Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the Budget Processes of Three Southeastern States: A Step Toward Normative Budget Theory

by

Kimberly Ann Payne

A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
May 4, 2019

Keywords: normative budget theory, transparency, social network analysis, transparency, organizational culture, values

Approved by

Dr. Linda Dennard, Professor Emeritus of Political Science and Public Administration
Dr. Cynthia Bowling, Associate Dean for Research & Faculty Development
Dr. Keren Deal, Professor of Accounting, Director of the Auburn University of Montgomery State of Alabama Accounting Initiative Program
Dr. Cathleen Erwin, Associate Professor of Health Administration, Program Director Health Services Administration

Abstract

The budget process in any state is more than the structural hierarchy, budget calendars and procedures, and the technical preferences of the day, it is also a network of budget agents interacting to complete the budget. This process occurs within the formal and informal connections among agents. Symmetry of information flow among exchange relationships can potentially generate a transparent budget culture overtime. An improved flow of information should facilitate improved decision-making within the budget process as a pattern of transparency emerges.

This dissertation examines the budget process of three southeastern states, North Carolina, Georgia and Tennessee. It maps information flow among state budget analysts using social network analysis. The strength of information-exchange relationships is used to define internal transparency in the budget network as an empirical aid to the development of normative budget theory.

The agents in each state completed a survey that included questions about which agents they interact with and the level of relationship maintained through their budget process interactions. The data collected (attributes & interactions) was formatted and loaded to UCINET to calculate the social network measures defined by Caroline Haythornthwaite's information exchange model. Each state's measures for cohesion (density & centralization), structural equivalence, prominence, range, brokerage, and strength of ties were analyzed. Patterns of budget agent behavior in information exchange were revealed as indicators of internal transparency.

Acknowledgements

First, I would like to express my sincere gratitude to my Chair/Advisor Professor Linda Dennard for the continuous support of my Ph.D. study and related research, for her patience, motivation, and immense knowledge. I would like to thank you for showing me the beauty of complexity and introducing me to new avenues in research methodology. Her guidance helped me in all the time of research and writing of this dissertation. I could not have imagined having a better advisor and mentor for my Ph.D. study.

Gratitude is insufficient to describe the respect and appreciation I have for my advisor and committee chair, Dr. Linda Dennard. Besides my advisor, I would like to thank the rest of my dissertation committee: Professor Cynthia Bowling, Professor Keren Deal, and Professor Cathleen Erwin, for their great support, invaluable comments, and encouragement. Thank you for the direction that allowed me to carry out my research and make the contacts that helped me complete my dissertation. A special thank you to Dr. James Witte for agreeing to be my University Reader on short notice.

Also, I would like to extend thanks to the many people, in North Carolina, Tennessee, and Georgia, who so generously gave me permission to complete my research using their states budget analysts. Plus, the state budget analysts who completed the questionnaire allowing me to complete my study.

Last but not the least, I would like to send a special thanks my family: my parents and to my husband and children for supporting me throughout writing this dissertation and my life in general. Words cannot express how grateful I am for all the sacrifices and prayers.

Table of Contents

List of Tables

List of Figures

List of Key Terms

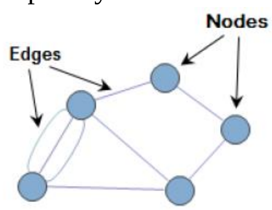
Basic Elements:

Actors/Agents/Node - network members that are distinct individuals. Note: Actors/agents/nodes terms are interchangeable).

Alters – Actors connected to ego through ties.

Isolates – This is an Actor/agent/node without interaction. Either in-degree and out-degree connections or links are zero.

Relational Ties (Edges) – the connections/links between actors within a network. These ties can be informal (for example, co-workers or friends) or formal (for example, supervisor or manager). Actors can have multiple ties with other actors, a feature known as multiplexity.



http://semanticommunity.info/AOL_Government/Social_Media_-_Six_Degrees_of_Separation_and_Now_Even_Less

Type of Network:

Ego-centric (personal networks) - are defined from a focal actor's perspective only. This refers to the ties directly connecting the focal actor (ego) to others (egos alter) in the network, plus ego's views on the ties among his or her alters.

Socio-centric (complete networks) - consist of the relational ties among members of a single, bounded community. An example would be relational ties among all the teachers in a high school.

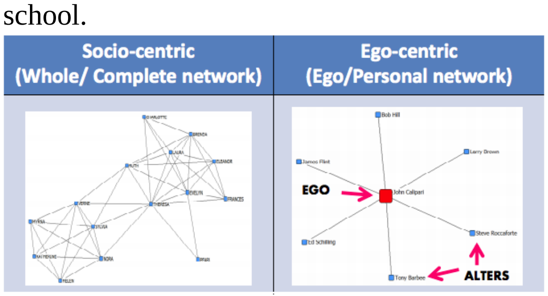


Image via http://www.analytictech.com/e-net/pdwhandout.pdf

One Mode - networks involve relations among a single set of similar actors, such as information exchange among physicians within a hospital or in this case between budget agents working in a state's budget office.

Two Mode - networks involve relations among two different sets of actors.

Measures of Network Structure:

Betweenness centrality - is the number of times an actor connects pairs of other actors, who otherwise would not be able to reach one another. It is a measure of the potential for control as an actor who is high in "betweenness" can act as a gatekeeper controlling the flow of resources between the alters that he or she connects.

Brokerage – is number of pairs not directly connected. The idea of brokerage is that ego is the "go-between" for pairs of other actors. In an ego network, ego is connected to every other actor (by definition). If these others are not connected directly to one another, ego may be a "broker" ego falls on paths between the others. One item of interest is simply how much potential for brokerage there is for each actor (how many times pairs of neighbors in ego's network are not directly connect

Centrality - measures identify the most prominent actors (measure is an indicator of key players), that is those who are extensively involved in relationships with other network members.

Closeness centrality - is based on the notion of distance. If an actor is close to all others in the network, no more than one, then she or he is not dependent on any other to reach everyone in the network. Also, the node can communicate quickly with other nodes in the network. Closeness measures independence or efficiency. Length of the average shortest path between a given node and all other nodes in a graph.

Cohesion - is the connectedness or "knittedness" of the network.

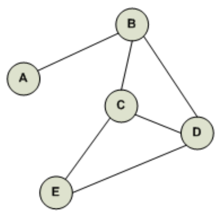
Component - is a portion of the network in which all actors are connected, directly or indirectly, by at least one tie. Note: Each isolate is a separate component.

CONvergence of iterated CORrelations (CONCOR) – This refers to the observation that repeated calculations of correlations between rows (or columns) of a matrix will eventually result in a correlation matrix consisting of only +1s or -1s.

Dendrogram – diagram representing a tree. In this study it is used as hierarchal clustering to illustrate the arrangement of groups/clusters from the partitions completed in CONCOR calculations.

Directed graph (Network) - When the relationship may not be valid in both directions (connecting nodes), then it is called a directed graph. If Bill is following Steve on Twitter and Steve is not following Bill, the relationship is directed.

Un-directed graph (Network) - When the relationship is always valid in both directions, then it is called undirected graph.



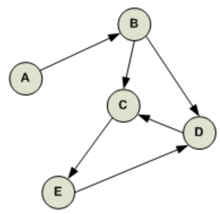


Image via http://www.codediesel.com/wp-content/uploads/2012/02/d-graph1.gif

Fig 1. Undirected Graph

Fig 2. Directed Graph

Degree centrality - is the sum of all other actors who are directly connected to ego. It signifies activity or popularity. Lots of ties coming in and lots of ties coming out of an actor would increase degree centrality.

Density - is the total number of relational ties divided by the total possible number of relational ties.

Distance - The number of “steps” between any two actors in a network.

Dyad - consists of any two nodes and the ties that may (or may not) exist between them.

Ego – is an individual "focal" node. A network has as many egos as it has nodes. Egos can be persons, groups, organizations, or whole societies.

Geodesic Distance - in the mathematical field of graph theory, the distance between two vertices in a graph is the number of edges in a shortest path (also called a graph geodesic) connecting them.

Graphs - are visual representations of networks, displaying actors as nodes and the relational ties connecting actors as lines.

Heterophily - is the tendency of individuals to collect in diverse groups; it is the opposite of homophily

Homophily - is the extent to which social ties between similar people occur more often than chance alone would predict. The homophily principle declares that the probability of a social tie between two individuals becomes smaller the more different those two individuals are from one another in some socially-salient characteristic such as age, education, income, occupation, religion, racial/ethnic group or geographic location.

In-Degree Centrality - is a count of the number of ties directed to the node. When ties are associated to some positive aspects such as friendship or collaboration, indegree is often interpreted as a form of popularity or prominence. The basic idea is that many actors seek to direct ties to them—and so this may be regarded as a measure of importance.

Neighborhood - is the collection of ego and all nodes to whom ego has a connection at some path length. In social network analysis, the "neighborhood" is almost always one-step; that is, it includes only ego and actors that are directly adjacent. The boundaries of ego networks are defined in terms of neighborhoods.

NetDraw – is the program integrated with UCINET for drawing diagrams of social networks.

Out-Degree Centrality - is the number of ties that the node directs to other Actors who have high out-degree centrality may be relatively able to exchange with others or disperse information quickly to many others. So, actors with high out-degree centrality are often characterized as influential or have power.

Prominence – an actor is prominent if he/she occupies a distinctive location in the network that may lead to high visibility or importance to other actors. This measure is dependent on the actor's direct ties. This is not a characteristic of the individual but of the individual's position.

Reachability - measures whether actors within a network are connected, either directly or indirectly, to all other actors.

Reciprocity (mutuality) - is how strong the tendency for one actor to connect is (choose) another, if the second actor connects (chooses) the first.

Regular equivalence - is a relaxation of structural equivalence. Actors who are "regularly equivalent" have identical ties to equivalent, but not necessarily identical, others.

Role and position - measures reveal subsets of actors whose relations are similarly structured. (Ex. Structural Equivalence)

Size - A measure of the number of actors (nodes) in a complete or egocentric network.

Social Network - A finite set (or sets) of actors and the relations defined on them. It consists of three elements: (1) a set of actors; (2) each actor has a set of individual attributes; and (3) a set of ties that defines at least one relation among actors.

Structural equivalence - identifies actors that have the same ties to the same others in a network.

Subgroup - measures show how a network can be partitioned.

UCINET - software package for the analysis of social network data.
http://www.analytictech.com/ucinet/description.htm

CHAPTER I

REVIEW OF BUDGETING

Introduction

Budgeting is an activity both "transitory and permanent, both infinitely varied and yet always the same (Caiden, 1994, p. 44)". According to Wildavsky, budgeting is, "the translation of financial resources into human purposes" (Wildavsky, 1987, P.4). But while budgeting is the setting of expenditure levels for each of an entity's functions, the process of how this occurs has been subject to more speculation than fact.

Creating a budget requires information exchange, discussing entity needs, and ultimately deciding how to execute the budget. V. O. Key Jr, however, asks a critical question that remains unanswered, "On what basis shall it be decided to allocate x dollars to activity A instead of activity B?" (1940, p. 1138) How do decision makers choose in conditions of uncertainty, those influenced by values as much as by facts?

But as Aaron Wildavsky observes in *The Politics of the Budgetary Process*, "The interest of students of budgeting lies in the interactions" (1979, p. viii). To date, however, researchers of budgeting have looked everywhere but in the interactions of budget participants and decision makers. To answer the question of "how decision-makers choose in conditions of uncertainty," this research examines the process as understood by the actors involved.

For example, in 1915 Frederic Cleveland defined budgeting as “a plan for financing an enterprise of government during a definite period, which is prepared and submitted by a responsible executive to a representative body (or other duly constituted agent) whose approval and authorization is necessary before the plan may be executed" (Cleveland, 1915, 15). But Cleveland's definition is merely a definition of the document. Other than his mention of who would complete the budget, the definition does not provide insight into the normative values of budgeting.

Edwin R. A. Seligman's article “The Social Theory of Fiscal Science” (1926) lays out common wants and why groups fulfill them. This article seems to be the only attempt at a holistic system view of the social nature of budgeting. It was Key's article (1940), however, which called for a theory that would explain the expenditure side of budgeting, which marked the formal start of the search for a normative budget theory. Yet, twenty years later Aaron Wildavsky noted that progress explaining the decision making of value-laden choices had not been made. According to Barbara L Neuby (1997), this gap in budgeting research and literature still exists.

Some of the difficulty in developing normative theory is identifying and tracking values and their impact in a complex public budget process. "If a normative theory of budgeting is to be more than an academic exercise, it must guide the making of governmental decisions" (Wildavsky, 1961, p. 184). In Linda Dennard's 2008 article "The budget process as Complex Civic Space: Wildavsky and Radical Incrementalism," she states "Wildavsky observed that one could not understand the budget process structure by simply dissecting the parts of it or recounting the steps between ideas and implementation.

Rather, the process must be looked at as a dynamic system with self-organizing aspects" (p. 4).

Statement of the Problem

Normative values of public budgeting have conventionally associated directly or indirectly with technical expertise, neutral competence, and the professionalism of the agents that participate in the budget process. While there is a spirit of 'what ought to be,' the research has not focused on the behavior of the budget agent interactions which generate information flow channels for improving budget decisions. This dissertation examines the working relationships that facilitate this flow of information within an organization and identifies the normative value of internal transparency, which it is maintained here, could improve governmental decisions within the budget process. Indeed, the premise of this dissertation is that budget agents, and their relationships, could, with conscious management, create a pattern of interactions that produce internal transparency as a constant within the organizational culture.

Social Network Analysis (SNA) is employed to identify these potential patterns related to information diffusion. Mapping the budget networks in North Carolina, Georgia, and Tennessee provides a means for identifying patterns of interaction among the "transitory and permanent" aspects of the budgeting process, with hopes of identifying an emergent pattern of internal transparency as a normative variable within each state's budget network.

Research Questions

The following research questions directed this study:

1. Is internal transparency a core element of the budget process?

2. Can internal transparency be empirically identified?

3. Does a high level of connectedness and strength of ties increase the level of internal transparency within a sample state's budget process?

Overview of Methodology

Normative budget theory has been a highly debated topic, in multiple disciplines, for more than hundred years. However, many of the books, journals, and editorials that shed light on the issue have focused on the technical or mechanical processes of input and output, but there does not seem to be a focus on the behavior of individuals who are responsible for completing a technical/mechanical process.

This study employs social network analysis (SNA) (one-mode, cross-sectional, whole-network) to identify patterns of interaction related to internal transparency. The analysis is meant to maps a pattern of behavior in the exchange of information among agents, suggestive of a normative value—one that then can be observed and measured in future studies. The networks within three southeastern states' budget processes are mapped. This research design is consistent with information exchange studies from various disciplines.

Assembling the Study

The first focus of the research design identified which budget process to use. Since the federal government would encompass a budget for the entire United States, it was too large for this study. State and local governments only encompass their state, district, counties, cities, or other entities. But information on the budgetary process of local government's budgetary process can be limited depending on the size and structure of the locality. For one, there may be few budget analysts, thus making it difficult to map a network of budget agents. Instead, state level budget analysts were chosen because the size of most state budget offices would allow the mapping of a budget analyst network.

Initially, eight states of the Southeastern region of the United States were selected because of their proximity if additional personal interviews were needed. North Carolina, South Carolina, Georgia, Tennessee, Louisiana, Mississippi, and Florida were sent invitations to participate. North Carolina, Georgia, and Tennessee (Appendix A) agreed to participate. Florida declined because of the severe destruction caused by 2018's hurricane Michael. No replies were received from South Carolina, Louisiana, or Mississippi.

The second focus of the research design was to collect data from the budget analysts listed on the state's budget office website. Budget analysts (agents) of the three states received invitations to participate in the study (Appendix B) and participation consent forms (Appendix C). Next, an e-mail was sent with a survey link (Appendix D) to the budget analysts who signed and returned the consent form — inputting participant's responses into a spreadsheet.

The third focus of the research design was to prepare the data to upload into UCINET and select the measures to be completed. Caroline Haythornthwaite's 1996 article *Social Network Analysis: An approach and Set of Techniques for the Study of Information Exchange* sets forth a model ideal for this study. The measures identified in the model generate the networks graphically, providing an empirical view of the social structure at both the node level and network levels of budget agent interaction.

Various disciplines such as information systems, economics, and health administration use these measures for mapping different networks. Also, Stephen Borgatti's & Daniel Halgin (n.d.), Caroline Haythornthwaite & Barry Wellman (1998), Daniel, McCalla, & Schwier (2008), and Menachemi, Rahurkar, Harle, & Vest (2018) use the measures to map information exchange networks. Cohesion (density & centralization), structural equivalence, prominence, range, brokerage, and strength of ties (Haythornthwaite, 1996) are the measures calculated in this study.

The final focus of the research design was analyzing UCINET's output. This part of the research design included figuring out which measures to NetDraw to create visualization models of the measures. During this portion, the statistical use measures and visualization models were reviewed to write the analysis.

Overview of the Chapters

The literature review covered in Chapter II focuses on the various theories that this study utilizes: budget theory, normative budget theory, organizational theory, communication theory, knowledge transfer, social network analysis, and internal transparency. Because of the nature of this research design, it is essential to explain the theories that are guiding this study. The chapter also touches on why the prevailing budget theory has not acknowledged normative variables.

Chapter III provides the methodology and approach for this study. The background and significance of the lack of a normative budget theory as well as why there has not been an acceptable advancement in this area of research is discussed. Also, in Chapter III terms will be operationalized and variables identified. Finally, the chapter includes a discussion of limitations for the study.

Chapter IV is a discussion of the budget analyst perception survey. Review of the budgeting process and the specific budget calendars for the participating states is the initial emphasis. Additionally, this chapter identifies the variables (independent & dependent), the analysis and results.

Chapter V presents the significant findings of this research study. A comparison of the results of the participating state and the implications of their differences. Future research for advancing normative budget theory is discussed.

CHAPTER II

LITERATURE REVIEW

To understand the importance of identifying internal transparency as a measurable variable for budgeting, it is essential to consider several vital theories that serve as a foundation for this research. These include budget theory, normative budget theory, organizational theory, social network theory, and internal transparency.

The following is information on each of the theories, the theory's importance to the research, and prevailing thoughts in the respective areas. Each theory builds a stepping stone toward an understanding of why human behavior is the key to identifying measurable variables of a normative budget theory. The final section reviews transparency to define its meaning for this study.

Budget Theory

Budgeting research is filled with descriptions of multi-year planning, "top-down" and "bottom-up" budget processes, socially responsive budgeting, fiscal policy making, conflict resolution budgetary control, deficit reduction, budgeting methods, and various functions of budgeting (Axelrod, 1995; Schick. 1995; Rubin, 1990; Wildavsky, 1987; Lindblom, 1965; Davies, Dempster, and Wildavsky, 1966; Crecine, 1969; Meyers, 1996). However, normative (or prescriptive decision theory) is concerned with the best decision to make, often modeling an ideal decision maker who can compute with perfect accuracy and is fully rational.

Carol Lewis, in 2013 explained that balanced budgets were not necessarily a legal requirement. In 1991, Thomas Cuny reviewed the federal government's efforts to standardize critical concepts and definitions to increase accountability and transparency. Davis, Dempster, and Wildavsky (1966) and Crecine's (1969) use empirical methods to demonstrate how incrementalism, (while lacking consensus, it is the most dominant budgeting method) operates within the budget process.

While these researchers employ a normative structure, they focus on technical aspects of budgeting and not normative values of decision making. According to Davis, Dempster, and Wildavsky (1966) budget process behavior results in aggregate decisions like those produced by a set of simple decision rules that are linear and temporally stable. That is, budget agents make rational decisions about how much they "get" from the process. This rationality seems to exclude calculations based on a fuller knowledge of what the best course of action may be, given better information.

John Crecine's 1969 study, *Government Problem Solving* is a computer simulation of Davis, Dempster, and Wildavsky's simple rules from observations taken in three large metropolitan governments (Pittsburg, Detroit, and Cleveland). The study created three sub-models from the observations. The first model replicates the formulation of departmental requests, the second model formulates the executive budget request, and the third duplicates the adjustment of the executive request by the legislature (Crecine, 1969, p. 1). The research indicates that the models represent a viable system of decision making within large urban governments. However, the decision process only accounts for "incrementally changing, drifting budget levels" (Crecine, 1969, P. 234).

The assumption of Crecine's model—that incremental changes to the number of services, incremental changes to the cost of services, and new demands emerge at the same time old demands are satisfied—is not realistic. Budgeting controls fiscal policy; it does not control the economy, foreign relations, manmade disasters, natural disasters, and it especially does not control human behavior. In the context here, this means budgeting involves uncertainty and uncertainty requires new information to address. Further, deciding what to do in the volatile conditions in which budgeting exists would seem to demand a sense of 'what ought to be' to help define appropriate solutions.

Indeed, the question here is 'what ought to be' the outcomes of budget agent's behavior during the budget process and what information is needed by whom to produce effective decisions given the complexity of the budgeting landscape.

Normative Budget Theory

Budget reform has been a topic since the turn of the 20th century. The United States has experienced at least five phases in budgeting, starting with control at the turn of the century, moving to management in the New Deal and post-World War II period, to planning in the 1960s, prioritization in the 1970s and 1980s and accountability in the 1990s.

However, for the most part, budget reform has focused on mediating the exercise of power by public agencies and politicians, control of the purse (executive budget or legislative budget power) and incremental corrections of past, technical budgeting practices.

Scientific Management

Needs and desires of citizens as well as governments problem-solving capabilities have all changed, adapted, and emerged to reflect the culture of the time. Woodrow Wilson, for example, writes "Society, the state, government, all three go through a process of development, changing under the pressure of competition and adaptation to new circumstances" (Wilson, 1889, 629). In this regard, the evolution of budget theory has followed the same trajectory as public administration theory.

Public administration and public budgeting emerged in the same environment as scientific management which focused on control, efficiency, predictability, and continuity (Koven, 1999) but did not consider the 'dynamics' of the human (agent) interactions. The need to control the exponential growth of expenditures influenced administrative and technical rationality in budget theory (Adams, 1992, 363). This paradigm was made stronger by the dualism of reformers such as Woodrow Wilson (1887), Frank Goodnow (1900), Leonard White (1926), and Luther Gullick & Lyndall Urwick (1937) and the dichotomies of facts and values, structure and behavior, means and ends, and politics and administration (Gibran and Sekwat, 2009, 620).

Scientific management did not produce a normative theory of budgeting because, by focusing on technical methods and outcomes, it ignored the human interactions creating and sharing information through a network of actors. The actors are cogs in the wheel, rather than independent agents who create organizational culture in their interactions. Conventional literature of this early era treated organizational culture as a descriptive attribute of an organization that may enhance or impede workflow—not necessarily as a set of relationships within which values are exchange and organizational learning occurs reflected in more recent literature (Wildavsky, 1998, p. 1-2).

Within the paradigm of scientific management and its followers, budget agents and other administrators have appeared to be compelled to simply adapt the budget process to the changing requirements of the environment. However, research into what the budget process ought to be beyond merely adaptive and how to achieve this is limited. "A normative theory of budgeting, therefore, is utopian in the fullest sense of that word; its accomplishment and acceptance would mean the end of conflict over the government's role in society" (Wildavsky, 1961, p. 595). The development of the current budget process is 'incremental at best, clumsily introducing and continually requiring adaptation' (Rubin, 1990), and ideals are frequently forced to adapt to local circumstances and demands (Walters, 1996).

After budget agents make incremental changes, the results are scrutinized and judged either better or worse than the original. This "satisficing" as Herbert Simon coined it (1945), seems to limit the budget process to what works in a given environment, however mediocre that decision may be. If an outcome is deemed unsatisfactory, new attempts will be made until a good "fit" is found (Rubin, 1990). But the process seems to lack a commitment to both innovation and ethical behavior.

Complex Adaptive Systems

However, while some view the iterative method of problem solving described by Rubin as equivalent to stumbling in the dark, it can also be viewed as *self-organization*. Self-organization is the dynamics of agent interactions by which an overall pattern or order arises from these interactions at a local level. From the normative perspective, this dynamic implies that more is happening in the budget network than the instrumental implementation of rules and procedures.

