Work Life Advisory Committee, Lexington, Kentucky
2006 –2010	University of Kentucky, Appalachian Center Advisory Board, Lexington, Kentucky
2006 – 2009	University of Kentucky, Commission on Women, Lexington, Kentucky
2005	National Guiding Committee for USDA on Childhood and Youth Obesity, Washington, D.C.

2002-2005	Commissioner, Kentucky Appalachian Commission, Frankfort, Kentucky
1997	National Association of 4-H/Youth Development Extension Agents, Online Interactive Land Judging Contest, Outstanding Technology Award

Presentations

2010	Mental Healthiness in Aging Initiative, October 26, Concurrent Session, National Collaborative Family Healthcare Association, Louisville, Kentucky.
2009	Mental Healthiness in Aging Initiative, July 28, Poster Session, Kentucky Rural Health State Conference, Frankfort Kentucky.
2008	Kentucky Team Up Addresses Health Disparities in Never or Rarely Screened Appalachian Kentucky Women, December 16, NIH Summit: National Conference on Eliminating Health Disparities, Poster Session, Washington, D.C.

Publications

Kruger, T., **Murray, D**., & Zanjani, F. (2011). The mental healthiness and aging initiative: Lessons from a social marketing-informed research campaign in Kentucky. Social Marketing Quarterly, 17(3), 18-38. doi: 10.1080/15245004.2011.595537

Kruger, T., **Murray, D**., & Zanjani, F. (2011). Rural community members' perspectives on mental health and aging: An ecological approach to interpreting and applying focus group results. *Journal of Extension, 49*(2)

Zanjani, F., Kruger, T., & **Murray, D**. (2011). Evaluation of the mental healthiness aging initiative: Community program to promote awareness about mental health and aging issues. *Community Mental Health Journal*, 1-9. doi: 10.1007/s10597-011-9373-1

Scutchfield, F. D., Harris, T., Tanner, B., & **Murray, D**. (2007). Academic health centers and cooperative extension service: A model for a working partnership. *Journal of Extension,* 45(1)

Murray, D. (2006) Kentucky responds to meth production and use, *Journal of Family and Consumer Sciences,* 98(2), pp. 61-62.

Deborah Murray