Indeed, this cycle of incremental change, review, and continual adaptation could be mapped as a network that identifies the behavior of budget processes as a *complex nonlinear system.* That is, the adaptive interaction of budget agents produces states—such as innovation—that are greater than the sum of the parts of network behaviors. In the hypothesis here, this transcendent pattern of organizational behavior related to information flow would be *internal transparency.*

The dynamics of complex nonlinear systems and the phenomena of self-organization are essential to this research since it is maintained that a transcendent pattern of internal transparency may emerge from the robust interaction of budget agents' overtime. Simplistic linear explanations are not adequate to encompass the diverse components of a network, including value orientation. The complexity mathematics employed in SNA provide the means to visualize the growth of budget networks in the interactions of countless variables (Hennig, Brandes, Pfeffer, & Mergel, 2012, 31-37).

In networks, a small change—e.g. one budget agent no longer participates in the budget process (temporarily or permanently)—can disrupt the patterns of relationship and information flow until the system adapts to the change. The 'chaos' may be as little as another agent being forced to complete the missing agent's tasks, so only the agents having to exchange information to complete the missing agents' tasks would be impacted. In the extreme, however, the disruption results in an unbalanced budget forcing a "special session" and a government shutdown occurs. This crisis behavior, however, is not the only possible outcome of adaptation (Miller & Page, 2007, 27).

In organizations attuned to the possibility, this adaptability could also be the gateway to improved patterns of interaction and information flow. Yet, this self-organization differs from conventional thinking in which change is imposed upon the network. Robert Axelrod (1997) describes this process of how norms are changed internally overtime as trial and error (p. 41).

How will budget agents know if there are imperfections within their budget process if there is not some understanding of what ought to be? In 1997, Barbara Neuby said "Normative theorists stress the all-encompassing nature of budgeting, believing that budget theory should incorporate and explain interaction between public wants and allocation of resources in terms of accepted norms (Bretschneider and Straussman, 1988:305; LeLoup, 1988; Wildavsky, 1988; Crecine, 1969; Musgrave, 1959).

For Wildavsky (1975), budget theory must relate to the values of accepted norms of budgeting. Key (1940) felt that budgeting would approximate a whole theory of government–a supremely normative process" (Neuby, 1997, p. 136). Such a theory would seem to demand a methodology accommodating a holistic view of the budget network with the ability to identify individual normative values, such as internal transparency, that govern local behavior—which ultimately impacts the network globally.

Organizational Theory

"Organizational theory describes the delicate conversion pf conflict into cooperation, the mobilization of resources, and the coordination of effort that facilitates the joint survival of an organization and its members." (March & Simon, 1993, p. 2) Organizational culture, in particular here a transparent culture, has not always been credited with impacting the quality of decision-making in administrative systems, particularly the budget process.

For example, Harry Ecksteinb (1997) said, "Political cultures, and authority cultures more generally, contain as an important component… norms about conditions under which collective decisions are considered to have been taken properly so that they are binding on the collectivity." (p. 27). Eckstein's definition of culture as a scientific concept is "Cultures are the variable and cumulatively learned patterns of orientations to actions in society." (Eckstein, 1997, p. 54).

Culture is the system of knowledge shared by a group of people denoting the group's experience, beliefs, values, attitudes, meanings, hierarchies, religion, notions of time, roles, spatial relations, concepts of the universe, and material objects and possessions (Hofstede, 1997). Tom Postmes, Russell Spears, and Sezgin Cihanger's article "Quality of Decision Making and Group Norms" (2001) found that "group history affects the formation of group norms, and that these norms have a substantial impact on the quality of group decisions (p. 927)." This research posits that group norms are *observable* in the *patterns* of interaction of budget analysts identified through SNA, and further these emergent patterns may reflect the growth of the norm of internal transparency.

Culture consists of patterns, explicit and implicit, with the fundamental core of culture comprised of traditional ideas and their attached values. Cultural systems may be products of action or "conditioning influences" upon further action (Hofstede, 1997). Robert Denhardt (2000) notes, "In organizations, we find a way of molding human behavior to rational patterns of obtaining our objective." (p. 26). Using Denhardt's insight for example, it could be said, that in the budget process, agent behavior determining how to achieve the organization's goals, is molded by organizational rules and learned patterns of behavior that affect how, when, and why connections and interactions occur within a budget network.

Within the processes by which cultures (and their agents) adapt and change, behavior patterns are clues to what values are operating within the budget process. For example, in this dissertation, behavior indicating frequent and widespread interaction among agents shows patterns of information dissemination which implies the tendency towards internal transparency as a normative variable in network behavior. Further, information dissemination, according to the literature, is critical to effective decision making ( ).

Normative statements make claims about how things should or ought to be, how to value them, which things are good or bad, and which actions are right or wrong.

Organizations, Individuals and rational-decision making

The budget process is an allocation process in which fiscal resources are divided into human purposes (Wildavsky, 1987; Meyers, 2004). Rational decision-making in this process has been described by Simon, Key and others (e.g., Lewis, 1952)

Budgetary decision making from an economic perspective is mostly limited to applications of normative microeconomic theory based on utility-maximization assumptions grouped under public choice theory (Niskanen, 1971, p. 45, Thrumaier, 1995, p. 448). However, decision making in government is a process in which evidence, both from systematic research and practical experience, mixes with a complex interaction of ideas, interests, ideologies, institutions, and individuals. This often means system actors are concerned less with rational or irrational behavior as with adaptation and learning (Cohen, 1981; Cook & Chesire, 2013; Saski & Pratt, 2001). Further, what is rational in one setting, may be irrational in another. For example, it may be rational to explore innovation in an open culture, but irrational in one that does not value autonomy.

Yet according to Herbert Simon (1997, p. 170) organizational decisions have two premises: empirical (factual) and normative (value). When making a rational decision, an agent has determined a means to an end in order to achieve a goal (Simon, 1997, p. 240) in which the information used to determine the rational decision is empirical such as cost, time, and details of the project considered. Simon dismissed "values, because they are difficult to measure and tend to produce uncertainty (Dennard, 1995, p. 8) Yet, social norms and the relationships they foster impact the decisions agents make whether or not they are empirical or "rational."

Still, it is conventional wisdom that agents employ replicable heuristics to mediate the effects of "bounded rationality" (Simon, 1982). The observation is agents do not have perfect information, memory, or processing power (Elsenbroich, & Gilbert, 2014, p. 19 – 20). Yet, Simon's theory provides little instruction on how this limited knowledge might be expanded, rather than merely adapted to (Dennard, 1995). In an iteration of rational decision-making theory, game theory, the social interaction version of rational choice theory, (Elsenbroich, & Gilbert, 2014, p. 21) is concerned with how rational individuals make decisions when they are mutually interdependent, using the underlying assumptions of individualism, rationality, and mutual interdependence (Romp, 1997, p. 1-3).

In normative theory, however, the rationality of decisions is not divorced from ethical or acceptable actions. A norm in this sense is a standard for evaluating or making judgments about behavior or outcomes. However, this study is not evaluative, rather it is an empirical observation about behavior and outcomes during the budget process. Looking at the patterns of budget agent interactions may be a step towards a normative budget theory, but it could also establish a methodological approach which helps identify additional elements or behavior confined in the “black box” of decision-making for lack of an empirical tool.

Social Network Theory and Analysis

Peeking inside the Black Box

"It is political culture" inexplicably seems to be used as a euphemism for "I do not know" when there is unexplained variation in research (Wildavsky, 1998, p. 1). In *Culture and Social Theory*, Wildavsky laments the crime of using culture as an explanation of what researchers cannot explain in studies (p. 1). Metaphorically, culture is assumed to be the ‘unexplainable’ in the ‘black’ box (Figure 1). However, in order to develop a normative theory, researchers need to find a way to peek into this black box.

“Apart from those who make science, who study it, who defend it or who submit to it, there exists, fortunately, a few people either trained as scientists or not, who open the black boxes so that outsiders may have a glimpse at it” (Latour, 1987, p. 15). Latour’s *Science in Action* describes *Actor-Network Theory*, and the black box is a significant factor in his explanations. He defines a black box as a complex network of individuals acting as a single automaton to achieve a shared goal. The automaton for this study is the social network of budget actors. The budget actors (agents) are the nodes and their interactions are the information exchange relationships.

Figure 2. 1 Black Box Theory

In Black Box Theory, input & output matter while the hidden processes of the black box in-between do not.

Social Network research entails the use of network representations to understand phenomena and the unit of analysis are social entities whose behavior we wish to explain or describe (Hennig et al., 2012, p. 27). According to March and Simon (1993), "Organizations are systems of coordinated action among individuals and groups whose preferences, information interest or knowledge differ" (p. 2). A network is a group or system of interconnected people, and mathematically networks are demonstrated by an arrangement of intersecting horizontal and vertical lines or graphs. Social network analysis allows researchers to focus attention on relationships among actors that make up a network (Borgatti, Everett, & Johnson, 2013, p. 1).

Social network theory is a lens through which the budget process is examined, and social network analysis is the methodology for mapping and comprehending budget agent relationships and their network structures (Freeman, 2004, p. 2-3). The method is well suited to analyzing complex systems, such as budget networks, because it provides measures for behaviors at both the network and node (local) levels. Data is shown in a matrix and the network is visualized along with the agent interactions within the network that occur after the initial kickoff and before the budget document is submitted.

SNA examines and quantifies patterns of relationships that arise among interacting social entities, typically individuals. An explicit assumption of this approach is that indirect relationships (i.e. "friends of friends") in social groups matter. A strength of SNA is that it provides standardized mathematical methods for calculating measures of sociality across levels of social organization, from the population and group levels to the individual level (Freeman, 1984; Sih et al., 2009; McCowan et al., 2011).

In the 1968 Article "Bringing society back into survey research and macro-methodology" Allen Barton says, "For the last thirty years, empirical social research has been dominated by the sample survey. But as usually practiced, using random sampling of individuals, the survey is a sociological meat grinder, tearing the individual from his social context and guaranteeing that nobody in the study interacts with anyone else in it" (Barton, 1968, abstract). However, SNA maps and models individuals and their behavior in their social context.

In *Social Physics* (2015*)* Alex Pentland describes the advances empirical social research methods such as SNA bring. "Social physics helps us understand how ideas flow from person to person through the mechanism of social learning and how this flow of ideas ends up shaping norms, productivity, and creative output of our companies, cities, and societies" (p. 4).

Whether it is called social science, social physics, or social networks, this approach to empirically studying human behavior reveals the connections and patterns of interactions that explain the contents of the "black box" of administrative decision-making.

Statistical analysis and visualizations provide a broad overview of the information exchange patterns within the budget process. Also, SNA offers the tools to explore deeper into the social network, identifying the most prominent actors of the budget process, reporting overall connectedness, isolating the isolates and brokers, and exploring the inter-group relationships within the budget analyst network.

Internal Transparency

Here it is hypothesized that internal transparency is a key social norm which indicates information symmetry and dissemination between budgeting agents, making the budget decision and process more stable, efficient, and effective. However, the absence of internal transparency as a critical social norm may indicate information asymmetry between budgeting agents making the budget decision and process less stable, efficient, and effective.

Stiglitz provides an excellent example of information asymmetry (the uneven dissemination of information) when talking about funding for the Vietnam War, "It was apparent to many of us that the government was spending far more on the Vietnam War than it was admitting. One of the problems was that not only did we not know for sure how much it was spending, but we did not know who knew, and so we did not know the true extent of culpability of President Johnson's advisors." (Stiglitz, 1999). Richard MacLean (2011) stated, "real transparency must begin on the inside, with clear channels of communication that go all the way to the top of the [organization]" (MacLean, 2011, p. 103).

Within budget research, transparency is associated with other good governance qualities such as accountability, corruption control, impartiality, open government laws. Like budget theory, transparency does not have a commonly agreed upon meaning. In 2006, Christopher Hood described it as the "broadest doctrine of openness" or "...the doctrine that the general conduct of the executive government should be predictable and operate according to published (and as far as possible non-discretionary) rules rather than arbitrarily." (Hood, 2006, p. 135). While this describes the discipline that citizens should expect of the executive branch, this normative standard does not define the significance of internal transparency in disseminating information within a network to improve decision-making. Although openness and transparency are interchangeable, the concepts are not identical.

Transparency is a concern in every government. The World Trade Organization gives three core requirements for transparency: 1. to make information on relevant laws, regulation, and other policies available, 2. to notify interested parties of relevant laws and regulations and changes to them, 3. to ensure that laws and regulations are administered in a uniform, impartial and reasonable manner (Bellver and Kaufman, 2004). Bauhr and Grimes (2012) define transparency as "the availability of, and feasibility for actors, both internal and external to state operations, to access and disseminate information relevant to evaluating institutions, both in terms of rules, operations as well as outcomes (Bauhr & Grimes, 2012). Both definitions include important variables to internal transparency, such as accessibility, availability, impartiality, and predictability and validity. However, this definition fails to include reliability or understandability. These variables, however, are observable by mapping the perceptions of budget agents about their interactions.

Here transparency is defined as *a lack of hidden agendas and conditions (impartiality), accompanied by the availability (access) of full, reliable, and valid information required for collaboration, cooperation, and collective decision making (understanding).* 'Internal' is added to transparency to indicate a concern for information dissemination within the organization, particularly between the budget agents within the budget process—this rather than transparency variables between the organization and the public.

As an integrated and emergent property of a budgeting network, rather than an 'add on', internal transparency is important because distribution of information is available through agents that are both sources and processors of, information, and who through varied interactions, are capable of developing alternate choices (Simon, 1945; Simon, 1997; Simonsen, 1994). As such, a social norm of internal transparency could spawn the emergence of information symmetry which enables more effective self-organization, understanding and rational decisions within the state's budget process. Yet, the inverse is also true, that a robust exchange of information creates the conditions whereby internal transparency could emerge as an established cultural 'habit' or pattern of behavior.

Summary

"What is a good budgetary process?" has been asked since the early development of accounting in ancient Mesopotamia (Henio, 1992). In 1940, Key's complaint about what basis budget decisions are made sent researchers from various disciplines searching for the solution to this critical budgeting conundrum. Key's million-dollar question has yet to be answered, even poorly.

So, on what basis should decision-making occur? Decision making is the process of making choices by identifying a course of action, gathering information, and assessing alternative resolutions based on the values, preferences, and beliefs of the decision-maker that is optimal or at least satisfactory. Therefore, it is a process viewed as rational (and maybe sometimes irrational) but based on explicit and tacit knowledge or information. Tacit knowledge is often used to fill the gaps in complex decision-making processes (Brockmann & Anthony, 2016). While budget agents get information several ways, one way is by talking to co-workers.

The study of decision making, consequently, is a conglomerate of intellectual disciplines: mathematics, sociology, psychology, economics, and political science, to name a few. For example, Herbert Simon's book *Administrative Behavior* (1976) focuses on the behavioral and cognitive processes of humans making rational choices. By his definition, an operational, administrative decision should be correct and efficient, and it must be practical to implement with a set of coordinated means. "if there were no limits to human rationality administrative theory would be barren" (p. xxviii).

However, Simon (1976) put values into a black box, dismissing them because they are not "measurable." This division between rational decision-making and social process has limited normative research. However, as Bruno Latour suggests (1987) understanding the big picture of decision-making depends on peeking into the black box to observe the connections among 'input, throughput, and output.'

Employing methods to find observable patterns of budget agent interactions is important to the task of identifying the normative variable of internal transparency in the budget process. As such, this dissertation is not concerned with rational decision-making in the conventional sense. Rather it explores the human side of decision-making observable in the network of connections that budget agents create and maintain to collect information.

CHAPTER III

METHODOLOGY AND APPROACH

Summary of Research Design: Background and Significance

The budgeting process is a complex subject because it varies by the level of government, jurisdictions, environmental conditions, and procedural tools; especially the behavior budget agents and non-budget agent's exhibit. While budgeting is found in some form in all aspects of human life and society, nowhere is it ever done the same way, with the same goals, and purposes. Budgeting includes processes as diverse as those employed by Congress, the budget processes of Southeastern states, mom and pop businesses, and domestic, foreign and multinational corporations. This variation in context and complexity makes it necessary to find analytical tools and methods that include this complexity in the models utilized in research.

Social Network Analysis

Social network analysis (SNA) is a research paradigm consisting of concepts, methods, and theories designed to study human interactions within network structure empirically (Knoke and Yang, 2008; Scott, 1991; Wasserman and Faust, 1994) which will allow for the variation in context and complexity. While there is minimal research into connectedness in the budget process, there is evidence to suggest that interpersonal relationships of information exchange between budget agents would be valuable to normative budget theory.

For example, Young, Nguyen, Corriveau, Cooke, & Hinch, 2016 article for co-managed fisheries and Gainforth, Latimer-Cheung, Athanasopoulos, Moore, & Ginis, 2014 article on individuals who are more interpersonally connected may be more likely to adopt innovations. Since information is an important resource within the budget process, and one that is contingent on establishing and maintaining relationships or connections with the right actors, a social network approach offers a rich diversity of concepts and tools to describe and explain internal transparency (information access).

Decision making within the budget process is human behavior, and it is reasonable to hypothesize that knowledge exchange among budget agents influences normative behavior within the budget process. Scott Douglas Lazenby (2013) in the *Human Side of Budgeting*, discusses emerging properties, such as budget games that can cause a lack of local interactions that generates information asymmetry. An example of a budget game is the sacrificial lamb: The budget office requests a list of budget items that can be cut if revenues insufficient. Department heads will offer up ‘sacred’ pet programs of the governing body (Lazenby, 2013, p. 158). However, complexity science suggests that organizations (formal or informal), specifically in this study the sample states’ budgeting process, are complex adaptive systems (Mitchell, 2009, p. 4-12).

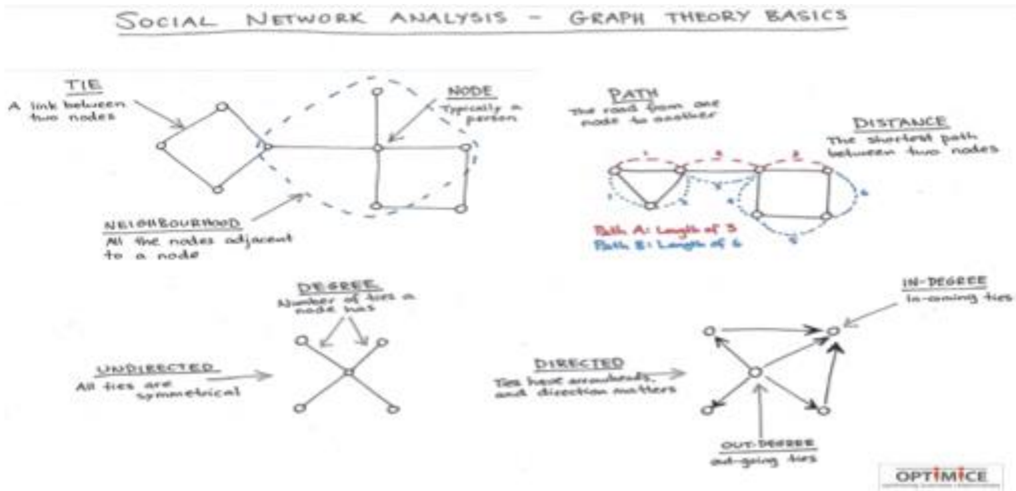
An example, information asymmetry (one agent has more/better information than another), is an emerging property of the budget process as interacting agents exploit their ‘utility function,' i.e., they use what is available to them to maximize outcomes within the situation they find themselves-much like John Stuart Mills ‘economic man’, (2011, p. 20) or Herbert Simon’s rational actor (Dennard, 1995, p. 464)

The budget networks in this study are examined for how relationships among budget actors generate information flow paths within the budget process which indicate information symmetry, and thereby internal transparency, by measuring the groups’ levels of cohesion, structural equivalence, prominence, range, and brokerage. The assumption is: the greater the internal transparency, the more quality decision-making occurs.

Type of Observational Study

This study exemplifies a one-mode, cross-sectional, whole-network study using graph theory basics for visualization models. Figure 3.1 provides the essential elements of graph theory used to build visual models to represent a sample state's budget process network. These principles measure both relational properties (group cohesion and possible sub-groups of interconnected budget agents), and positional properties (such as brokerage, and range) (Haythornthwaite, 1996; Alba, 1982; Monge & Eisenberg, 1987). Empirically identifying roles, positions, and groups will focus the data collection on similarities in behavior and not private budget practices. Figure 3.1 below illustrates the basic anatomy of social network analysis demonstrating the visualization that social network analysis provides.

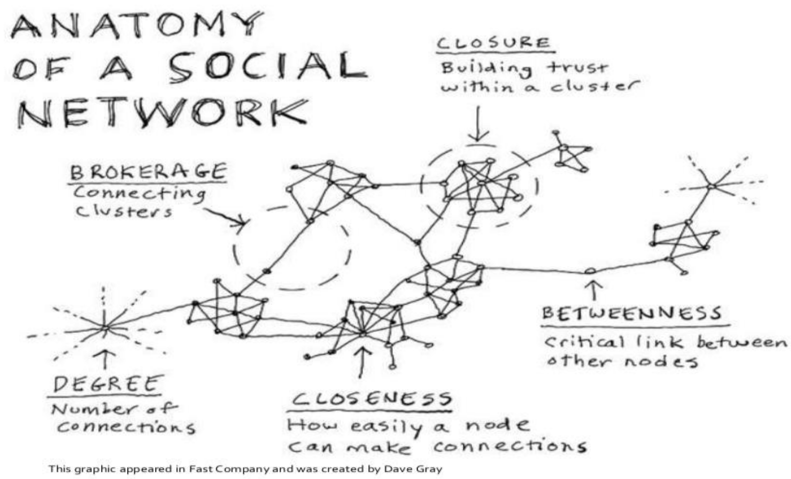
Figure 3. 1 Graph Theory Basic Elements



Downloaded from: https://www.slideshare.net/Optimice/social-network-analysis-and-graph-theory-concepts-explained

The network principles of cohesion, structural equivalence, prominence, range, and brokerage will be used to support internal transparency as a normative value of the budget process to provide empirical data for measuring and tracking purposes. These principles measure both relational properties (group cohesion and possible sub-groups of interconnected budget agents), and positional properties (such as brokerage, and range) (Haythornthwaite, 1996; Alba, 1982; Monge & Eisenberg, 1987). Empirically identifying roles, positions, and groups will focus the data collection on similarities in behavior and not isolated budget practices. Figure 3.2 below reviews some basic anatomy of social network analysis to demonstrate the visualization that social network analysis provides.

Figure 3. 2 Anatomy of a Social Network



Downloaded from: https://www.slideshare.net/Optimice/social-network-analysis-and-graph-theory-concepts-explained

Modeling Internal Transparency

Modeling internal transparency through social network analysis differs from traditional linear methods in two ways: 1) it shows internal transparency as a fundamental system characteristic in which cohesion, centralization and between-group centrality measures how much control an agent has over information and 2) it reveals patterns of interaction indicating transparency (or the lack of it) as a core social element of budget. The interactions are mapped based on agent perceptions of network principles of cohesion, structural equivalence, prominence, brokerage, and range from which relational properties of the network are examined.

Why Map Internal Transparency?

Internal transparency is an important element of a budgeting culture because it enhances the communication and information exchange capacity of different budget divisions and agents—information used to adapt to changes within the network. Secondly, transparency, as a critical social element in the budget process, encourages agents to follow cultural norms that enhance transparency. Also, social network analysis enables researchers and organizational change consultants to recognize the impact on information symmetry and decision-making.

Usually, transparency is modeled as an 'add on' to patrol for corruption and hold officials accountable, whereas this research suggests transparency (or lack of it) is a fundamental system characteristic that may affect organizational behavior, specifically budget decisions and outcomes and is therefore a core element of decision-making which optimizes available information.

Observations of transparency traditionally focus on citizens (principle) and the government officials (agent) and the citizens "right to know" (Schnackenberg and Tomlinson, 2014; Popova-Nowak, 2011; Stadelmann, Portmann, & Eichenberger, 2014; Stiglitz, 1999). This paper, however, looks at the issue of transparency from the patterns of interactions described by agent perceptions of connectedness and information flow. That is, again, transparency is integral to an effective budgeting network, rather than being external or only an altruistic norm.

Measuring Normative Variables

Social network analysis unveils the social structure affecting budget decisions, allowing for an empirical analysis of the normative value of transparency (Haythornthwaite, 1996, p. 325). In this case, the perception of key budget actors is used to map information flow in the budgeting networks of the three southeastern states.

In 1997, Barbara Neuby explained that researchers have a "lack of consensus on the proper approach to ... budgeting theory" (p. 131) and "understand[ing] root elements and interactions" (p.139) of a normative budget theory. In order to fulfill the need for a normative budget theory, it will be necessary to identify the environment, the differing boundaries, and the networks involved to simplify the real world (Bacharach, 1989, p. 499-500). In 1952, Verne Lewis stated an alternative budget approach as "its purpose is to pose budget questions at every level in terms of relative value. It also is designed to make maximum use of expert knowledge and judgment of officials at the lower organization levels by having them analyze, incrementally, the estimates of their agencies and evaluate the relative effectiveness of their several activities in achieving the goals of their organizations" (p. 54).

The established network of links or ties created by the behavior of budget agents asking questions (communicating) to individuals with expert knowledge will identify an underlying meta-pattern and feedback loops of internal transparency within budgeting culture (Adams, 1993). *The Politics of the Budgetary Process* by Wildavsky and *The Power of the Purse* by Fenno brought incrementalism to dominance by describing the interaction of agencies and Congress and the resulting appropriations. Aaron Wildavsky (1992) stated "Budgets are social orders. A moral order regulating relations among people specifies commands and prohibitions" (p. 51).

In his seminal work, *The Politics of the Budgetary Process*, Wildavsky observed budget agents' behavior rather than adopting a single prescriptive theoretical perspective. His uncanny ability to extract from the complexity of everyday realities the underlying essence of human behavior in knowledge exchange relationships should be closely examined. This study illustrates, that given the prominence of knowledge exchange relationships as information resources in budgeting, it is possible to identify normative variables within the process to support a normative budget theory.

Social network analysis will provide a more in-depth exploration of Wildavsky's budgeting ‘social order’ by identifying and mapping behavioral norms of the budgeting culture, the budget participants, their connections, and the strength of ties that suggest the degree of information available for improved decision making. SNA further builds on his concern with budgeting behavior by adding a viable method to budgeting research to empirically evaluate information symmetry as a clue to (Borgatti and Foster, 2003, p. 997) internal transparency.

J. Clyde Mitchell definition of social networks emphasizes their impact on outcomes "a specific set of linkages among a defined set of persons of persons the characteristics of these linkages as a whole may be used to interpret the social behavior of the persons involved (1969, p. 2)." Measuring *closeness centrality*, for example, will identify the nodes with the shortest path which are more central to the budget process. *Betweenness centrality* quantifies the number of times a node acts as a bridge, and the *eigenvector centrality* measures the amount of influence a node has over the budget process. Knoke and Kuklinski echo describe these measures in "The structure of relations among actors, and the location of individual actors in the network have significant behavioral, perceptual, and attitudinal consequences for the individual units and the system (1982, p. 13)."

Data Collection

A survey was sent to the budget agents listed on each state’s budget office website to complete data collection. After collecting the data, social network analysis used two tools from mathematics to represent the information about patterns of ties among the budget agents: graph and matrices. This study describes and analyzes internal transparency patterns within the budget network of three southeastern states utilizing social network methods.

Limitations

Social network analysis (SNA) offers a holistic view of a network when often only parts of that network are familiar to actors. An accurate perception of a network can itself be a source of power in an organization that would assist budget agents develop collaborations (Balkundi & Kilduff, 2006). Also, this study is a static snapshot of budget agent participation, and their perceptions may change as time and information exchange occurs.

As previously mentioned, the influence of those beyond the network selected is not studied. This network study did not capture the full range, embeddedness, and influence of all relevant budget participants. The influence of budget network participants is likely to be affected by ties that are not revealed by the budget office's budget agent list on their website (Balkundi & Kilduff, 2006).

Lastly, this study used only an online survey. While an online survey is one of the most cost-effective ways to collect data, the results may suffer because it is easier for participants to not provide accurate information. Also, participants may not have been fully aware of the meaning or reason for the questions. Plus, there are data errors caused by full non-responses by a network member or by one of the participants leaving questions blank.

CHAPTER IV

BUDGET ANALYST PERCEPTION SURVEY

Anatomy of the Survey Instrument

SNA can be applied to any data that highlights relationships between nodes, in this case budget agents. Caroline Haythornthwaite's 1996 article "Social Network Analysis: An approach and Set of Techniques for the Study of Information Exchange" set forth a model ideal for this study. The questionnaire captures budget agent demographic information (some used as attributes for measures), network level measures, and node level measures mapping the presence of variables related to internal transparency. The questionnaire for each state varies slightly based on budget calendars.

The first ten questions ask for demographics or attributes. Protecting confidentiality is achieved by coding the participant's name. The attribute data are properties, qualities, or characteristics exclusive to the budget agents. While the attributes are typically analyzed with standard statistics as quantitative or categorical variables, this study uses attributes on some measures to expose the existence of possible sub-populations within budgeting network.

Questions eleven through thirteen are inquiries about who kicks off the budget season and how. This information is used to compare similarities to similarities at the start of the budget season. However, these three questions are not structured to map the existence of the budget agent networks.

Questions fourteen through nineteen cover budget agents' perceptions of whom they seek advice from, whom they probably should seek advice from but do not, who should seek advice from them but do not and the specific type of relationship (i.e., do not know, acquaintance, friends, relative) the budget agent has with other budget agents. Questions 20 through the end (Georgia 25, North Carolina 28, and Tennessee 23) are questions about the budget agents' interactions during each phase/step of the budget calendar. Questions fourteen and nineteen are the network questions used to map and determine the strength of budget agents' relationships in each state's budget process.

Data Source

A description of the sample networks is important. Each budget analyst network varies, and these variances could impact the perception of the measures computed. Also, size is important for the structure of social relations between the agents in each of the budget analyst networks because each agent has a limited resource and capacity for building and maintaining ties. Table 4.1 provides the number of agents in each budget network and the total possible number of ties for each network. (Accessed at http://faculty.ucr.edu/~hanneman/nettext/C1_Social_Network_Data.html)

Table 4. 1 Network Size and possible ties

	NC	GA	TN
# of agents	29	32	28
Possible Ties	406	496	378

It is important to remember that social network analysis maps the relational ties between agents and not the prevalence of an attribute associated with a single agent. The survey recorded each participating budget agents' connections from their perspective. Therefore, the information is asymmetric (directed ties) Table 4.2 displays information for survey participants in the different states.

Table 4. 2 Survey Participation

	Population	Invites/Consent	Survey's Completed	Overall Response Rate	Invite Completion Rate	Possible Connections
NC	29	28	28	96.55%	100.00%	406
GA	32	14	8	25.00%	57.14%	496
TN	28	16	13	46.43%	81.25%	378

The difference in each state's budget process calendar will also impact the comparison of the measures. Below are the calendars for the three participating states: Table 4.3 is North Carolina, Table 4.4 is Georgia, and Table 4.5 is Tennessee.

Table 4. 3 North Carolina's Budget Calendar

Steps in the State Budget Process	Biennial Budget	Annual Update
	2015-17 Example	2016-17 Example
Instructions to agencies for submitting requests	June - August 2014	Jan-16
Development/submission of agency requests	August - October 2014	January - March 2016
Preparation of governor's recommended budget	November 2010 - January 2015	March - April 2016
Release of governor's recommended budget	Feb-15	May-16
Legislative review and passage of final state budget for budget Execution	February - July 2015	May - July 2016

Table 4. 4 Georgia’s Budget Calendar

Phase	Step In Process	Occurance
Phase One	Agencies Submit request	September 1st
Phase Two	OPB Revenue Projections	N/A
Phase Three	Governor Meets with Analyst	Late Fall
Phase Four	Legislature Access to Governor's Budget Report	Five days before convening
Phase Five	Governor signs w/in 40 days of passing	After both Chambers Pass budget
Phase Six	OPB & Auditors executes and audits budget activity	N/A

Table 4. 5 Tennessee’s Budget Calendar

When	Step in Process
July - September	Planning Estimation (agencies submit requests)
October - January	Preparation of the budget
January - May	Legislative Deliberation
June - July	Budget Execution

A quick review of the budget process calendars illustrates the variance in the budget processes. Since each state's steps vary, the analysis will use Q 14 whom you seek information from question, Q 19 strength/type of relationship with the other budget agents is, Q 20 whom you seek information from during budget submission, and North Carolina's Q 28, Georgia Q 25, and Tennessee Q 23 who you seek information from in the last step. Limiting the analysis to a few budget process questions will ensure that the comparison will indeed be among the budget agents' relationships and their perception of the budget agents' relationships at similar times in the budget (start and end).

Independent Variable

The independent variable in this study is the information flow/interactions among budget agents within the sample state's budget process.

Dependent Variable

The dependent variable in this study is the normative value of internal transparency within the sample state's budget process.

Control Variables

Control Variables related to demographics were included (gender, age, ethnicity, education level, and area of study).

Hypotheses

Please refer to glossary for terms.

Cohesion Hypotheses:

H0: If a sample state's budget process agents do not have moderate to high density and centralization, then the budget network is not a cohesive group and internal transparency does not exist.

H1: If a sample state’s budget process has moderate to high levels of density and centralization, then the budget network is a cohesive group and internal transparency exists.

H2: If a sample state’s budget process has moderate to high levels of density or centralization, then the budget network is a moderately cohesive group and internal transparency exists.

Density Hypotheses:

H0: If a sample state’s budget network displays low density or no density, then information is asymmetrical and not likely to be disseminated to the necessary budget actors after ten days, indicating that internal transparency is not a normative value.

H1: If a sample state's budget network has a high density, then information is symmetrical and likely to be disseminated to the necessary budget actors within five days indicating that internal transparency is a normative value operating within the network.

H2: If a sample state's budget network has a moderate density, then information is symmetrical and likely to be disseminated to the necessary budget actors within ten days indicating that internal transparency is present as a normative value.

Centralization Hypotheses:

H0: If a sample state's budget network is a de-centralized structure, then information is not likely to be disseminated in a timely fashion to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network is a centralized structure, then information is likely to be disseminated within five days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

H2: If a sample state's budget network is a distributed structure, then information is likely to be disseminated within ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Structural Equivalence Hypotheses:

H0: If a sample state's budget network has low levels of structural equivalence exhibited by CONCOR and Proportion of Matches measures, then information asymmetry is present indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate to high levels of structural equivalence exhibited by CONCOR and Proportion of Matches measures, then information symmetry is present indicating that internal transparency is a normative value within the state's budget network.

H2: If a sample state's budget network has moderate to high levels of structural equivalence exhibited by CONCOR or Proportion of Matches but not both measures, then information symmetry is present indicating that internal transparency is a normative value within the state's budget network.

CONCOR

H0: If a sample state's budget network has low levels of correlating pairs as exhibited by pair density measures and goodness of fit block model, then information asymmetry is present indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate to high levels of correlating pairs as exhibited by pair density measures and goodness of fit block model, then information symmetry is present indicating that internal transparency is a normative value within the state's budget network.

Proportion of Matches

H0: If a sample state's budget network has a low number of proportion of matches, then information asymmetry is present indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate to high levels number of proportion of matches, then information symmetry is present indicating that internal transparency is a normative value within the state's budget network.

Prominence Hypotheses:

H0: If a sample state's budget network does not have prominent budget agents as indicated by low levels of In-degree/Out-degree centrality and Global/Closeness Centrality, then information is not likely to be disseminated in a timely fashion to other budget actors indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has prominent budget actors as indicated by low levels of In-degree/Out-degree centrality and Global/Closeness Centrality, then information is likely to be disseminated in less than five days to other budget actors indicating that internal transparency is a normative value within the state's budget network.

H2: If a sample state's budget network has prominent budget actors as indicated by low levels of In-degree/Out-degree centrality or Global/Closeness Centrality, then information is likely to be disseminated in five to ten days to other budget actors indicating that internal transparency is a normative value within the state's budget network.

In-degree/Out-degree Centrality

H0: If a sample state's budget network has low levels of In-degree and out-degree centrality, then information is not likely to be disseminated in more than ten days indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate levels of In-degree and out-degree centrality, then information is likely to be disseminated in five to ten days indicating that internal transparency is a normative value within the state's budget network.

H2: If a sample state's budget network has high levels of In-degree and out-degree centrality, then information is likely to be disseminated in five or fewer days indicating that internal transparency is a normative value within the state's budget network.

Global/Closeness Centrality

H0: If a sample state's budget network has low levels of Global/Closeness centrality, then information is not likely to be disseminated within five days to other budget actors indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate to high levels of Global/Closeness Centrality, then information is likely to be disseminated within five days to other budget actors indicating that internal transparency is a normative value within the state's budget network.

Range Hypotheses:

H0: If a sample state's budget network has a low range as exhibited by low ego-network basic measures and low reachability distance, then information is not likely to be disseminated within five days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has a high ego-network basic measure and high reachability, then information is likely to be disseminated within five days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

H2: If a sample state's budget network has a moderate ego-network basic measure and moderate reachability, then information is likely to be disseminated within five to ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Ego-neighborhoods

H0: If a sample state's budget network has low levels of ego- neighborhood measures, then information is likely to be disseminated in more than ten days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has high levels of ego- neighborhood measures, then information is likely to be disseminated with five days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

H2: If a sample state's budget network has moderate levels of ego- neighborhood measures, then information is likely to be disseminated within five to ten days to the necessary budget actors indicating that internal transparency is a normative value within the state’s budget network.

Reachability

H0: If a sample state’s budget network has low reachability measures, then information is likely to be disseminated ten or more days to the necessary budget actors indicating that internal transparency is not a normative value within the state’s budget network.

H1: If a sample state's budget network has high reachability measure, then information is likely to be disseminated in five or fewer days to the necessary budget actors indicating that internal transparency is a normative value within the state’s budget network.

H2: If a sample state's budget network has moderate reachability measure, then information is likely to be disseminated in five to ten days to the necessary budget actors indicating that internal transparency is a normative value within the state’s budget network.

Brokerage Hypotheses:

H0: If a sample state's budget network has a low normalized brokerage and betweenness centrality measure, then information dissemination is not likely to be disseminated within ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

H1: If a sample state's budget network is a decentralized structure, then information is less likely to be disseminated within five days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

H2: If a sample state's budget network has one high measure and one low measure for normalized brokerage or betweenness centrality measures, then information is likely to be disseminated within five to ten days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

Normalized Brokerage:

H0: If a sample state's budget network has no or few brokers, then information is likely to be disseminated five or more days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate levels of brokers, then information is likely to be disseminated five or fewer days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Betweenness Centrality:

H0: If a sample state's budget network has low levels of betweenness centrality, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate to high levels of both betweenness centrality, then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Strength of Ties Hypotheses:

H0: If a sample state's budget network has low levels of both reciprocity and homophily indicating low levels of strong and weak ties, then information asymmetry occurs indicating that internal transparency is not a normative value within the sample state's budget network.

H1: If a sample state's budget network has high levels of either reciprocity or homophily indicating high levels of strong and weak ties, then information symmetry occurs indicating that internal transparency is a normative value within the sample state's budget network.

H2: If a sample state's budget network has moderate to high levels for reciprocity and low levels for homophily indicating a prominence of weak ties, then information asymmetry is present indicating that internal transparency is a normative value within the state's budget network.

H3: If a sample state's budget network has low levels for reciprocity and moderate to high levels for homophily indicating a prominence of strong ties, then information asymmetry is present indicating that internal transparency is a normative value within the state's budget network.

Reciprocity

H0: If a sample state's budget network has low levels of reciprocity, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has moderate to high levels of reciprocity, then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Homophily

H0: If a sample state's budget network has low levels of homophily, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

H1: If a sample state's budget network has high levels of homophily, then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Overall Hypothesis

H0: If a sample budget network shows the budget agents are not highly connected, then internal transparency is not present as a core element within each state's budget process and the budget agents are less likely to make budget decisions based on adequate information, enough to maximize the effectiveness of decision making.

H1: If a sample budget network shows the budget agents are highly connected, then internal transparency is present as a core element within the state's budget process and the budget agents are more likely to have maximized budget decisions.

Background to Analysis

Cohesion

Cohesiveness describes attributes of the whole network, indicating the presence of strong socializing relationships among network members, and the likelihood of their having access to the same information. In laymen's terms, how well do the budget agents work together? Using measures of density and centralization will indicate the extent to which the population of budget agents within the state’s budget process interact (Haythornthwaite’s, 1996, 332), thereby supporting internal transparency.

Density will indicate the degree to which participants of the sample state's budget process are connected to all other budget agents. Centralization measures the extent to which a set of actors are organized around a central budget actor, identify the topology of the sample state's budget network. The arrangement of the budget in the network affects how quickly and easily information is distributed among all budget actors. High levels of cohesiveness suggest that the sample state's budget network has internal transparency as a normative value. The concepts of density and centralization refer to different aspects of the overall compactness of a network (Haythornthwaite, 1996, 333).

Network density describes the general level of cohesion in a network or the portion of potential connections in a network that are actual connections. Density is calculated as the ratio of the number of actual links in the southeastern state's budget process to the number of possible links (Haythornthwaite, 1996, 332). Information in a low-density network can flow through only one (or few) routes which means the information flow is obstructed, and information asymmetry occurs. However, individuals in a high-density network are more interactive with others which means information flows more freely within the budget network and information symmetry occurs (Haythornthwaite, 1996, 333). This means high levels of density presence of internal transparency as a normative variable in the sample state’s budget network and low levels of density would not.

Network centralization describes the extent to which a whole network has a centralized structure (topology), not to be confused with centrality which is cohesion around a single node in the network. Networks do not randomly. Rather, agents self-organize around norms and rules which govern why they develop and maintain relationships with one node and not another for budget information exchange.

Thus, centralized, decentralized, or distributed typology (network structures) emerge from interactions with norms and rules. This measure not only shows the typology, (such as Star, Line, or Circle patterns see Appendix B) but indicates the robustness or lack of it of a state's budget network internal transparency norm by revealing key nodes in the overall information exchange network.

Freeman (1979, p. 218 -227) has shown how measures of point centrality can be converted into measures of the overall level of centralization found in networks, such as the three state budget networks. The measure of centralization begins by looking at the differences between the centrality measures of the most central point and those of all other points. Centralization, then, is the ratio of the actual sum of differences to the maximum possible sum of differences. (Freeman, 1979, 227).

Structural Equivalence

Budget agents are structurally equivalent if they fill similar roles. Loosely speaking, structural equivalence is referring to the degree to which two actors connect to the same others -- i.e., have the same social environments (Kilduff & Krackhardt, 2008, p. 115 – 116). It is often hypothesized that structurally equivalent nodes will be similar in other ways as well, such as in attitudes, behaviors or performance. Structurally equivalent budget agents are those with "identical ties to and from all other actors in the network" (Wasserman & Faust, 1994, 356). In Lorrain & White's (1971) explanation, two actors have structural equivalence if they have identical ties to and from all other actors in a directed or non-directed graph. In matrix terms, both the row- and column-vectors of an equivalent pair have identical elements.

> In a binary network, a structurally equivalent pair is indistinguishable when they exhibit precisely the same set of present and absent ties (0-1) with an identical set of third actors. In effect, one equivalent actor can substitute for another because the two relational patterns are impossible to tell apart.
>
> In a valued graph, all equivalent actors' ties must have the same magnitudes to & from third parties. For multiple networks, structural equivalence means that every pair has identical relational patterns with all third parties on every type of tie.

Structural Equivalence is measured using block modeling, in which correlations between all pairs of cases are calculated, and then the clustering procedure is used to reorder the cases into highly correlated pairs. This will identify who shapes the information exchange environment and also, identify budget agents not generally seen as having as informational roles (Haythornthwaite, 1996, 334). Cronbach's Alpha computation by UCINET is a reliability coefficient alpha or internal consistency measure of the proportion of matches.

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

Prominence

Measures of prominence indicate which budget agent(s) have influence or power in a network, and "who is more or less in demand" (Nohria, 1992; Haythornthwaite, 1996). Prominence is measured by assessing the budget agents centrality, and not measuring the configuration of the network as a whole. Centrality has two levels: local and global. To identify nodes with local centrality, there should be a higher number of ties with other agents; otherwise, agents have global centrality (Gahli, Panda, Hassanien, & Snasel, 2012).

Local centrality is the number of actors to which the agent is connected, and the *global measure* is the distance between the various connected agents. Centrality has *several forms in-degree centrality, out-degree centrality, and global or closeness* centrality. *In-degree* and *out-degree centrality* measures are calculated by counting the information exchange relationships flowing to a budget agent (in-degree) and flowing out from a budget agent (out-degree) centrality. Visualization of in-degree and out-degree centrality is in figure 4.34, 4.35, and 4.36. These centrality measures will identify the most central budget actor known as the network ‘Star,' which allows the greatest access to information from others. This will potentially identify any isolated actors representing lost information exchange opportunities.

Global or *closeness centrality* is measured by calculating the shortest path between budget agents and every other budget agent/participant. By impeding or facilitating information exchange, central budget agents can maintain, create or prevent internal transparency. An example is a star-structured network, in which the center budget agent would be more powerful than the other budget agents because they are closer to more budget agents than any other budget agent. Exercising power is achieved by direct brokering and exchange. However, power also comes from acting as a "reference point" by which other actors measure themselves, and by being a focal point where more budget agents hear opinions

(UCINET information accessed at, http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html).

Budget agents that can reach other budget agents at shorter path lengths, or who are more reachable by other budget agents at shorter path lengths have preferred positions. This structural benefit is interpreted as an agent's influence. In the star network, the center budget agent is at a geodesic distance of one from all other budget agents; each other budget agent would be at a geodesic distance of two from all other budget agents. “This logic of structural advantage underlies approaches that emphasize the distribution of closeness and distance as a source of power (Hanneman & Riddle, 2005, online p. 322).”

(UCINET information accessed at, http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html).

Range

Range measures the information resources that budget agents can access. Mainly the more relationships maintained by a budget agent the more access the agent has to information resources (Burt, 1992a) and the more access to information the higher the internal transparency. Range can be measured by examining how many other budget agents a budget agent is connected to both directly (one step) and indirectly (2 or more steps). It is maintained here that the more diverse relationships a budget agent, the more likely internal transparency occurs (Haythornthwaite, 1996, p. 335). The measures used are Ego Networks Basic Measures and Reachability.

The ego-networks basic measures construct the ego-network for every actor within the network and calculate a collection of ego-network measures. For directed data, both in and out networks can be considered separate or together.

The existence of a path between nodes establishes reachability. The basic concept is an actor is "reachable" by another if there exists a set of connections by which we can go from the source to the target actor, regardless of how many others fall between them. If the data is directed, it is possible that a budget agent one can reach another budget agent two but budget agent two cannot reach budget agent one.

Brokerage

Various agents facilitate internal transparency and information flow between agents or groups without cognitive access to each other. These agents in network language are called bridges, brokers and boundary spanners. In this paper, brokerage means "intermediary actors who facilitate transactions between actors lacking access to or trust in one another" (Marsden & Lin, 1982). Brokerage roles are measured by betweenness. The visualization of brokerage and betweenness are in figure 4.49, figure 4.50, and figure 4.51. Betweenness measures the number of times a budget agent sits between others on the shortest path in a network (Haythornthwaite, 1996, p. 335). Brokers are key players in a sense they can be vital to the integrity and viability of internal transparency between budget agents or groups with information to exchange. "The betweenness of a point measures the extent to which an agent can play the part of a 'broker' or 'gatekeeper' with possible control over others" (Scott, 2000, p. 89-90).

There are three benefits of being a broker according to Burt (2005, p. 23); (1) access to alternative viewpoints and applications in the network, (2) early access to innovative ideas and thoughts, (3) ability to transmit the new ideas & thoughts if there is an advantage to be gained. Budget agents with high betweenness measures fill the important role of broker, filtering and importing information to the budget network thereby increasing information symmetry (Haythornthwaite, 1996, p. 336).

Interpersonal ties are defined as information-carrying connections between sample state budget agents. Interpersonal ties are strong, weak, or absent. Tie strength is measured during the sample state's budget process by how often the budget agents contacts another budget agent using a Likert scale of often (more than once a week), occasionally (Once a month), and rarely (One to two times during the budget process). The "strength" of communication relationship/connection is a linear combination of the amount of time, the emotional intensity, the intimacy (or mutual confiding), and the reciprocal services which characterize each relationship a budget agent maintains.

Granovetter’s article “The Strength of Weak Ties," shows weak ties are important for various aspects of information in networks. Weak ties transmit novel information within the budget process and will provide contrast to what is already known thereby increasing the quality and quantity of information informing decisions. Therefore, weak ties can be a factor in internal transparency. People resist change and are uncomfortable with uncertainty. Strong ties, on the other hand, indicate trust among system actors which can reduce resistance and provide comfort in the face of uncertainty. Krackhardt argues that change is not facilitated by weak ties, but rather by a particular type of strong tie." (1992, p. 218). Strong ties are critical in generating trust and supporting internal transparency and discouraging malfeasance. This assumes the superiority of strong ties in creating the conditions of internal transparency. Meaning likes exchange information with likes, but outliers expand the landscape and interpretation of knowledge.

Byrne's (1971) similarity-attraction hypothesis and Turner's (1987) theory of self-categorization are two of the leading theories supporting homophily. The similarity-attraction hypothesis forecasts that budget agents are more likely to develop a communication relationship with those with whom they share similar attributes. The theory of self-categorization suggests budget agents tend to self-categorize in terms of race, gender, age, education, and area of study. Agents use these categories to further differentiate between similar and dissimilar others.

Merging these postulates, the basis for the theory of homophily is straight-forward: ‘‘Similarity breeds connections" (McPherson et al., 2001, p. 415) and ‘‘birds of a feather flock together’’ (p. 417). Budget agents who are homogeneous in age, ethnicity, educational level, and area of study are much more likely to network with each other than with budget agents who are heterogeneous in these attributes. Since budget agents are more comfortable interacting with similar budget agents, it is hypothesized that team members are more likely to exchange information with people of the same attribute (McPherson et al., 2001).

Results

Density

Density describes the general level of cohesion in the network. In comparing three budget networks population density measured how well the network is connected. Note, binary and valued data measures have different meanings. For binary data, density is merely the ratio of the number of connections/relationships that are present divided by the number of pairs (dyadic connections). The value ranges from 0 to 1; the closer the value is to 0, the less information exchange relationships occur in the network while the closer the value is to 1, the more information exchange relationships happen within the network.

For example, in Q 14, (whom do you seek information from), results in binary data and Q 19 strength of the relationship, Q 20 whom you seek advice from at the start of the budget season, and the last question(s) whom you seek advice from at the end of the budget season concerns valued data. Since the data is directed or asymmetric, density is calculated across the total number of pairs (Table 4.6). (UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C7_Connection.html)

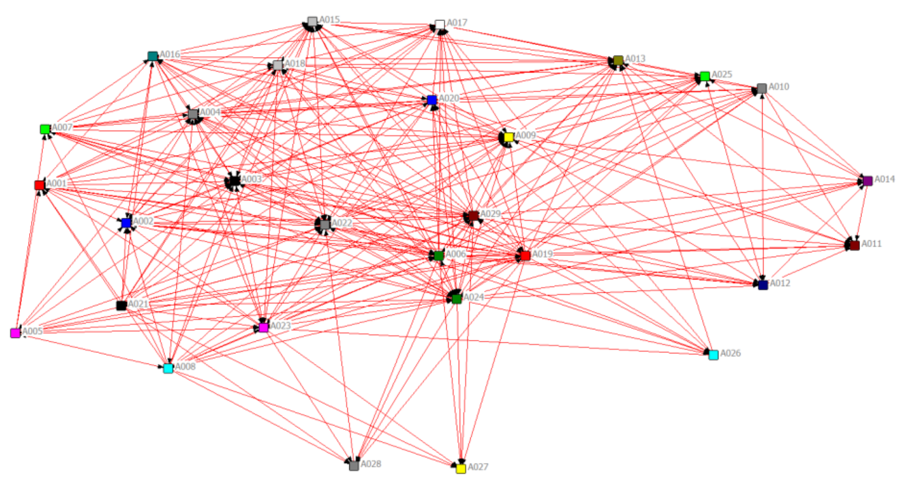
Table 4. 6 Density – Overall Network Measure

Density	NC	GA	TN	Summarized Question	Date Type
In General	0.407	0.056	0.217	Whom do you seek information from	Binary

North Carolina

According to results from Q 14, whom you seek information from, the North Carolina budget network is more connected than Georgia and Tennessee, with a density of 0.47, or there is a 47% chance that one agent exchanges information with another agent (Figure 4.1).

Figure 4. 1 North Carolina's Budget Agents network map

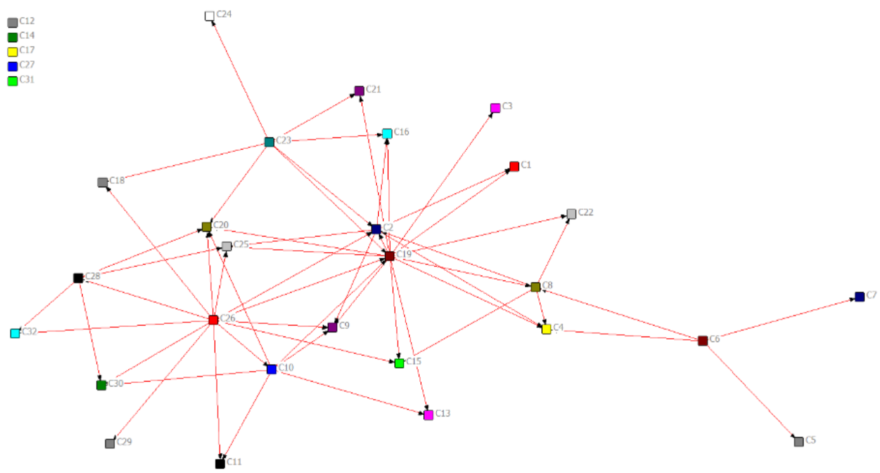


North Carolina's information exchange relationships

Georgia

By comparison the density for Georgia (Q 14) is .056 meaning, in general, there is only a 5.6% chance that one agent exchanges information with another agent (Figure 4.2).

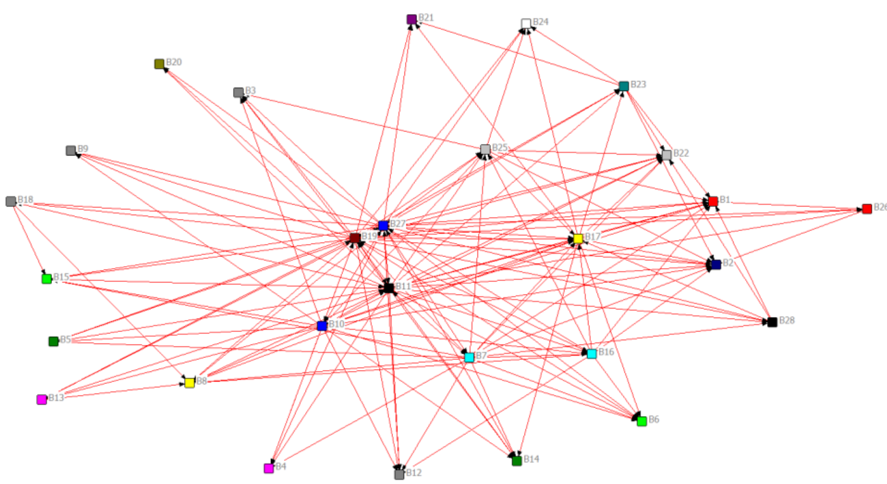
Figure 4. 2 Georgia's Budget Agents Network Map



Georgia's information exchange relationships

The amounts for Tennessee (Q 14) are .0.217 meaning that in general there is only a 21.7% chance that one agent exchanges information with another agent (Figure 4.3).

Figure 4. 3 Tennessee's Budget Agents Network Map



Tennessee's information exchange relationships

Centralization

Like density, centralization is an aspect of how tightly connected the network is at the macro level. Centralization describes the extent to which this cohesion is organized around a budget agent (focal point). Linton Freeman, one of UCINET's authors, has a method that allows for network centralization scores to be calculated from node level degree centrality scores. This centralization score describes the variability in degree centrality of the budget agents. (Note: Degree centrality is a measure of the influence of prominence that a budget agent might have over other budget agents.) This percentage is a comparison of the network being analyzed to a perfect Star network of the same size. Below are centralization scores from Freeman Degree Centrality measure in UCINET for the sample states. (UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 7 In-Centralization Scores

In Centralization	NC	GA	TN
In General,	44.52%	10.82%	19.75%
The beginning of the Budget	3.35%	0.63%	0.17%
End of the Budget	3.44%	0.82%	3.15%

Table 4. 8 Out-Centralization Scores

Out Centralization	NC	GA	TN
In General,	63.01%	81.21%	37.46%
Beginning of Budget	5.66%	0.47%	11.45%
End of Budget	5.52%	11.43%	12.75%

North Carolina

North Carolina, in general, has an in-centralization of 44.52% (Table 4.7) and an out-centralization of 63.01% (Table 4.8). This means a high amount of centralization exists within the socio-centric or whole network, and the power/influence budget agents have varied substantially. Since the influence varies substantially there does not appear to be any budget agents with a positional advantage (Refer back to Figure 4.1 for visualization).

Georgia

Georgia has a general in-centralization of 10.82% (Table 4.7) and an out-centralization of 81.21% (Table 4.8). This means that it is a low amount of centralization in the socio-centric network and the power/influence budget agents also vary substantially. Since there are low centralization and influence varies substantially, there does not appear to be any budget agents with a positional advantage (Refer back to figure 4.2 for visualization).

Tennessee

Tennessee has a general in-centralization of 19.75% (Table 4.7) and an out-centralization of 37.46% (Table 4.8). This represents a moderate amount of centralization in the social-centric network, and the power/influence of budget agents varies moderately. Since centralization is low and influence varies moderately a few budget agents may hold a positional advantage (Refer to Figure 4.3 for visualization).

Structural Equivalence

Structural equivalence occurs when different agents are embedded similarly in their network of relations. Social network analysis is an effort to understand the pattern of relationships in a graph by creating classes, or groups of actors who are "equivalent" in one manner or another. The methods for identifying such budget agents' and their groups' measure the similarity or dissimilarity of budget agents, and then search for patterns and simplifications. Simply put, the measure is the similarity of ties. Structural equivalence is best seen with block modeling which partitions the budget agents into groups of equivalent agents.

A partitioning routine defines a block model of the original, un-partitioned data matrix; in this case, CONCOR, then the relations between blocks are generalized on the basis of block densities. CONCOR (Convergence of Iterated Correlations) measure in UCINET calculates a correlation matrix, both sending and receiving information, for each pair of budget agents. This measure determines how similar the relationships between budget agents are giving a value of -1 to +1. Then the splits were set to three in each measure to show the division of budget agent groups. The set of three groups produces six blocks in which the relations are shown in the block model provided by UCINET's analysis. In the high-density blocks, a 1 is displayed, and 0 is displayed in the low-density blocks.

The Quadratic Assignment Procedure (QAP) is an accepted method for evaluating the goodness-of-fit of a block model by correlating the in/out exchanges in the matrix representing the predicted model and that of the matrix representing the observed in/out relationships (Faust & Wasserman, 1992). The significance of the correlation is assessed by generating 1000 permuted matrices from the data in the original matrix to ascertain whether or not the correlation between the original data matrix and the model matrix is greater than that expected by chance (Krackhardt & Porter, 1986).

Another approach to measuring the similarity of two tie profiles is to count the number of times that one actor connects to alter is the same as another actor ties to alter and express this as a percentage of the possible total. In UCINET this is achieved through the proportion of matches. Proportion or matches is particularly useful with multi-category nominal measures of ties; it also provides an excellent scaling for binary data. Networks with low density the "matches" "correlation" and "distance" measures can all show relatively little variation among the actors and may cause difficulty in discerning structural equivalence sets (of course, in large, low-density networks, there may be deficient levels of structural equivalence).

(UCINET Information accessed at http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

North Carolina

North Carolina's structural equivalence of budget actor relationships seems distributed throughout the eight groups of budget network agents. Figure 4.4 is a visualization of North Carolina's agent connections based on the correlation measures in Appendix B.

CONCOR begins by correlating each pair of actors. Each row of this actor-by-actor correlation matrix is then extracted and correlated with each other row. The agents making the inquiries (rows) have the highest density (Table 4.9) is group 6 with agents A024, A019, A006, and A029. What this means is group 6 (A024, A019, A006, and A029) is likely to send inquiries to all actors in all eight groups (Figure 4.6 or the dendrogram in Figure 4.7). However, the block models display important connections from all eight groups which can make inquiries with group 1 (A001, A002, A003, A004, A022, and A015). These connections are in the block model, Figure 4.6. (UCINET Information accessed at http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

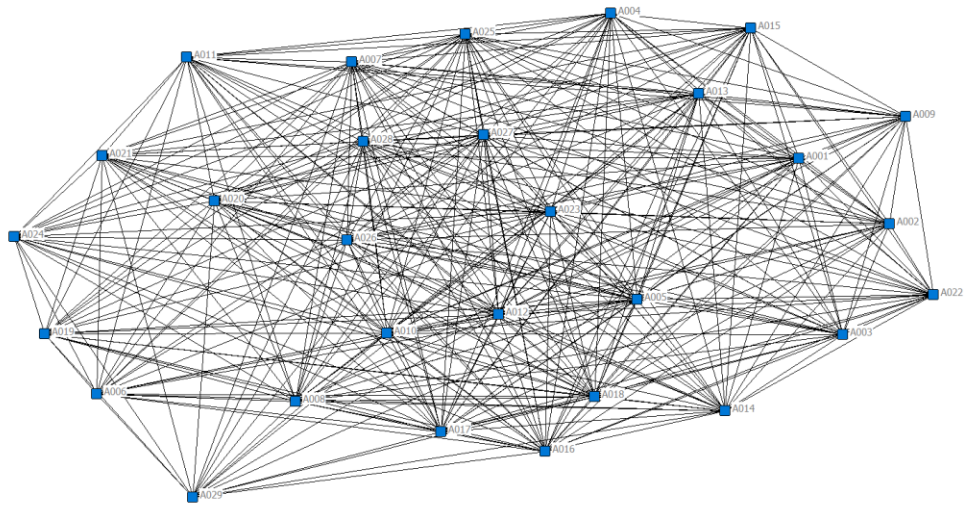
The goodness of fit of a block model can be assessed by correlating the permuted matrix (Figure 4.6) against a "perfect" model with the same blocks (i.e., one in which all elements of one blocks are ones, and all elements of zero blocks are zeros). For the CONCOR three-split model, r-squared is .586. That is, a little more than half of the variance in the ties in the CONCOR model can be accounted for by a "perfect" structural block model (meaning blocks with ones have all ones and blocks with zeros have all zeros there are no blocks with zeros and ones). Figure 4.5 shows the three splits. In the first division of North Carolina modeling, the three groups {1, 2, 3, 4, 22, 15}, {7, 28, 27, 23}, {13,9} {25,14,10} {5, 8, 24, 19, 6, 29}, {11, 12, 26}and {17, 18, 20, 21, 16} were formed. On the second split these were sub-divided into {1, 2, 3, 4, 22, 15, 7, 28, 27, 15, 7, 28, 27, 23}, {13, 9, 25, 14, 10}, {5, 8, 24, 19, 6, 29}, and {11, 12, 26, 17, 18, 20, 21, 16}. For the third split these were sub-divided into {1, 2, 3, 4, 22, 15, 7, 28, 27, 23, 13, 9 25, 14, 10}, {5, 8, 24, 19, 6, 29, 11, 12, 26, 17, 18, 20, 21, 16}. This also might be regarded as OK but is not a wonderful fit (there is no real criterion for what is a good fit). (UCINET Information accessed at: http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

Table 4. 9 North Carolina's Density Table

Density Matrix	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	0.833	0.083	0.417	0.000	0.167	0.125	0.000	0.100
2	0.458	0.167	0.375	0.000	0.000	0.125	0.000	0.100
3	0.583	0.000	1.000	0.500	0.000	0.000	0.500	0.000
4	0.278	0.000	0.833	0.333	0.000	0.167	0.444	0.067
5	0.917	0.750	0.250	0.000	1.000	0.625	0.000	0.000
6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
7	0.250	0.125	0.750	0.500	0.000	0.125	0.250	0.100
8	0.967	0.450	0.800	0.214	0.000	0.400	0.133	0.789

Partitioning by the CONCOR method yields a *density matrix* reflecting the density of ties (density is the number of observed ties versus the number of possible ties) within and between each block.

Figure 4. 4 North Carolina's CONCORCC1stCorr



First iteration order actor-by-actor correlation matrix from the CONCOR1stCorr data set.

Figure 4. 5 North Carolina's CONCOR Partition Diagram

```
PARTITION DIAGRAM

        A A A A A A A A A A A A A A A A A A A A A A A A A A A A A
        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 1 0 2 2 2 1 0 2 1 1 0 0 2 1 0 2 1 1 2 1 1 2 2 1
        1 2 3 4 2 5 7 8 7 3 3 9 5 4 0 5 8 4 9 6 9 1 2 6 7 8 0 1 6

                2 1   2 2 2 1   2 1 1     2 1   2 1 1 2 1 1 2 2 1
Level   1 2 3 4 2 5 7 8 7 3 3 9 5 4 0 5 8 4 9 6 9 1 2 6 7 8 0 1 6
-----   - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    3   XXXXXXXXXXX XXXXXXX XXX XXXXX XXX XXXXXXX XXXXX XXXXXXXXX
    2   XXXXXXXXXXXXXXXXXXX XXXXXXXXX XXXXXXXXXXX XXXXXXXXXXXXXXX
    1   XXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXX
```

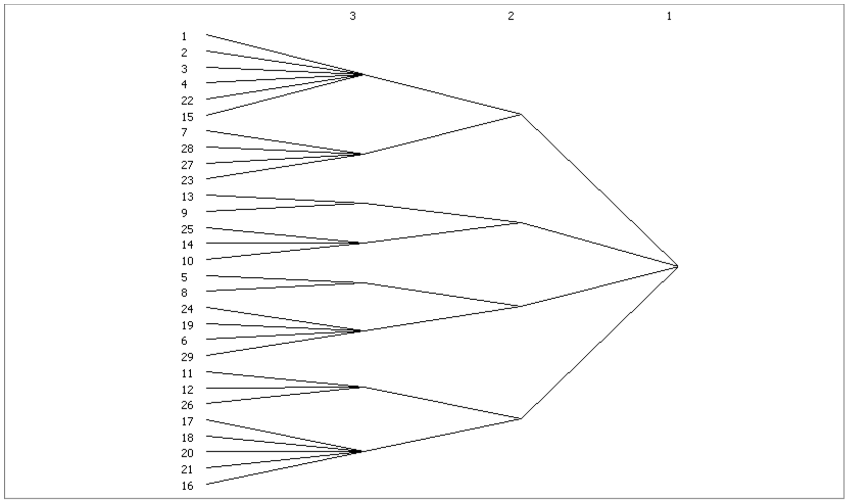
This figure shows the three splits in which the eight groups were formed.

Figure 4. 6 North Carolina's CONCOR Block Model

```
                  2 1     2 2 2   1     2 1 1         2 1   2   1 1 2   1 1 2 2 1
          1 2 3 4 2 5   7 8 7 3   3 9   5 4 0   5 8   4 9 6 9   1 2 6   7 8 0 1 6
          A A A A A A   A A A A   A A   A A A   A A   A A A A   A A A   A A A A A
        ---------------------------------------------------------------------------
 1 A001 |   1 1   1   |         |     |       |     |         |       |           |
 2 A002 | 1   1 1   1 |         |   1 |       |     |         |       |           |
 3 A003 | 1 1   1 1 1 |       1 |   1 |       |     | 1     1 |       |           |
 4 A004 | 1 1 1   1 1 | 1       | 1 1 |       | 1 1 |     1   |       | 1         |
22 A022 | 1 1 1 1   1 |         |   1 |       |     |         |       |           |
15 A015 |   1   1 1   |         |     |       |     |         |       |   1     1 |
        ---------------------------------------------------------------------------
 7 A007 |     1 1 1 1 |         | 1 1 |       |     |     1 1 |       |   1     1 |
28 A028 |         1   |         |     |       |     |         |       |           |
27 A027 |             |         |     |       |     |         |       |           |
23 A023 | 1 1 1 1 1 1 |   1 1   |   1 |       |     |         |       |           |
        ---------------------------------------------------------------------------
13 A013 |         1 1 |         |   1 |       |     |         | 1     |           |
 9 A009 | 1 1   1 1 1 |         | 1   | 1 1 1 |     |         | 1 1   |           |
        ---------------------------------------------------------------------------
25 A025 |     1   1   |         |   1 |       |     | 1     1 |   1   |   1       |
14 A014 |             |         | 1 1 | 1     |     |         | 1     |           |
10 A010 |       1 1 1 |         | 1 1 |   1   |     |         | 1 1   |           |
        ---------------------------------------------------------------------------
 5 A005 | 1 1 1 1 1   | 1     1 |     |       |   1 |     1 1 |       |           |
 8 A008 | 1 1 1 1 1 1 | 1 1 1 1 |   1 |       | 1   | 1   1 1 |       |           |
        ---------------------------------------------------------------------------
24 A024 | 1 1 1 1 1 1 | 1 1 1 1 | 1 1 | 1 1 1 | 1 1 |   1 1 1 | 1 1 1 | 1 1 1 1 1 |
19 A019 | 1 1 1 1 1 1 | 1 1 1 1 | 1 1 | 1 1 1 | 1 1 | 1   1 1 | 1 1 1 | 1 1 1 1 1 |
 6 A006 | 1 1 1 1 1 1 | 1 1 1 1 | 1 1 | 1 1 1 | 1 1 | 1 1   1 | 1 1 1 | 1 1 1 1 1 |
29 A029 | 1 1 1 1 1 1 | 1 1 1 1 | 1 1 | 1 1 1 | 1 1 | 1 1 1   | 1 1 1 | 1 1 1 1 1 |
        ---------------------------------------------------------------------------
11 A011 |             |         |     |       |     |         |       |           |
12 A012 |   1 1       |         | 1 1 | 1 1 1 |     |         | 1     |           |
26 A026 |         1   |       1 | 1   |       |     |       1 |       | 1         |
        ---------------------------------------------------------------------------
17 A017 | 1 1 1 1 1 1 |         | 1 1 | 1     |     | 1       |       |   1     1 |
18 A018 | 1 1 1 1 1 1 | 1     1 | 1 1 |       |     | 1       |       | 1   1   1 |
20 A020 | 1 1 1 1 1 1 | 1     1 | 1 1 | 1   1 |     | 1 1     | 1   1 | 1 1   1 1 |
21 A021 | 1 1 1   1 1 |   1 1 1 |     |       |     | 1 1   1 |       | 1 1 1   1 |
16 A016 | 1 1 1 1 1 1 | 1     1 | 1 1 |       |     | 1       |       | 1 1       |
        ---------------------------------------------------------------------------
```

The block matrix shows the permuted original date. This shows the grouped agents in which 1s show the connections and blanks are no connections.

Figure 4. 7 North Carolina's Dendrogram



The dendrogram shows the partitions or approximate equivalence classes for North Carolina. The eight groups are seen horizontally, and the three levels are vertical. This is a visualization of the partition diagram.

Georgia

Georgia's structural equivalence of the budget actors' relationships seems to be sparsely distributed throughout the budget network. Figure 4.8 shows the visualization of Georgia's connections based on the correlation measures (Appendix B). CONCOR begins by correlating each pair of actors. Each row of this actor-by-actor correlation matrix is then extracted and correlated with each other row. Two small groups of budget agents seem to be making the inquiries (rows) with high density (Table 4.10) for the groups with C10, C19, and C20 and group C23 and C26. Overall Georgia's structurally equivalent agents are not likely to make inquiries. Budget Agent C19 is likely to inquire with group 1 (C1, C22, C3, C4, C13, C8, C15, C9 & C25), more so than group three in its entirety inquiring with group 1. Budget Agent C26 is likely to inquire with group 4 (C11, C30, C29, C18, C20, & C32), more so than group six in its entirety inquiring with group 1.

UCINET Information accessed at http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

The goodness of fit of a block model, assessed by correlating the permuted matrix (Figure 4.10 or the dendrogram in Figure 4.11) against a "perfect" model with the same blocks, showing the three splits (Figure 4.9 and Figure 4.11). In the first division, the three groups {1, 22, 3, 4, 13, 8, 15, 9, 25}, {2, 16, 24, 21,}, {10, 19, 28} {11, 30, 29, 18, 20, 32} {7, 5, 6}, {23, 26} and {27, 17, 14, 31, 12} were formed. On the second split these were sub-divided into {1, 22, 3, 4, 13, 8, 15, 9, 25, 2, 16, 24, 21}, {10, 19, 28, 11, 30, 29, 18, 20, 32}, {7, 5, 6, 23, 26}, and {27, 17, 14, 31, 12}. For the third split these were sub-divided into {1, 22, 3, 4, 13, 8, 15, 9, 25, 2, 16, 24, 2, 10, 19, 28, 11, 30, 29, 18, 20, 32}, {7, 5, 6, 23, 26, 27, 17, 14, 31, 12}. Like North Carolina, this might be regarded as OK but is not a wonderful fit.

The R-squared for Georgia is 0.358. This means about one-third (35.8%) of the variance in the connections could be accounted for by a "perfect" model (meaning everything is equivalent, in which all 1 blocks have all 1s and all 0 blocks have 0s).

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

Table 4. 10 Georgia's Density Table

Density Matrix	1	2	3	4	5	6	7
1	0.042	0.028	0	0	0	0	0
2	0.111	0.083	0	0	0	0	0
3	0.444	0.25	0.167	0.389	0	0	0
4	0	0	0	0	0	0	0
5	0.074	0	0	0	0.333	0	0
6	0.167	0.625	0.667	0.667	0	0	0
7	0	0	0	0	0	0	0

Partitioning by the CONCOR method yields a density matrix reflecting the density of ties (density is the number of observed ties versus the number of possible ties) within and between each block.

Figure 4. 8 Georgia's CONCOR1st CCorr

Ffirst iteration order actor-by-actor correlation matrix from the CONCOR1stCorr data set.

Figure 4. 9 Georgia's CONCOR Partition Diagram

```
PARTITION DIAGRAM

           C     C   C   C   C C C C C C C C C C C C       C C C C C C C
         C 2 C C 1 C 1 C 2 C 1 2 2 1 1 2 1 3 2 1 2 3 C C C 2 2 2 1 1 3 1
         1 2 3 4 3 8 5 9 5 2 6 4 1 0 9 8 1 0 9 8 0 2 7 5 6 3 6 7 7 4 1 2

           2     1   1   2   1 2 2 1 1 2 1 3 2 1 2 3       2 2 2 1 1 3 1
Level    1 2 3 4 3 8 5 9 5 2 6 4 1 0 9 8 1 0 9 8 0 2 7 5 6 3 6 7 7 4 1 2
-----    - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    3    XXXXXXXXXXXXXXXXX XXXXXXX XXXXX XXXXXXXXXXX XXXXX XXX XXXXXXXXX
    2    XXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXX XXXXXXXXX XXXXXXXXX
    1    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXX
```

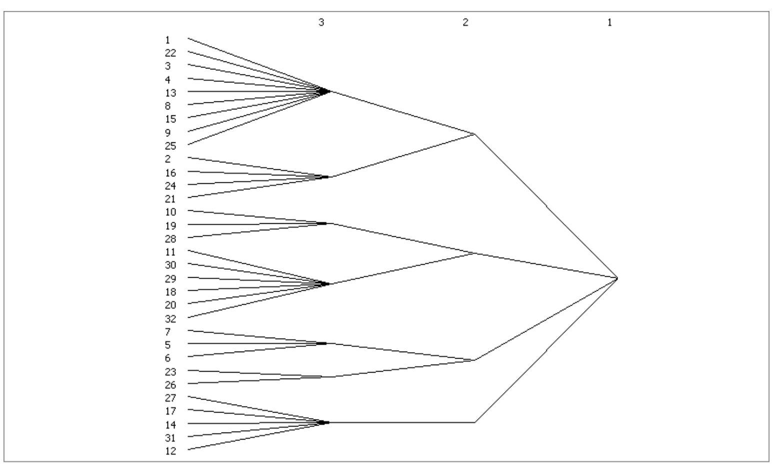
Georgia's three splits in which the seven groups were formed.

Figure 4. 10 Georgia's CONCOR Block Model

```
           2     1   1   2     1 2 2   1 1 2   1 3 2 1 2 3           2 2   2 1 1 3 1
         1 2 3 4 3 8 5 9 5   2 6 4 1   0 9 8   1 0 9 8 0 2   7 5 6   3 6   7 7 4 1 2
         C C C C C C C C C   C C C C   C C C   C C C C C C   C C C   C C   C C C C C
        ------------------------------------------------------------------------------
 1  C1 |                   |         |       |             |       |     |           |
22 C22 |                   |         |       |             |       |     |           |
 3  C3 |                   |         |       |             |       |     |           |
 4  C4 |                   |         |       |             |       |     |           |
13 C13 |                   |         |       |             |       |     |           |
 8  C8 |   1   1     1     | 1       |       |             |       |     |           |
15 C15 |                   |         |       |             |       |     |           |
 9  C9 |                   |         |       |             |       |     |           |
25 C25 |                   |         |       |             |       |     |           |
        ------------------------------------------------------------------------------
 2  C2 | 1     1       1 1 |   1     |       |             |       |     |           |
16 C16 |                   |         |       |             |       |     |           |
24 C24 |                   |         |       |             |       |     |           |
21 C21 |                   |         |       |             |       |     |           |
        ------------------------------------------------------------------------------
10 C10 |         1     1   |         |   1   | 1 1     1   |       |     |           |
19 C19 | 1 1 1 1 1 1 1 1 1 | 1 1   1 |       |         1   |       |     |           |
28 C28 |                 1 |         |       |   1     1 1 |       |     |           |
        ------------------------------------------------------------------------------
11 C11 |                   |         |       |             |       |     |           |
30 C30 |                   |         |       |             |       |     |           |
29 C29 |                   |         |       |             |       |     |           |
18 C18 |                   |         |       |             |       |     |           |
20 C20 |                   |         |       |             |       |     |           |
32 C32 |                   |         |       |             |       |     |           |
        ------------------------------------------------------------------------------
 7  C7 |                   |         |       |             |       |     |           |
 5  C5 |                   |         |       |             |       |     |           |
 6  C6 |       1   1       |         |       |             | 1 1   |     |           |
        ------------------------------------------------------------------------------
23 C23 |                   | 1 1 1 1 |   1   |       1 1   |       |     |           |
26 C26 |             1 1 1 | 1       | 1 1 1 | 1 1 1 1 1 1 |       |     |           |
        ------------------------------------------------------------------------------
27 C27 |                   |         |       |             |       |     |           |
17 C17 |                   |         |       |             |       |     |           |
14 C14 |                   |         |       |             |       |     |           |
31 C31 |                   |         |       |             |       |     |           |
12 C12 |                   |         |       |             |       |     |           |
        ------------------------------------------------------------------------------
```

The block matrix shows the permuted original date. This shows the grouped agents in which 1s show the connections and blanks are no connections.

Figure 4. 11 Georgia's Dendrogram



The dendrogram shows the partitions or approximate equivalence classes for Georgia. The seven groups are seen horizontally, and the three levels are vertical. This is a visualization of the partition diagram.

Tennessee

Tennessee's structural equivalence of the budget actor relationships e distributed through approximately half the budget network (Groups 5 - 8). Figure 4.12 shows the visualization of Tennessee's connections based on the correlation measures (Appendix B). CONCOR begins by correlating each pair of actors. Each row of this actor-by-actor correlation matrix is then extracted and correlated with each other row. There is one group of agents making the inquiries (rows) that have a high density (Table 4.11) group 8 (B19, B11, and B27). Group 8 is structurally equivalent and is likely to make inquiries with all eight groups. (See the block model in Figure 4.14 or the dendrogram in Figure 4.15). Three other groups have a high-density calculation (Table 4.11): group 5 (B7 and B10); group 7 (B16, B25, B17, and B 28); and group 8 (B23, and B26). All three groups will interact with group 1 (B1, B2, and B22). Group 5 will interact with groups 5, group 6 and group 7.

(UCINET information accessed from http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

Figure 4.3 illustrates goodness of fit by the three splits (Figure 4.13). In the first division, the three groups {1, 2, 3, 4, 22, 15}, {7, 28, 27, 23}, {13,9} {25,14,10} {5, 8, 24, 19, 6, 29}, {11, 12, 26}and {17, 18, 20, 21, 16} were formed. On the second split these were sub-divided into {1, 2, 3, 4, 22, 15, 7, 28, 27, 15, 7, 28, 27, 23}, {13, 9, 25, 14, 10}, {5, 8, 24, 19, 6, 29}, and {11, 12, 26, 17, 18, 20, 21, 16}. For the third split these were sub-divided into {1, 2, 3, 4, 22, 15, 7, 28, 27, 23, 13, 9 25, 14, 10}, {5, 8, 24, 19, 6, 29, 11, 12, 26, 17, 18, 20, 21, 16}. Again, the goodness of fit might be regarded as OK but is not a wonderful fit. The R-squared for Tennessee is 0.775. This means about three-quarters (77.5%) of the variance in the connections could be accounted for by a perfect model.

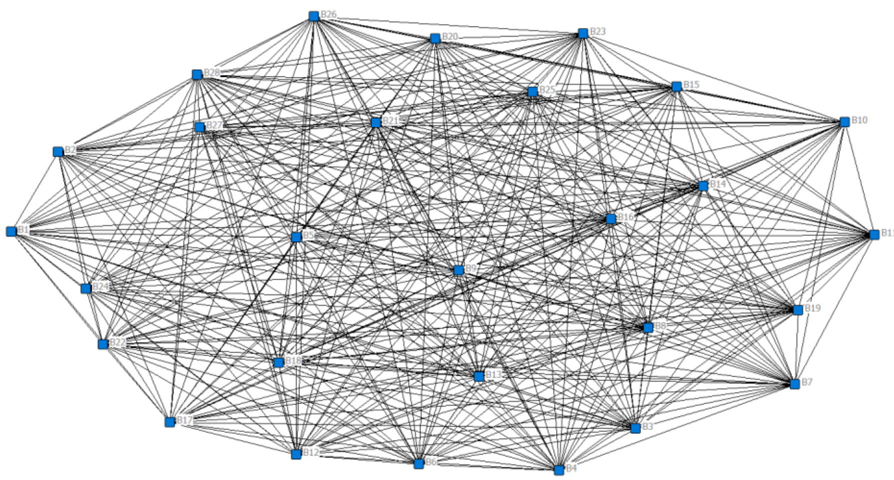
(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C13_%20Structural_Equivalence.html)

Table 4. 11 Tennessee's Density Table

TN Density Matrix	1	2	3	4	5	6	7	8
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.111	0.000	0.000	0.333	0.000	0.000
5	1.000	0.000	0.889	0.167	0.000	1.000	0.875	0.000
6	1.000	0.667	1.000	1.000	1.000	1.000	1.000	1.000
7	0.833	0.375	0.194	0.000	0.125	0.667	0.333	0.125
8	0.833	0.500	0.000	0.000	0.000	0.333	0.000	0.000

Partitioning by the CONCOR method yields a *density matrix* reflecting the density of ties (density is the number of observed ties versus the number of possible ties) within and between each block.

Figure 4. 12 Tennessee's CONCOR1st CCorr



First iteration order actor-by-actor correlation matrix from the CONCOR1stCorr data set.

Figure 4. 13 Tennessee's CONCOR Partition Diagram

```
PARTITION DIAGRAM

            B B B               B B   B B B B   B B B B B B B B B B
        B B 2 2 2 B B B B B 1 1 B 1 1 1 2 B 1 1 1 2 1 2 1 2 2 2
        1 2 2 4 1 6 4 5 9 3 4 2 8 5 8 3 0 7 0 9 1 7 6 5 7 8 3 6

            2 2 2               1 1   1 1 1 2   1 1 1 2 1 2 1 2 2 2
Level   1 2 2 4 1 6 4 5 9 3 4 2 8 5 8 3 0 7 0 9 1 7 6 5 7 8 3 6
-----   - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    3   XXXXX XXX XXXXXXXXXXXXXXXXX XXXXX XXX XXXXX XXXXXXX XXX
    2   XXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX XXXXXXXXXXX
    1   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXX
```

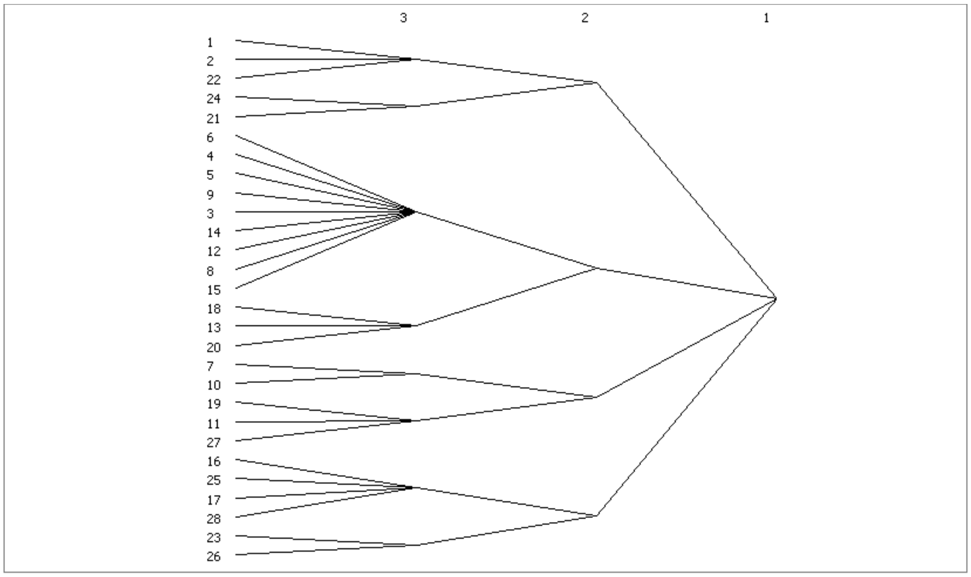
Tennessee's three splits in which the eight groups were formed.

Figure 4. 14 Tennessee's CONCOR Block Model

```
              2   2 2             1 1   1   1 1 2     1   1 1 2   1 2 1 2   2 2
          1 2 2   4 1   6 4 5 9 3 4 2 8 5   8 3 0   7 0   9 1 7   6 5 7 8   3 6
          B B B   B B   B B B B B B B B B   B B B   B B   B B B   B B B B   B B
         ------------------------------------------------------------------------
  1  B1 |       |     |                   |       |     |       |         |     |
  2  B2 |       |     |                   |       |     |       |         |     |
 22 B22 |       |     |                   |       |     |       |         |     |
        -------------------------------------------------------------------------
 24 B24 |       |     |                   |       |     |       |         |     |
 21 B21 |       |     |                   |       |     |       |         |     |
        -------------------------------------------------------------------------
  6  B6 |       |     |                   |       |     |       |         |     |
  4  B4 |       |     |                   |       |     |       |         |     |
  5  B5 |       |     |                   |       |     |       |         |     |
  9  B9 |       |     |                   |       |     |       |         |     |
  3  B3 |       |     |                   |       |     |       |         |     |
 14 B14 |       |     |                   |       |     |       |         |     |
 12 B12 |       |     |                   |       |     |       |         |     |
  8  B8 |       |     |                   |       |     |       |         |     |
 15 B15 |       |     |                   |       |     |       |         |     |
        -------------------------------------------------------------------------
 18 B18 |       |     |               1 1 |       |     |   1   |         |     |
 13 B13 |       |     |               1   |       |     | 1 1   |         |     |
 20 B20 |       |     |                   |       |     |       |         |     |
        -------------------------------------------------------------------------
  7  B7 | 1 1 1 |     | 1 1 1     1 1 1 1 |       |     | 1 1 1 | 1 1 1 1 |     |
 10 B10 | 1 1 1 |     | 1 1 1 1 1 1 1 1 1 |   1   |     | 1 1 1 | 1 1 1   |     |
        -------------------------------------------------------------------------
 19 B19 | 1 1 1 | 1 1 | 1 1 1 1 1 1 1 1 1 | 1 1 1 | 1 1 |   1 1 | 1 1 1 1 | 1 1 |
 11 B11 | 1 1 1 |     | 1 1 1 1 1 1 1 1 1 | 1 1 1 | 1 1 | 1   1 | 1 1 1 1 | 1 1 |
 27 B27 | 1 1 1 | 1 1 | 1 1 1 1 1 1 1 1 1 | 1 1 1 | 1 1 | 1 1   | 1 1 1 1 | 1 1 |
        -------------------------------------------------------------------------
 16 B16 | 1 1   |     | 1           1 1   |       |   1 | 1   1 |   1 1   |     |
 25 B25 | 1 1 1 | 1   |         1         |       |     | 1   1 |   1 1   |     |
 17 B17 | 1 1 1 | 1 1 | 1         1   1   |       |     | 1 1 1 |         | 1   |
 28 B28 | 1   1 |     |                   |       |     | 1     |     1   |     |
        -------------------------------------------------------------------------
 23 B23 | 1 1 1 | 1 1 |                   |       |     | 1     |         |     |
 26 B26 | 1 1   |     |                   |       |     |     1 |         |     |
          -----------------------------------------------------------------------
```

The block matrix shows the permuted original date. This shows the grouped agents in which 1s show the connections and blanks are no connections.

Figure 4. 15 Tennessee's Dendrogram



The dendrogram shows the partitions or approximate equivalence classes for Tennessee. The eight groups can be seen horizontally, and the three levels are vertical. This is a visualization of the partition diagram.

Proportion of Matches

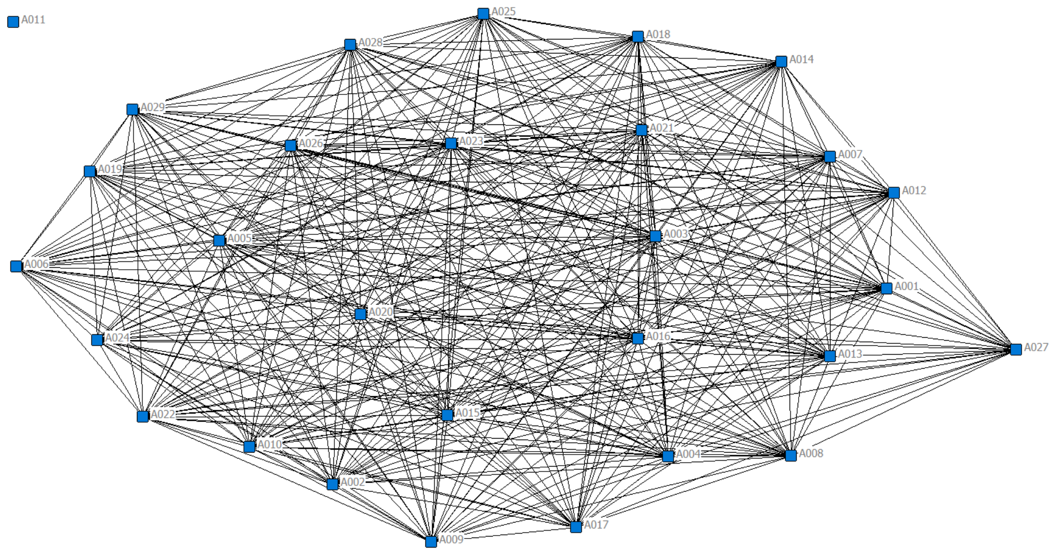
Appendix G displays the proportion of matches for Q 14 and Appendix H for Q 19 in which each actor is compared to other actors. The measure is converted to a percentage to give the percentage of ties the agents have in common.

North Carolina

In the case of North Carolina, for Q 14 columns table (Appendix G) for the proportion of matches (Figure 4.16) displays measures from 30.8% (A022-A013) to 92.3% (A001 to A002). The rows table (Appendix G) displays measures (Figure 4.17) from 14.8% (A024 to A013) to 92.6% (A001 to A020). The Cronbach's alpha for North Carolina's Q 14 is .984 for columns and .975 for rows. Q 19 columns (Appendix H) the range of proportion of matches (Figure 4.18) is 38.5% (A021-A002) to.92.3% (A001 to A002) and rows (table is in Appendix H and Figure 4.19) 7.4% (A024 to A013) to 92.6% (A006 to

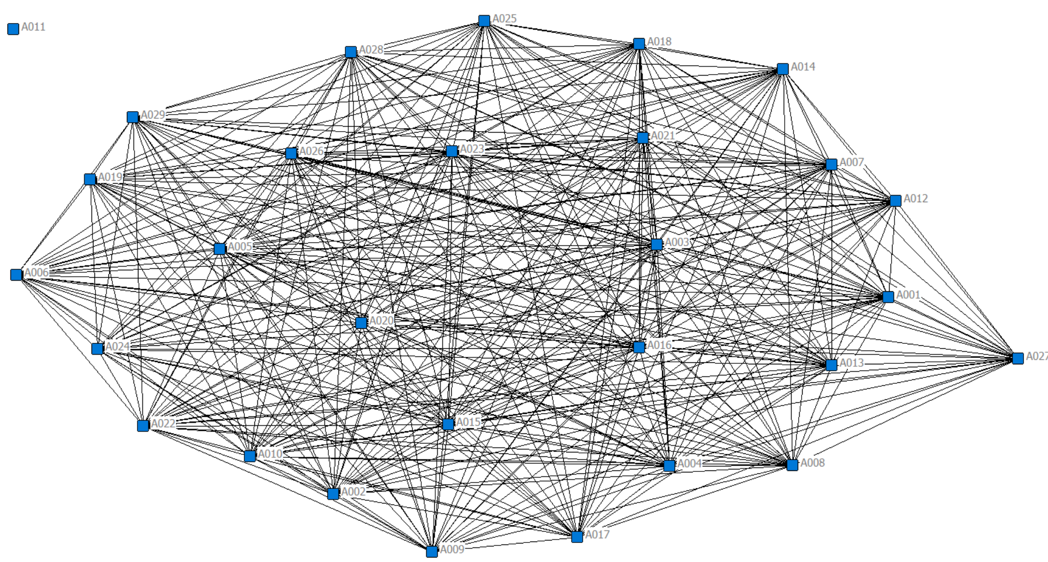
A002). The Cronbach's alpha for North Carolina's Q 19 is .979 for columns and .933 for rows.

Figure 4. 16 North Carolina Q 14 Columns



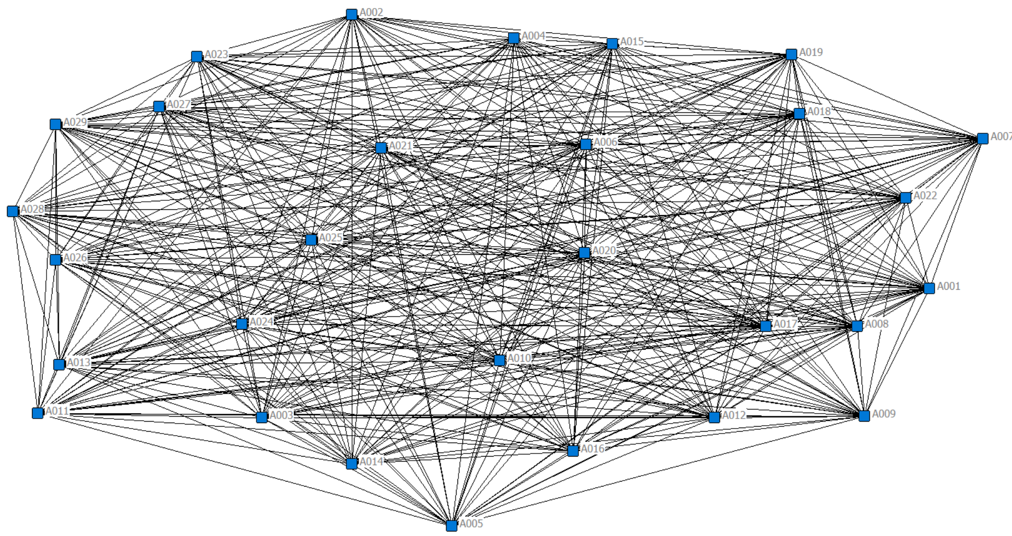
Columns similarities; an m-by-m similarity matrix is computed representing the similarity between each pair of columns.

Figure 4. 17 North Carolina Q 14 Rows



Rows similarities, an n-by-n similarity matrix representing the similarity between each pair of rows is computed.

Figure 4. 18 North Carolina Q 19 Columns



Columns similarities; an m-by-m similarity matrix is computed representing the similarity between each pair of columns.

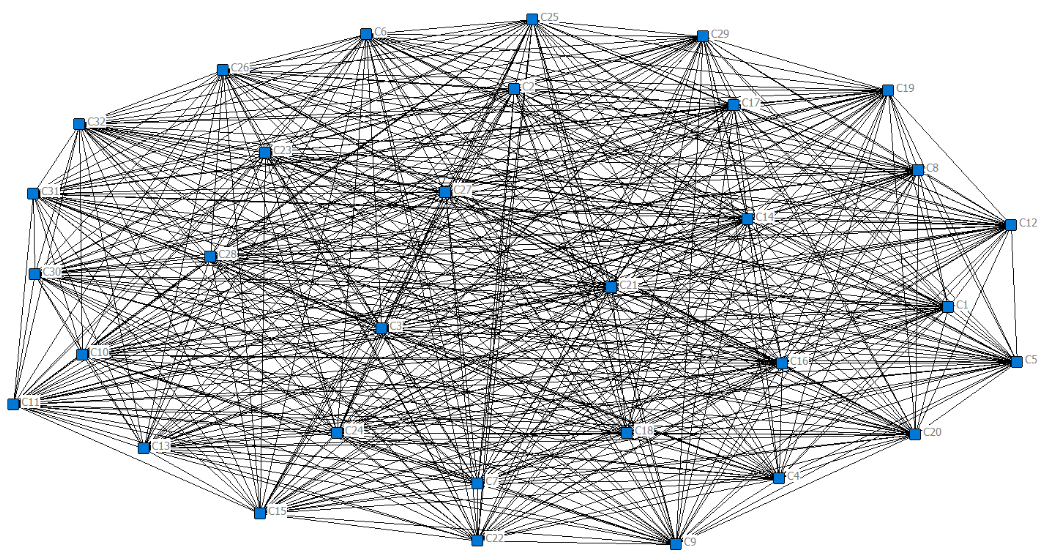
Figure 4. 19 North Carolina Q 19 Rows

Rows similarities, an n-by-n similarity matrix representing the similarity between each pair of rows is computed.

Georgia

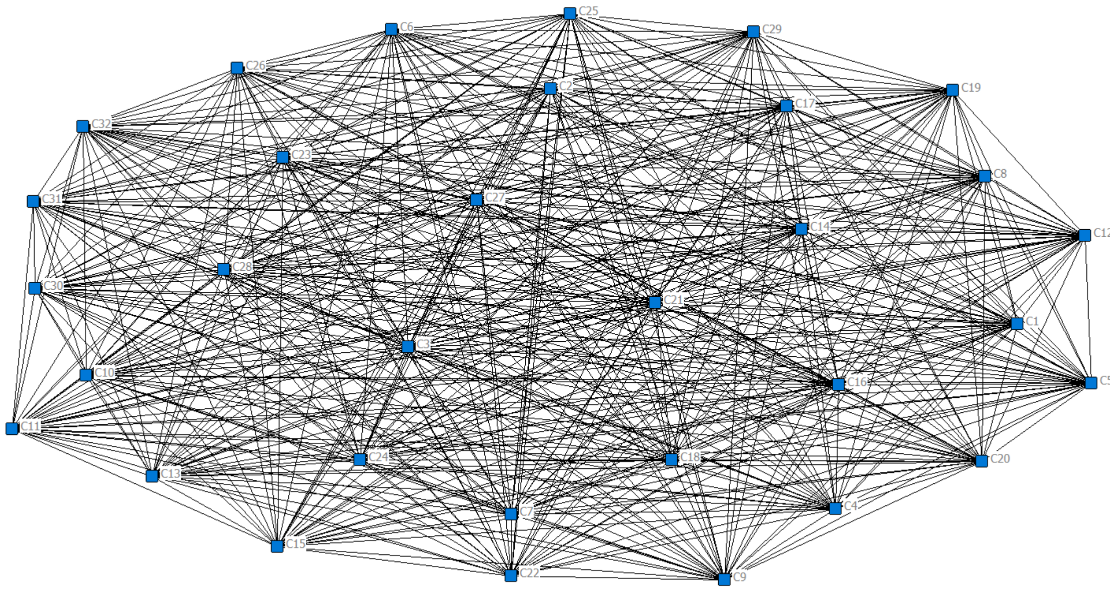
Georgia, for Q 14 columns measure of the proportion of matches ranges from 76.7% (C30-C4) to100% (several agents) (table is in Appendix G and visualization is Figure 4.20). The table for rows displays 43.3% (C26 to C6) to 100% (several agents) (table is in Appendix G and Figure 4.21). The Cronbach's alpha for Georgia's Q 14 is .997 for columns and .996 for rows. Q 19 column proportion of matches displays several agents with dissimilarity (measures of 0) (table is in Appendix H and Figure 4.22). The next lowest measure is 20% (C8-C23) to100% (several) and rows 73% (C12 to C3) to 100% (C5 to C6)b (table is in Appendix H and Figure 4.23). The Cronbach's alpha for Georgia's question 19 is .995 for both columns and rows.

Figure 4. 20 Georgia Q 14 Columns – Proportion of Matches



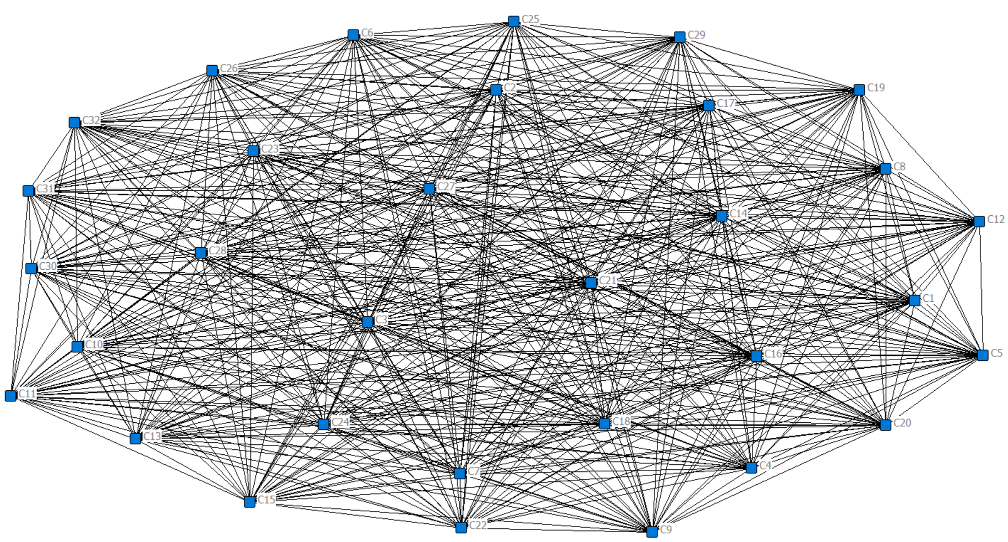
Columns similarities; an m-by-m similarity matrix is computed representing the similarity between each pair of columns.

Figure 4. 21Georgia Q 14 Rows – Proportion of Matches



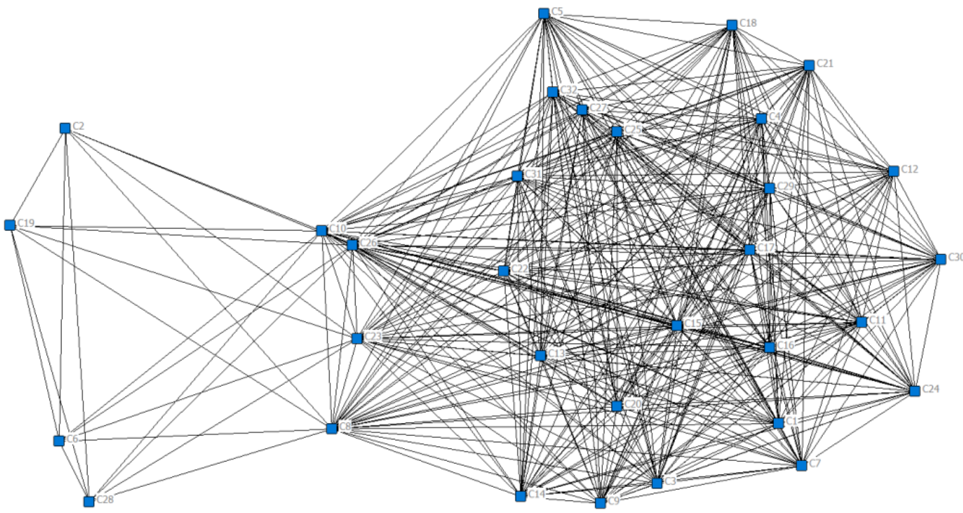
Rows similarities, an n-by-n similarity matrix representing the similarity between each pair of rows is computed.

Figure 4. 22 Georgia Q 19 Columns - Proportion of Matches



Columns similarities; an m-by-m similarity matrix is computed representing the similarity between each pair of columns.

Figure 4. 23 Georgia Q 19 Rows - Proportion of Matches

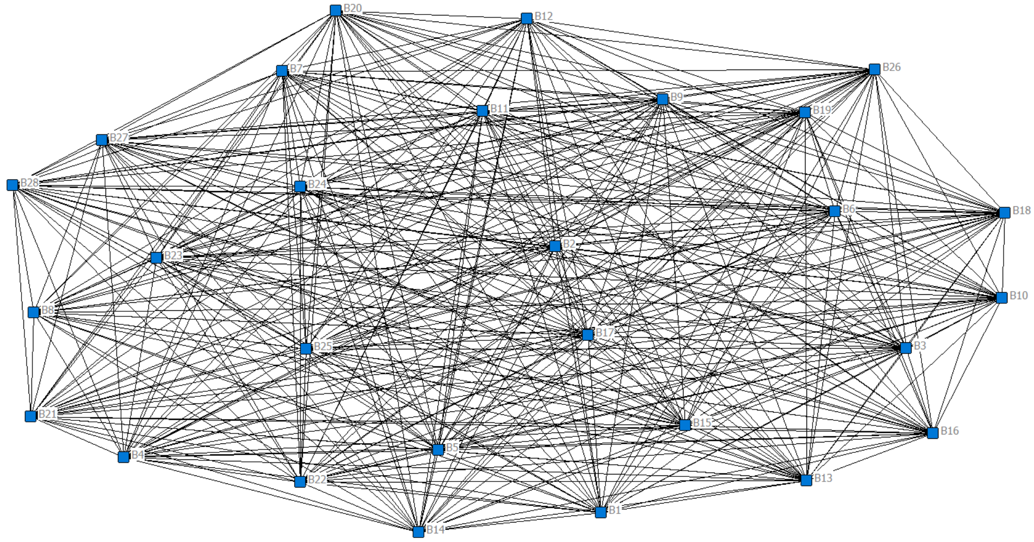


Rows similarities, an n-by-n similarity matrix representing the similarity between each pair of rows is computed.

Tennessee

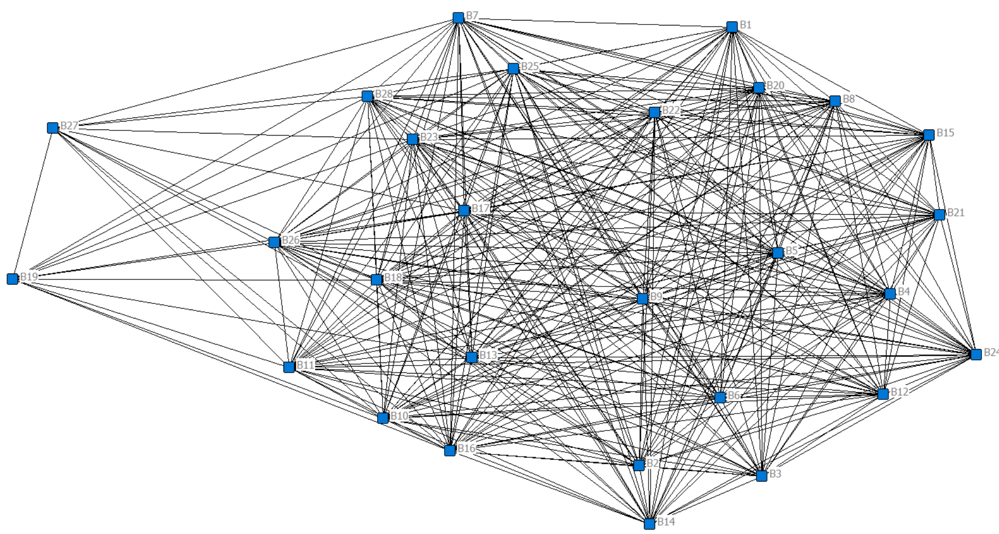
In the case of Tennessee, for Q 14 columns for the proportion of matches' measure range from 69.2% (B19 to B20) to 100% (several) (table is in Appendix G and visualization is Figure 4.24). While several agents are dissimilar (measures of 0), for rows the next lowest score is 11.5% exhibited by B19 to B18, B28 to B18, B27 to B13, and B 19 to B27 the highest similarity is 100% (several agents) (table is in Appendix G and visualization is Figure 4.25). The Cronbach's alpha for Tennessee's Q 14 is .995 for columns and .982 for rows. Q 19, column measures for the proportion of matches range from 61.5% (A021-A002) to 100% (A001 to A002) (table is in Appendix H and visualization is Figure 4.26). The table for rows (found in Appendix H) displays 11.5% (B25 to B26) to 100% (several) (Figure 4.27). The Cronbach's alpha for Tennessee's Q 19 is .991 for columns and .939 for rows.

Figure 4. 24 Tennessee Q 14 Columns - Proportion of Matches



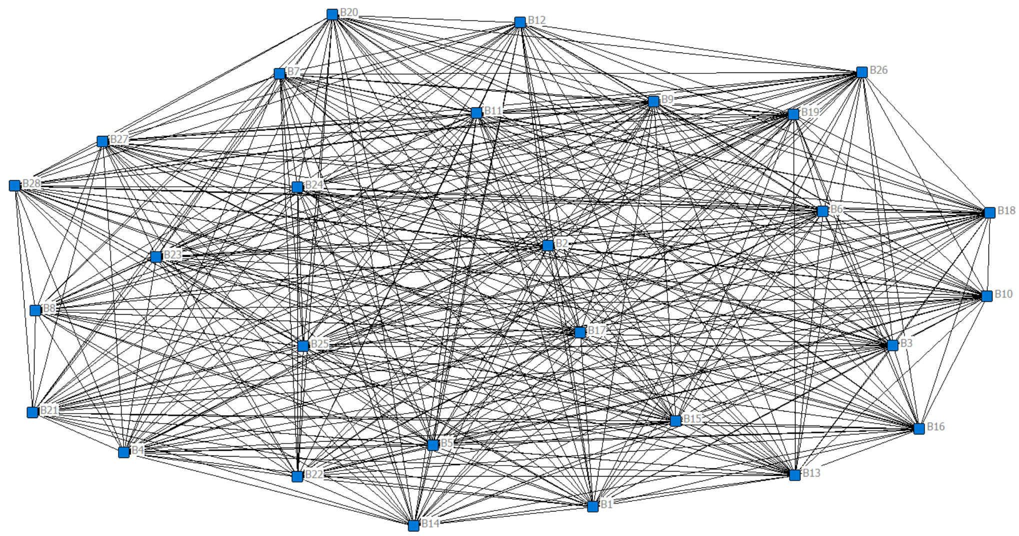
Columns similarities; an m-by-m similarity matrix is computed representing the similarity between each pair of columns.

Figure 4. 25 Tennessee Q 14 Rows - Proportion of Matches



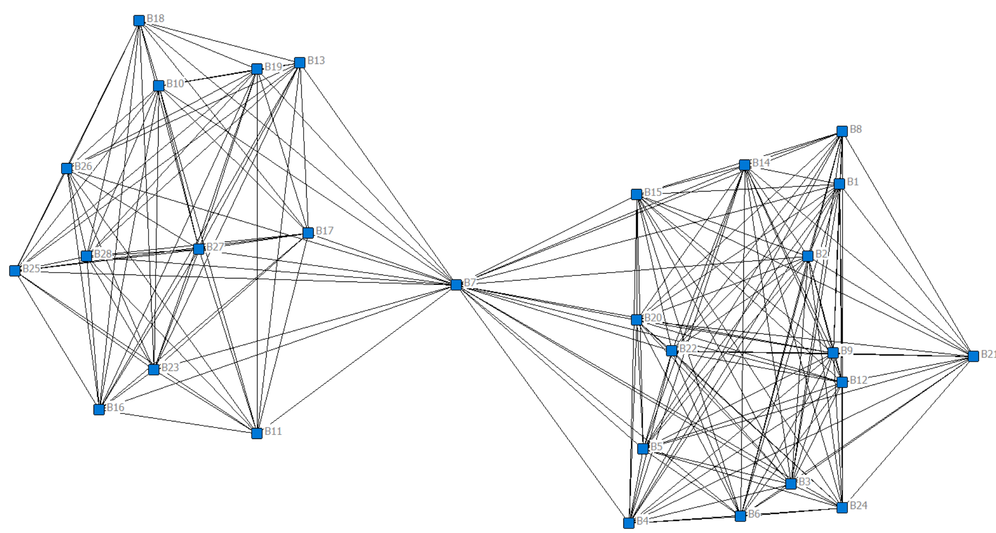
Rows similarities, an n-by-n similarity matrix representing the similarity between each pair of rows is computed.

Figure 4. 26 Tennessee Q 19 Columns - Proportion of Matches



Columns similarities; an m-by-m similarity matrix is computed representing the similarity between each pair of columns.

Figure 4. 27 Tennessee Q 19 Rows - Proportion of Matches



Rows similarities, an n-by-n similarity matrix representing the similarity between each pair of rows is computed.

Prominence

Prominence maps the visibility of a budget agent compared to other budget agents. Two types of prominence measures are centrality and prestige. Centrality is a measure of active and involved a budget agent is in general, regardless of inquiring or answering questions, in the budget process. The degree of prominence can be interpreted in terms of the opportunities a budget agent has to request information (out-degree) or answer requests for information (in-degree) throughout the network. In the case of a directed network (where ties have direction), two distinct measures of degree centrality, in-degree and out-degree are found. Accordingly, in-degree is a count of the number of ties directed to the budget agent and out-degree is the number of ties the budget agent directs to others. Since the ties are associated with the information exchange network this relationship can be interpreted as follows: in-degree is often interpreted as a form of admiration or respect and out-degree as power or control. For asymmetric data (directed) the in-degree of a budget agent is the number of individuals making inquiries (ties/connections) received by that budget agent, and the out-degree is the number of inquiries (ties/connections) initiated by the budget agent.

The normalized degree centrality (which is only for binary data) is the degree divided by the maximum possible degree expressed as a percentage. The range and variability of degree (plus additional network properties) can be relatively significant since it describes the population as homogeneous or heterogeneous in structural positions. Researchers can examine whether the variability is high or low relative to the typical measures by calculating the coefficient of variation (standard deviation divided by mean, times 100) for in-degree and out-degree. According to Hanneman and Riddle, a measure of coefficient variation between 35 for out-degree and 53 for in-degree represents moderate homogeneity within the sample state network.

Prestige is a measure of who and how many other agents come to talk to an agent which is measured by closeness centrality. In a connected network, the normalized closeness centrality of a budget agent is the average length of the shortest path between the node and all other budget agents in the network.

Closeness is defined by Alex Bayelsa (1950) as the reciprocal of the farness. Far-ness is the sum of the distance (by various approaches) from each ego to all others in the network. "Far-ness" is then transformed into "nearness" as the reciprocal of farness. That is, nearness equals one divided by farness. "Nearness" can be further standardized by normalizing against the minimum possible nearness for a graph of the same size and connection. Given a measure of nearness or farness for each actor, a measure of inequality in the distribution of distances across the actors can be calculated to express "graph centralization" relative to the idealized "star" network.

Closeness is calculated by one over the sum of the distance between ego and the shortest path between each budget agent to whom he/she is connected. Consequently, the more central a budget agent is, the closer they are to all other budget agents. The budget agent's closeness centrality is high when it equals 1, i.e., the actor is next to all other budget agents. However, when speaking of closeness centrality, researchers usually refer to its normalized form, generally given by the previous formula multiplied by $N - 1$, where N is the number of budget agents in the network. This adjustment allows comparisons between nodes of graphs of different sizes. Budget agents with closeness centrality of 0 are isolates. A budget agent is considered prestigious if he/she is relatively close to all other budget agents. (UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Degree Centrality

North Carolina

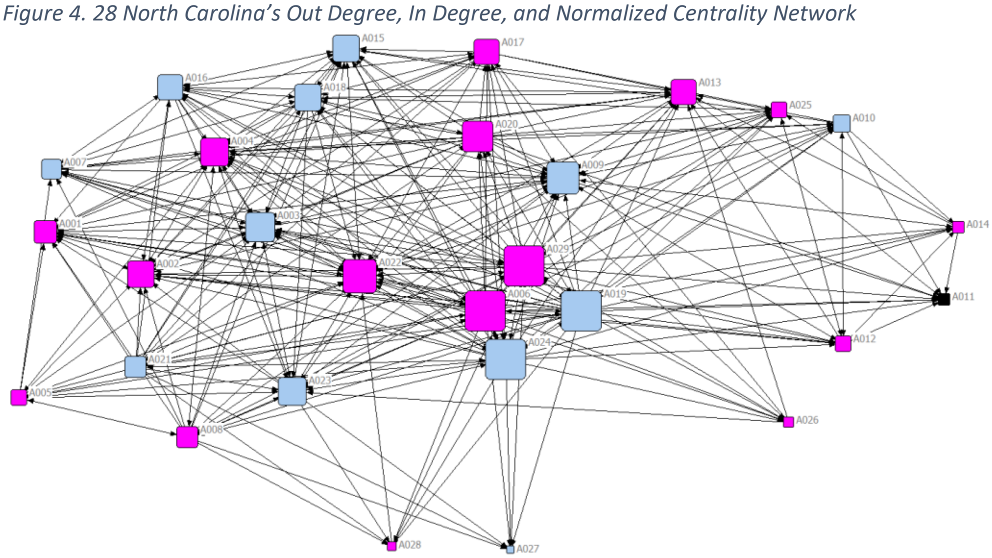
Degree Centrality in North Carolina ranges from 0% (2 budget agents) to 100% (4 budget agents) for out-degree centrality (Table 4.12) or requesting information. North Carolina's in-degree measures range from 17.90% to 71.40% (Table 4.12) or received inquiries. This budget process network has a higher range of out-degree centrality (maximum & minimum on Table 4.13; difference 100) than in-degree centrality (maximum & minimum on Table 4.13; difference 64.286). This means there is more variability between budget agents requesting information than receiving inquiries for information. This variability may describe either a homogenous (similar) or heterogeneous (diverse) network. Besides the range and variability of the degrees, calculating the coefficient of variation ((STD Dev/Mean) x 100) for the in-degree 48.11 and out-degree 75.07 in North Carolina will help determine homogeneity between budget agents.

North Carolina measures can be considered moderate, and the network is more homogeneous concerning in-degree prominence (48.11) than out-degree influence (75.07). Figure 4.28 is a visualization of the position of in-degree, out-degree centrality, and normalized centrality (since this is binary data) concerning each of the budget agents. The mean out-degree and in-degree for North Carolina is 39.16%, which means information is passing to and from budget agents at 39.16% on average (Table 4.13). (UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 12 North Carolina Normalized Out & In Degree Centrality

NC	Out-Degree	In-Degree
A001	10.70%	60.70%
A002	17.90%	67.90%
A003	32.10%	67.90%
A004	42.90%	64.30%
A005	35.70%	21.40%
A006	100.00%	25.00%
A007	35.70%	35.70%
A008	53.60%	21.40%
A009	39.30%	71.40%
A010	28.60%	25.00%
A011	0.00%	35.70%
A012	28.60%	25.00%
A013	14.30%	53.60%
A014	14.30%	25.00%
A015	17.90%	67.90%
A016	46.40%	35.70%
A017	42.90%	35.70%
A018	50.00%	39.30%
A019	100.00%	17.90%
A020	71.40%	21.40%
A021	53.60%	17.90%
A022	21.40%	82.10%
A023	32.10%	42.90%
A024	100.00%	39.30%
A025	25.00%	32.10%
A026	17.90%	17.90%
A027	0.00%	25.00%
A028	3.60%	25.00%
A029	100.00%	35.70%

Figure 4. 28 North Carolina's Out Degree, In Degree, and Normalized Centrality Network



North Carolina's Degree Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node concerns the nodes or agent's degree centrality. The larger the node, the higher the centrality.

Table 4. 13 North Carolina Out & In Degree Descriptive Statistics

NC	NrmOutDeg	NrmInDeg
Mean	39.163	39.163
Std Dev	29.398	18.84
Sum	1135.714	1135.714
Variance	864.253	354.929
SSQ	69540.82	54770.406
MCSSQ	25063.336	10292.928
Euc Norm	263.706	234.031
Minimum	0	17.857
Maximum	100	82.143
N of Obs	29	29

Georgia

Degree Centrality in Georgia ranges from 0% (24 budget agents, believed to be caused by the response rate) to 41.90% (2 budget agents) for out-degree (Table 4.14) or requesting information. Georgia's in-degree measures range from 0% (several because of the response rate) to 16.10% (Table 4.14) receiving inquiries for information. This budget process network has a higher range of out-degree centrality (maximum & minimum on Table 4.15; difference 41.935) than in-degree centrality (maximum & minimum on Table 4.15; difference 16.129). This means more variability between budget agents requesting information than receiving inquiries for information. Besides the range and variability of the degrees, calculating the coefficient of variation ((STD Dev/Mean) x 100) for the in-degree which is 82.07 and out-degree which is 201.52, in Georgia determines if there is homogeneity between the budget agents.

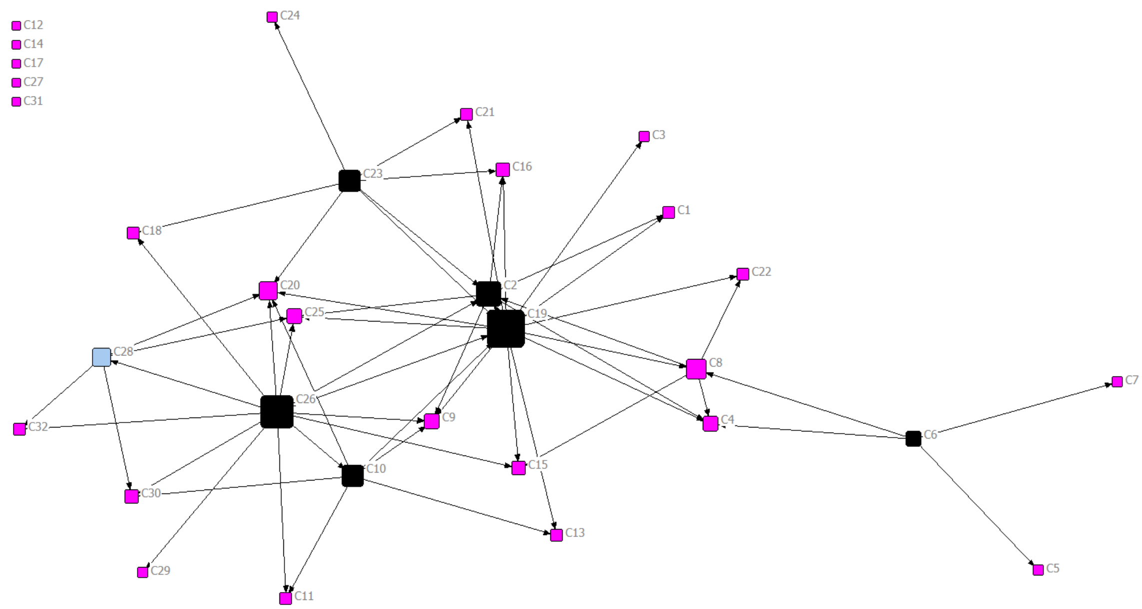
Georgia measures can be considered moderate, and the network is more homogeneous concerning in-degree centrality or prominence (82.07) than concerning out-degree centrality or influence (201.52). Figure 4.29 gives a visualization of the position of in-degree, out-degree centrality, and normalized centrality (since this is binary data) concerning each of the budget agents. The mean for both out-degree and in-degree for Georgia is 5.645%, which indicates information is passing to and from budget agents only 5.64% on average (Table 4.15).

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 14 Georgia Normalized Out & In Degree Centrality

GA	Out-Degree	In-Degree
C01	0.00%	6.50%
C02	16.10%	12.90%
C03	0.00%	3.20%
C04	0.00%	12.90%
C05	0.00%	3.20%
C06	12.90%	0.00%
C07	0.00%	3.20%
C08	12.90%	6.50%
C09	0.00%	12.90%
C10	19.40%	3.20%
C11	0.00%	6.50%
C12	0.00%	0.00%
C13	0.00%	6.50%
C14	0.00%	0.00%
C15	0.00%	9.70%
C16	0.00%	9.70%
C17	0.00%	0.00%
C18	0.00%	6.50%
C19	41.90%	9.70%
C20	0.00%	16.10%
C21	0.00%	6.50%
C22	0.00%	6.50%
C23	22.60%	0.00%
C24	0.00%	3.20%
C25	0.00%	12.90%
C26	41.90%	0.00%
C27	0.00%	0.00%
C28	12.90%	3.20%
C29	0.00%	3.20%
C30	0.00%	9.70%
C31	0.00%	0.00%
C32	0.00%	6.50%

Figure 4. 29 Georgia's Out Degree, In Degree, and Normalized Centrality Network



Georgia's Degree Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node concerns the nodes or agent's degree centrality. The larger the node, the higher the centrality.

Table 4. 15 Georgia Out & In Degree Descriptive Statistics

GA	NrmOutDeg	NrmInDeg
Mean	5.645	5.645
Std Dev	11.376	4.633
Sum	180.645	180.645
Variance	129.422	21.462
SSQ	5161.29	1706.556
MCSSQ	4141.519	686.785
Euc Norm	71.842	41.31
Minimum	0	0
Maximum	41.935	16.129
N of Obs	32	32

Tennessee

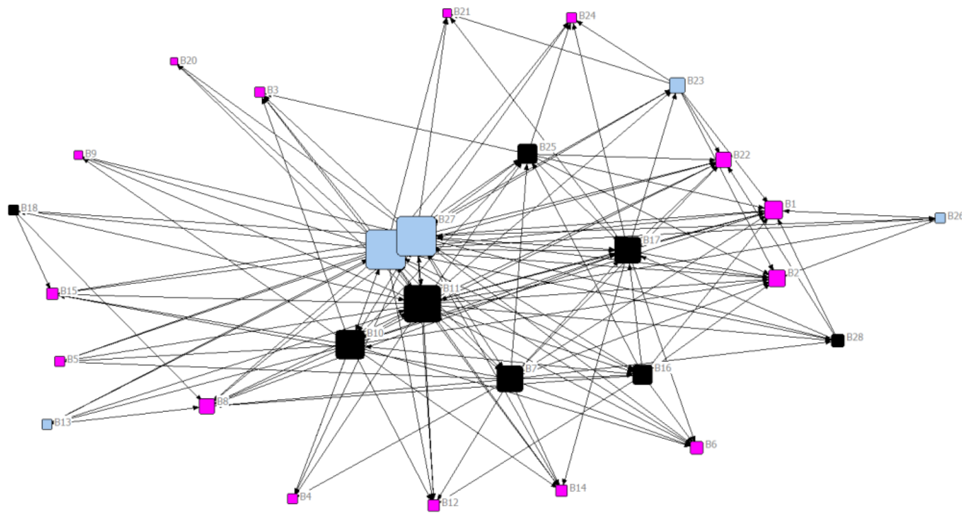
Degree Centrality in Tennessee ranges from 0% (15 budget agents because of the response rate) to 100.00% (2 budget agents) for out-degree (Table 4.16) or requesting information. For In-Degree measures, the ranges are 0% (several because of the response rate) to 40.70% (Table 4.16). This budget process network has a higher range of out-degree centrality (maximum & minimum on Table 4.17; difference 100) than in-degree centrality (maximum & minimum on Table 4.17; difference 29.63). This means there is more variability between budget agents requesting information than receiving inquiries for information. Besides the range and variability of the degrees, calculating the coefficient of variation ((STD Dev/Mean) x 100) for the in-degree which is 39.44 and out-degree which is 149.94 in Tennessee determines if there is homogeneity between budget agents.

Tennessee measures can be considered moderate, and the network is more homogeneous concerning in-degree prominence (39.44) than concerning out-degree influence (149.94). Figure 4.30 gives a visualization of the position of in-degree, out-degree centrality, and normalized centrality (since this is binary data) concerning each of the budget agents. The mean Out-Degree and In-Degree for Tennessee is 21.693%, which means information is passing to and from budget agents only 21.693% on average (Table 4.17). (UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 16 Tennessee Normalized Out & In Degree Centrality

TN	Out-Degree	In-Degree
B01	0.00%	40.70%
B02	0.00%	37.00%
B03	0.00%	18.50%
B04	0.00%	18.50%
B05	0.00%	18.50%
B06	0.00%	25.90%
B07	63.00%	11.10%
B08	0.00%	33.30%
B09	0.00%	14.80%
B10	70.40%	14.80%
B11	92.60%	25.90%
B12	0.00%	22.20%
B13	11.10%	14.80%
B14	0.00%	22.20%
B15	0.00%	22.20%
B16	37.00%	18.50%
B17	44.40%	29.60%
B18	11.10%	11.10%
B19	100.00%	37.00%
B20	0.00%	11.10%
B21	0.00%	14.80%
B22	0.00%	33.30%
B23	22.20%	14.80%
B24	0.00%	18.50%
B25	29.60%	22.20%
B26	11.10%	11.10%
B27	100.00%	29.60%
B28	14.80%	14.80%

Figure 4. 30 Tennessee's Out Degree, In Degree, and Normalized Centrality Network



Tennessee's Degree Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node concerns the nodes or agent's degree centrality. The larger the node, the higher the centrality.

Table 4. 17 Tennessee Out & In Degree Descriptive Statistics

TN	NrmOutDeg	NrmInDeg
Mean	21.693	21.693
Std Dev	32.526	8.556
Sum	607.407	607.407
Variance	1057.921	73.206
SSQ	42798.352	15226.337
MCSSQ	29621.791	2049.775
Euc Norm	206.878	123.395
Minimum	0	11.111
Maximum	100	40.741
N of Obs	28	28

Closeness Centrality

North Carolina

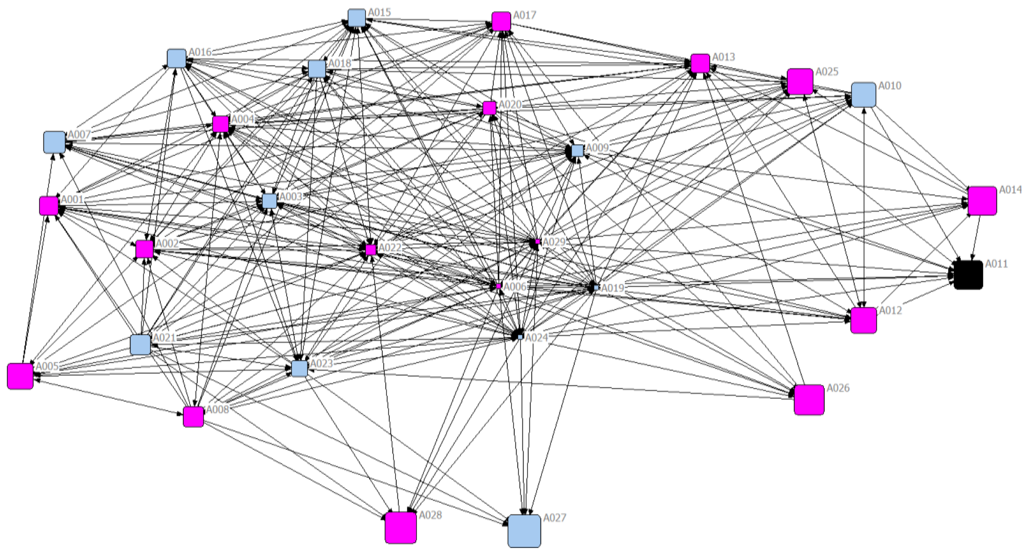
North Carolina's out-closeness range is 0.2 (1 budget agent) to 1 (4 budget agents) and the in-closeness ranges from 0.4 (3 budget agents) to 0.718 (Table 4.18). This means that most actors can interact quickly with all other budget agents. Budget agents who can reach other budget agents at shorter path lengths, or who are more reachable by other budget agents at shorter path lengths have favored positions. This structural advantage can be translated into power. The distribution of out-closeness has less variability than in-closeness. Budget agents A006 (measure 1), A019 measure 1), A024 (measure 1), and A029 (measure 1) are more isolated or makes inquiries (out-closeness) from all other budget agents within North Carolina's budget process network; this can is in Figure 4.31. Budget A011 (measure 0.2), is the "isolate" or makes inquiries (out-closeness) from a few budget agents within North Carolina's budget process network; this is in Figure 4.31. Budget A022 (measure 0.718) receives the most inquiries (in-closeness) from all other budget agents within North Carolina's budget process network; this is in Figure 4.31. Budget agents A019 (measure 0.4), A021 (measure 0.4), and A026 (measure 0.4) receives inquiries (in-closeness) from few budget agents within North Carolina's budget process network; this can is in Figure 4.31. The distribution of out-closeness has less variability than in-closeness.

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 18 North Carolina's Out Closeness and In Closeness measures

NC	Out Closeness	In Closeness
A001	0.389	0.622
A002	0.491	0.651
A003	0.596	0.651
A004	0.636	0.636
A005	0.609	0.459
A006	1	0.467
A007	0.609	0.491
A008	0.683	0.459
A009	0.538	0.667
A010	0.491	0.483
A011	0.2	0.538
A012	0.467	0.483
A013	0.394	0.571
A014	0.431	0.483
A015	0.452	0.651
A016	0.651	0.5
A017	0.636	0.491
A018	0.667	0.528
A019	1	0.4
A020	0.778	0.418
A021	0.683	0.4
A022	0.5	0.718
A023	0.549	0.509
A024	1	0.519
A025	0.571	0.5
A026	0.549	0.4
A027	0.2	0.438
A028	0.346	0.431
A029	1	0.5

Figure 4. 31 North Carolina's Closeness Centrality Network



North Carolina's Degree Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node is concerning the agent's closeness centrality. The larger the node, the higher the centrality.

Georgia

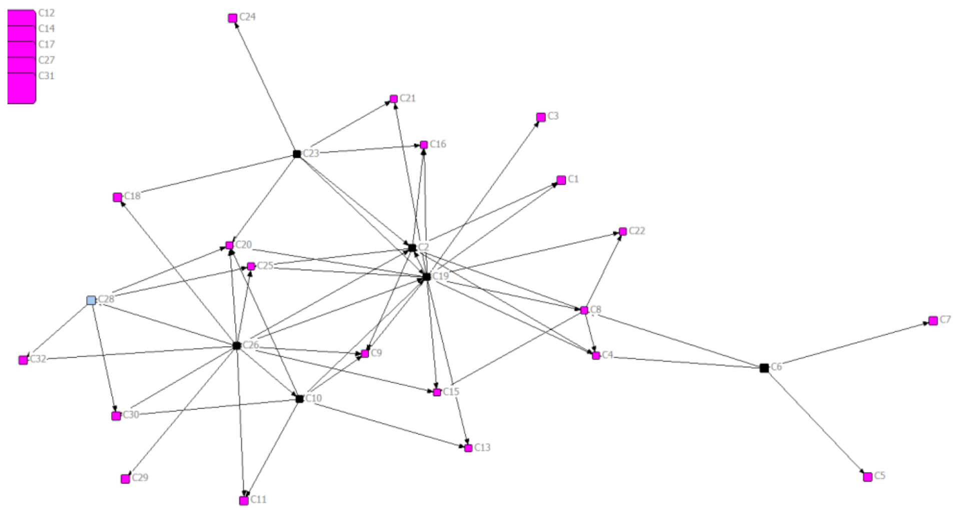
Georgia's Out-Closeness range is 0.25 to .449, and the In-Closeness ranges from 0.25 (budget agents) to 0.295 (Table 4.19). This means that most actors can interact rather moderately with all other budget agents. The distribution of out-closeness has less variability than in-closeness. Budget agent C26 (measure 0.449), is the "inquisitor" or makes inquiries (out-closeness) from about half the budget agents within Georgia's budget process network; this is in Figure 4.32. The lowest out-closeness centrality measure of 0.25 was from budget agents C1, C3, C4, C5, C7, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21, C22, C24, C25, C27, C29, C30, C31, and C32, which are more isolated or budget agents that make inquiries (out-closeness) from few budget agents within Georgia's budget process network; this is in Figure 4.32. Budget agent C4 (measure 0.292) receives the most inquiries (in-closeness) from other budget agents within Georgia's budget process network; this is in Figure 4.32. Budget agents C6, C12, C14, and C17, received a measure of 0.25 which means they receive inquiries (in-closeness) from few budget agents within Georgia's budget process network; this is in Figure 4.32. The distribution of in-closeness has less variability than out-closeness.

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 19 Georgia's Out Closeness and In Closeness measures

GA	Out Closeness	In Closeness
C1	0.25	0.284
C2	0.284	0.287
C3	0.25	0.27
C4	0.25	0.292
C5	0.25	0.256
C6	0.304	0.25
C7	0.25	0.256
C8	0.298	0.277
C9	0.25	0.29
C10	0.36	0.256
C11	0.25	0.263
C12	0.25	0.25
C13	0.25	0.272
C14	0.25	0.25
C15	0.25	0.284
C16	0.25	0.287
C17	0.25	0.25
C18	0.25	0.263
C19	0.365	0.27
C20	0.25	0.284
C21	0.25	0.272
C22	0.25	0.282
C23	0.365	0.25
C24	0.25	0.256
C25	0.25	0.295
C26	0.449	0.25
C27	0.25	0.25
C28	0.277	0.256
C29	0.25	0.256
C30	0.25	0.27
C31	0.25	0.25
C32	0.25	0.263

Figure 4. 32 Georgia's Closeness Centrality Network



Georgia's Degree Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node is concerning the agent's closeness centrality. The larger the node, the higher the centrality.

Tennessee

Tennessee's Out-Closeness range is 0.25 to 1 (2 budget agents), and the In-Closeness ranges from 0.333 to 0.38 (Table 4.20). This means that most actors can interact moderately with all other budget agents. The distribution of out-closeness has less variability than in-closeness. Budget B11 (measure 0.931), is the "inquisitor" or makes inquiries (out-closeness) from about half the budget agents within Tennessee's budget process network; this is in Figure 4.33.

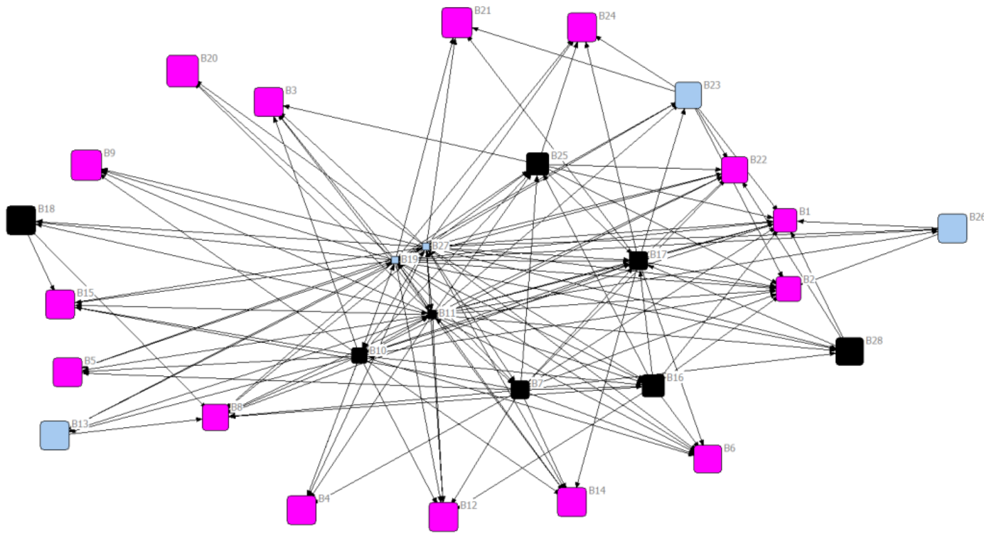
The lowest out-closeness centrality measure of 0.25 was from budget agents B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, and B15 which are more isolated or budget agents that make inquiries (out-closeness) from few budget agents within Tennessee's budget process network; Figure 4.33. Budget agent B1 (measure 0.38) receives the most inquiries (in-closeness) from other budget agents within Tennessee's budget process network; this is in Figure 4.39. Budget agents B7 and B18 received a measure of 0.333 which means they receive inquiries (in-closeness) from a few budget agents within Tennessee's budget process network; this is in Figure 4.33. The distribution of in-closeness has less variability than out-closeness.

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Table 4. 20 Tennessee's Out Closeness and In Closeness measures

TN	Out Closeness	In Closeness
B1	0.25	0.38
B2	0.25	0.375
B3	0.25	0.351
B4	0.25	0.351
B5	0.25	0.351
B6	0.25	0.36
B7	0.73	0.333
B8	0.25	0.37
B9	0.25	0.346
B10	0.771	0.338
B11	0.931	0.351
B12	0.25	0.355
B13	0.529	0.338
B14	0.25	0.355
B15	0.25	0.355
B16	0.614	0.342
B17	0.643	0.355
B18	0.509	0.333
B19	1	0.365
B20	0.25	0.342
B21	0.25	0.342
B22	0.25	0.37
B23	0.563	0.338
B24	0.25	0.346
B25	0.587	0.346
B26	0.529	0.333
B27	1	0.355
B28	0.54	0.338

Figure 4. 33 Tennessee's Out Closeness Centrality Network



Tennessee's Degree Centrality. The color of the nodes indicates the gender (female=pink, male=blue, no-response=black. The size of the node is in relation to the agent's closeness centrality. The larger the node the higher the centrality.

Range

To understand the variation of behavior in budget agents, a closer examination of the budget agents' local circumstances is warranted. Describing and indexing the variation across budget agents in the way they are embedded in "local" social structures is the goal of the analysis of ego networks. Range denotes to the selection of sources to which a budget agent has access (Hanneman & Riddle, 2005). The more connections the budget agents maintain, the more access to social resources or information and the more access to information the more other budget agents are likely to make a connection to retrieve information.

For example, a budget agent's range depends on the size of their network, the number of brokers, and the size of the networks of the budget agents with whom the budget agent interacts (Haythornthwaite, 1996, p. 335). In UCINET the ego-net basic measures will compute the standard ego-network measures for ever budget agent in each state budget network. While the basic measures for in-degree (considers budget agents contacting the budget agent), out-degree (considers who this budget agent contacts), and undirected (considers all budget agents connected to and from ego/this budget agent), for this study the undirected measure was used because we are interested in the transfer of knowledge to and from the budget agents. Also, all measures but the two for brokerage will be reviewed here because brokerage is discussed in another section. (UCINET information accessed from http://faculty.ucr.edu/~hanneman/nettext/C9_Ego_networks.html)

North Carolina

North Carolina's ego-networks basic measures of budget agents reveal interesting characteristics. Table 4.21 displays measures for each budget agent that participates in North Carolina's budget process. The first column, size, is the number of nodes that are one-step out from the budget agent (ego) identified at the beginning of the row, plus the ego itself. Budget agent A006, A019, A024, and A029 have the largest ego networks (size 28), budget agents A027 (size 7), A028 (size 8), and A026 (size 9) have the smallest networks. A visualization of the measures in Figure 4.34.

The second column, ties or number of directed ties, is the number of connections among all the budget agents in the budget agent's (ego) network. Among the 28 budget agents in A006's (ego) network, there are 283 ties. For budget agent A019 there are 285 ties, for budget agent A024 there are 279 ties, and budget agent A029 there are 280 ties. For the smallest ego network budget agent A027 there are 32 ties.

The third column, number of ordered pairs, is the number of possible directed ties in each budget agent (ego) network. In budget agents A006, A019, A024, and A029s network there are 28 budget agents, so there are 28*27 (n*(n-1) or 756) possible directed ties. In the smallest ego network, there are seven budget agents, so there are 7*6 (n*(n-1) or 42) possible directed ties.

The fourth column, density, is calculated by dividing ties by pairs. This is the percentage of all possible ties in each ego network that are present. North Carolina's budget agent A027's network is connected or seeks information to three-fourths (76.19) of the budget agent network; this budget agent is embedded in a dense local structure. Budget agent A024 lives in a smaller world where the budget agent is connected or seeks information from little more than one-third (36.9) of the network. This budget agent's A024 density or the world is not as tightly connected as A027. This kind of difference in the constraints and opportunities facing budget agents in their local networks may have significant consequences.

The fifth column, an average of the reciprocal of geodesic distances (number of edges/relationships) between alters or the reciprocal of the mean of the shortest path lengths among all connected pairs in the budget agents (ego) network. If one or more pairs of alters cannot reach either other except through ego, this measure is undefined and will be blank. Budget agent A005 is directly connected to .82 agents, almost fully connected while the direct connections of A006, A024, and A029 are directly connected to .62 of the totals of being fully connected.

The sixth column, a diameter of a budget agent (ego) network is the length of the longest path between connected budget agents (just as it is for any network). A network diameter indexes the span or extensiveness of the network -- how far apart are the two furthest actors. In the North Carolina's table below, the largest diameter or most extensive distance is 4 for budget agents' (ego) networks A003, A004, A007, A015, A016, A017, and A018. The budget agents that are blank do not have relationships that make the path for the diameter.

The seventh column, number of weak components, is the largest number of budget agents who are connected, disregarding the direction of the ties (a strong component pays attention to the direction of the ties for directed data). North Carolina measures indicate that each budget agent (ego) is embedded in a single component neighborhood. This means, there are no budget agents' connections where the budget agent (ego) is the only relationship between otherwise disjointed sets of budget agents.

The eighth column for North Carolina, the pweakC measures are relatively small 3.57 to 14.29 so, no budget agents were identified as important for this measure.

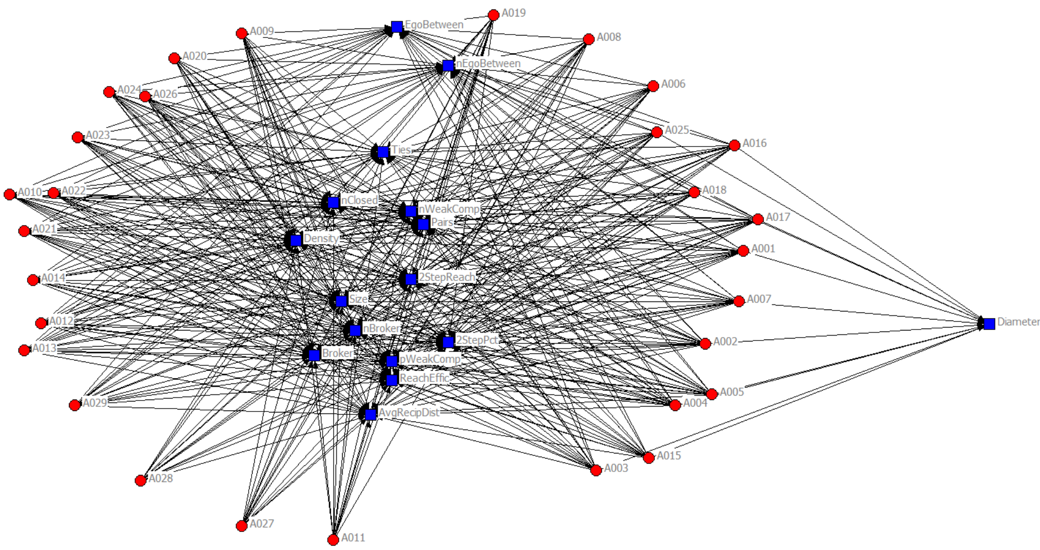
The ninth column, two-step reach or 2stepR, goes beyond ego's one-step neighborhood to report the percentage of all actors in the network within two directed steps of the budget agent. For North Carolina, all budget agents can get a message to all other budget agents within "friend-of-a-friend" because all agents have the same measure of 28.

The tenth column, reach efficiency norms, is the two-step reach by dividing it by size. The reach efficiency measures for North Carolina budget agents are low, the range from 5.81 to17.07.

Table 4. 21 North Carolina's Ego Network Basic measures

NC	Size	Ties	Pairs	Densit	AvgRec	Diamet	nWeakC	pWeakC	2StepR	2StepP	ReachE	Broker	nBroke	nClose	EgoBet	nEgoBe
A001	17	162	272	59.56	0.78	3	1	5.88	28	100	7.78	55	0.4	162	0.93	0.34
A002	19	187	342	54.68	0.76	3	1	5.26	28	100	7.2	77.5	0.45	187	6.37	1.86
A003	21	217	420	51.67	0.74	4	1	4.76	28	100	6.76	101.5	0.48	217	38.35	9.13
A004	20	199	380	52.37	0.73	4	1	5	28	100	6.9	90.5	0.48	199	59.26	15.59
A005	12	88	132	66.67	0.82	3	1	8.33	28	100	10.61	22	0.33	88	0.45	0.34
A006	28	283	756	37.43	0.62		1	3.57	28	100	5.81	236.5	0.63	283	39.98	5.29
A007	15	127	210	60.48	0.79	4	1	6.67	28	100	8.64	41.5	0.4	127	4.89	2.33
A008	16	126	240	52.5	0.71		1	6.25	28	100	8.83	57	0.47	126	6.7	2.79
A009	23	228	506	45.06	0.68		1	4.35	28	100	6.44	139	0.55	228	54.35	10.74
A010	13	84	156	53.85	0.69		1	7.69	28	100	10.37	36	0.46	84	4.17	2.67
A011	10	56	90	62.22	0.67		1	10	28	100	13.33	17	0.38	56	0	0
A012	12	70	132	53.03	0.7		1	8.33	28	100	11.76	31	0.47	70	5.7	4.32
A013	18	149	306	48.69	0.69		1	5.56	28	100	8.14	78.5	0.51	149	7.17	2.34
A014	10	56	90	62.22	0.74		1	10	28	100	14	17	0.38	56	1.67	1.85
A015	19	188	342	54.97	0.75	4	1	5.26	28	100	7.11	77	0.45	188	23.03	6.73
A016	18	180	306	58.82	0.77	4	1	5.56	28	100	7.31	63	0.41	180	6.78	2.21
A017	18	169	306	55.23	0.76	4	1	5.56	28	100	7.59	68.5	0.45	169	6.53	2.14
A018	19	191	342	55.85	0.76	4	1	5.26	28	100	7.11	75.5	0.44	191	14.57	4.26
A019	28	285	756	37.7	0.63		1	3.57	28	100	5.81	235.5	0.62	285	5.11	0.68
A020	22	219	462	47.4	0.7		1	4.55	28	100	6.62	121.5	0.53	219	5.09	1.1
A021	16	127	240	52.92	0.7		1	6.25	28	100	8.64	56.5	0.47	127	0.75	0.31
A022	24	249	552	45.11	0.69		1	4.17	28	100	6.26	151.5	0.55	249	37.27	6.75
A023	20	186	380	48.95	0.7		1	5	28	100	7.33	97	0.51	186	9.44	2.48
A024	28	279	756	36.9	0.62		1	3.57	28	100	5.81	238.5	0.63	279	73.39	9.71
A025	12	75	132	56.82	0.74	5	1	8.33	28	100	10.73	28.5	0.43	75	22.37	16.94
A026	9	43	72	59.72	0.65		1	11.11	28	100	13.08	14.5	0.4	43	0.33	0.46
A027	7	32	42	76.19	0.81		1	14.29	28	100	17.07	5	0.24	32	0	0
A028	8	39	56	69.64	0.73		1	12.5	28	100	14.89	8.5	0.3	39	0	0
A029	28	280	756	37.04	0.62		1	3.57	28	100	5.81	238	0.63	280	70.84	9.37

Figure 4. 34 North Carolina's Egonet Basic Measures



North Carolina's network concerning each measure provided.

Georgia

Georgia's ego-neighborhoods of budget agents another set off interesting characteristics. Table 4.22 there are several measures for each budget agent that participates in Georgia's budget process. The first column, size, is the number of nodes that are one-step out from the budget agent (ego) identified at the beginning of the row, plus ego itself. Budget agent C19 has the largest ego networks (size 19), budget agents C12 (size 0), C14 (size 0), C17 (size 0), C27 (size 0), and C31 (size 0) have the smallest networks. A visualization of the measures is in Figure 4.35.

The second column, ties or number of directed ties, is the number of connections among *all* the budget agents in the budget agent's (ego) network. Among the 16 budget agents in C19's (ego) network, there are 22 ties. For Georgia's smallest ego networks budget agent C1, C14, C17, C27, and C31 there are 0 ties.

The third column, number of ordered pairs, is the number of possible directed ties in each budget agent (ego) network. In budget agents C19's network there are 16 budget agents, so there are 16*15 (n*(n-1)) or 240 possible directed ties. In the smallest ego network, there are 0 budget agents, so there are 0*0 (n*(n-1)) or 0 possible directed ties.

The fourth column, density, is calculated by dividing ties by pairs. Georgia's budget agent C1 and C32 networks are connected or seek information from half (50) of the budget agents' network; both budget agents are embedded in moderately dense local structures. Budget agents C1, C14, C17, C27, and C31 live in a smaller world where they are not connected to the network. This kind of difference in the constraints and opportunities facing budget agents in their local networks may have significant consequences.

The fifth column, an average of the reciprocal of geodesic distances (number of edges/relationships) between alters or the reciprocal of the mean of the shortest path lengths among all connected pairs in the budget agents (ego) network. Budget agent C1 is directly connected to .5 of the total budget agents (half to being fully connected). The connections of C3, C5, C7, C12, C14, C17, C24, C27, C29, and C31 are not directly connected to the network; otherwise known as isolates.

The sixth column, a diameter of a budget agent (ego) network is the length of the longest path between connected budget agents (just as it is for any network). In Georgia's table below, the largest diameter or most extensive distance is 0 for budget agents' (ego) networks C3, C5, C7, C12, C14, C17, C24, C27, C29, and C31. The budget agents that are blank do not have information about their relationships which make the path for the diameter. There are no relationships that can span the diameter.

The seventh column, number of weak components, in the case of Georgia measures indicate that most budget agents (ego) are embedded in a single component neighborhood (C1, C2, C3, C4, C5, C7, C8, C9, C10, C11, C13, C15, C16, C20, C21, C22, C24, C25, C28, C29 C30, and C32. Georgia's budget agents C12, C14, C17, C27, and C31 do not have a neighborhood. While budget agents C18 and C19 have two component neighborhoods and C6 and C26 have a 3-component neighborhood.

The eighth column, the number of weak components divided by size, for Georgia the pweakC measures range from 0 to 100; This means budget agents with 100 are C3, C5, C7, C18, C24, and C29 are identified as important in connecting subgroups together. If one of the budget agents were removed with a pweakC of 100 it would break the network into two subgroups, if two were removed, then there would be three subgroups and so on.

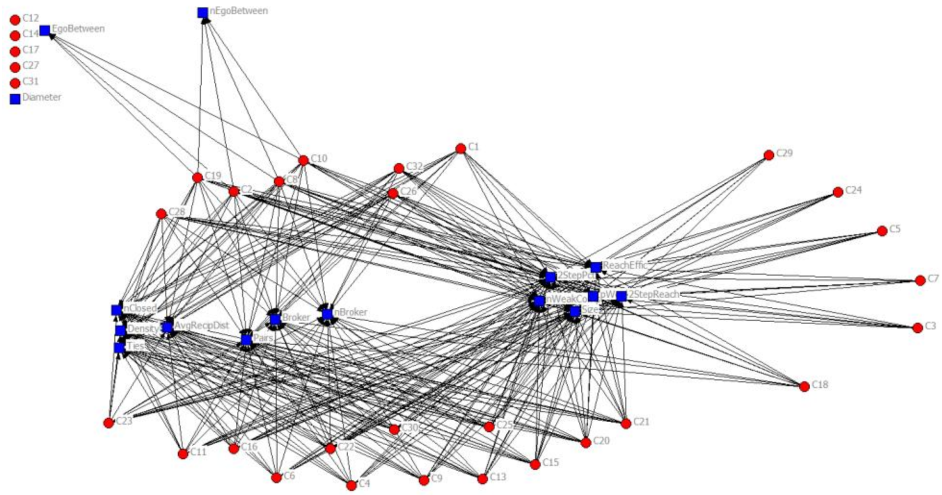
The ninth column, two-step reach, for Georgia, the two-step reach ranges from 0 to 24 which means that budget agents cannot get a message to all other budget agents within "friend-of-a-friend" distance. Budget agents C12, C14, C17, C27, and C31, are isolated and cannot reach any portion of the network. Budget agents C2 and C19 can reach 24% of the network within two steps.

The tenth column reaches efficiency norms; for Georgia budget agents have a high variance, the normalized measure ranges from 0% to 77.42%. Budget agents C12, C14, C17, C27, and C31, are isolated and cannot reach any portion of the network and budget agents C2 and C19 can reach 77.42% of the network. This implies that information exchanged distributes in a moderate non-redundant manner (there is some redundancy).

Table 4. 22 Georgia's Ego Network Basic Measures

GA	Size	Ties	Pairs	Density	AvgRec	Diamet	nWeakC	pWeakC	2StepR	2StepP	ReachE	Broker	nBroke	nClose	EgoBet	nEgoBe
C1	2	1	2	50	0.5		1	50	16	51.61	64	0.5	0.5	1	0	0
C2	9	12	72	16.67	0.23		1	11.11	24	77.42	40.68	30	0.83	12	7.5	10.42
C3	1	0	0		0	0	1	100	16	51.61	100	0		0	0	
C4	4	4	12	33.33	0.38		1	25	19	61.29	54.29	4	0.67	4	0	0
C5	1	0	0		0	0	1	100	4	12.9	100	0		0	0	
C6	4	1	12	8.33	0.08		3	75	8	25.81	66.67	5.5	0.92	1	0	0
C7	1	0	0		0	0	1	100	4	12.9	100	0		0	0	
C8	6	6	30	20	0.2		1	16.67	19	61.29	50	12	0.8	6	3	10
C9	4	5	12	41.67	0.46		1	25	22	70.97	48.89	3.5	0.58	5	0	0
C10	7	8	42	19.05	0.2		1	14.29	22	70.97	48.89	17	0.81	8	0.5	1.19
C11	2	1	2	50	0.5		1	50	14	45.16	70	0.5	0.5	1	0	0
C12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C13	2	1	2	50	0.5		1	50	18	58.06	78.26	0.5	0.5	1	0	0
C14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C15	3	2	6	33.33	0.42		1	33.33	23	74.19	65.71	2	0.67	2	0	0
C16	3	3	6	50	0.5		1	33.33	18	58.06	56.25	1.5	0.5	3	0	0
C17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C18	2	0	2	0	0		2	100	17	54.84	85	1	1	0	0	0
C19	16	22	240	9.17	0.12		2	12.5	24	77.42	32.43	109	0.91	22	23	9.58
C20	5	5	20	25	0.25		1	20	23	74.19	47.92	7.5	0.75	5	0	0
C21	2	1	2	50	0.5		1	50	18	58.06	78.26	0.5	0.5	1	0	0
C22	2	1	2	50	0.5		1	50	17	54.84	77.27	0.5	0.5	1	0	0
C23	7	5	42	11.9	0.12		3	42.86	19	61.29	50	18.5	0.88	5	0	0
C24	1	0	0		0	0	1	100	7	22.58	100	0		0	0	
C25	4	4	12	33.33	0.33		1	25	22	70.97	51.16	4	0.67	4	0	0
C26	13	16	156	10.26	0.11		3	23.08	22	70.97	34.92	70	0.9	16	0	0
C27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C28	5	4	20	20	0.2		1	20	14	45.16	51.85	8	0.8	4	0	0
C29	1	0	0		0	0	1	100	13	41.94	100	0		0	0	
C30	3	2	6	33.33	0.33		1	33.33	14	45.16	56	2	0.67	2	0	0
C31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C32	2	1	2	50	0.5		1	50	13	41.94	72.22	0.5	0.5	1	0	0

Figure 4. 35 Georgia’s Egonet Basic Measures



Georgia’s network concerning each measure provided.

Tennessee

Tennessee’s ego-neighborhoods of budget agents produces another set off interesting characteristics. Table 4.23 shows there are several measures for each budget agent that participates in Tennessee’s budget process. The first column, size, is the number of nodes that are one-step out from the budget agent (ego) identified at the beginning of the row, plus ego itself. Budget agent B19 and B27 have the largest ego networks (size 27), budget agents B20 (size 3) has the smallest networks. A visualization of the measures is in Figure 4.36.

The second column, ties or number of directed ties, is the number of connections among all the budget agents in the budget agent’s (ego) network. Among the 27 budget agents in C19’s (ego) network, there are 127 ties, and for budget agent B19 there are 127 ties. For Tennessee's smallest ego network budget agent B20 there are six ties.

The third column, number of ordered pairs, is the number of possible directed ties in each budget agent (ego) network. In budget agents B19's network there are 27 budget agents, so there are 27*26 (n*(n-1)) or 720 possible directed ties. In the smallest ego network, there are three budget agents, so there are 3*2 (n*(n-1)) or 6 possible directed ties.

The fourth column, density, for Tennessee's budget agents B12 and B14 networks are connected or seek information from 86.67% of the budget agents' network; both budget agents are embedded highly in dense local structures. Budget agent B20 lives in a smaller world where he/she is barely connected to the network. This kind of difference in the constraints and opportunities facing budget agents in their local networks may be very consequential.

The fifth column, an average of the reciprocal of geodesic distances, for budget agents B9 and B20 are directly connected to all the total budget agents (measure 1) while the direct connections of B19 have only direct connections with 29% of the network.

The sixth column, diameter of a budget agents (ego) network, in the case of Tennessee, the largest diameter or most extensive distance is 2 for budget agents' (ego) networks B1, B2, B3, B4, B5, B6, B8, B12, B14, B15, B21, B22, and B24. The budget agents with a diameter of 1 are B9 and B20. The budget agents that are blank do not have information about their relationships which make the path for the diameter. There are no relationships that can span the diameter.

The seventh column, number of weak components, is the most significant number of budget agents who are connected, indicated with a measure of 1 for all agents.

Tennessee measures indicate that all budget agents (ego) are embedded in a single component neighborhood.

The eighth column, number of week components, for Tennessee, pweakC measures range from 3.7 to 33.33; this means budget agent B27 connects 3.7% of the components. This agent can be removed with little to no disruption to a network connection. Budget agent B20 connects 33.33% of the components; there will be moderate disruption if this budget agent was removed.

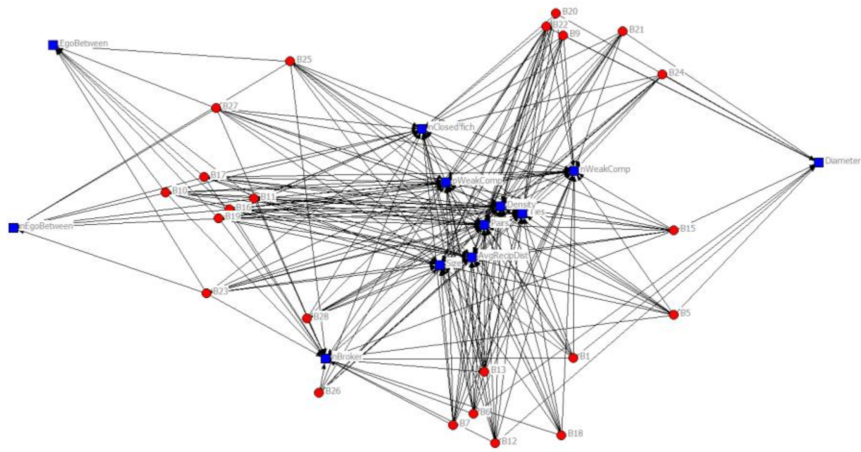
The ninth column, two-step reach goes beyond ego's one-step neighborhood to report the percentage of all actors in the whole network that is within two directed steps of the budget agent. For Tennessee, the two-step reach is 27 for all budget agents, and they can reach 27 out of 28 budget agents within "friend-of-a-friend" distance or 2 steps.

The tenth column, for Tennessee budget agents, has low variance, the normalized measure ranges from 10.55% to 34.18%. Budget agent B19 and B27 can only reach 10.55% of the network, and budget agent B20 can reach 34.18% of the network. This implies that information exchanged and repeated once or twice but is not a feedback loop.

Table 4. 23 Tennessee's Ego Network Basic Measures

TN	Size	Ties	Pairs	Density	AvgRec	Diamet	nWeakC	pWeakC	2StepR	2StepP	ReachE	Broker	nBroke	nClose	EgoBet	nEgoBe
B1	11	59	110	53.64	0.77	2	1	9.09	27	100	15.17	25.5	0.46	59	0	0
B2	10	53	90	58.89	0.79	2	1	10	27	100	15.79	18.5	0.41	53	0	0
B3	5	18	20	90	0.95	2	1	20	27	100	24.32	1	0.1	18	0	0
B4	5	18	20	90	0.95	2	1	20	27	100	23.48	1	0.1	18	0	0
B5	5	18	20	90	0.95	2	1	20	27	100	23.48	1	0.1	18	0	0
B6	7	35	42	83.33	0.92	2	1	14.29	27	100	18.75	3.5	0.17	35	0	0
B7	17	76	272	27.94	0.35		1	5.88	27	100	13.37	98	0.72	76	0	0
B8	9	45	72	62.5	0.81	2	1	11.11	27	100	17.53	13.5	0.38	45	0	0
B9	4	12	12	100	1	1	1	25	27	100	27.55	0	0	12	0	0
B10	19	82	342	23.98	0.3		1	5.26	27	100	12.92	130	0.76	82	2.62	0.77
B11	25	123	600	20.5	0.32		1	4	27	100	10.84	238.5	0.8	123	42.33	7.06
B12	6	26	30	86.67	0.93	2	1	16.67	27	100	21.26	2	0.13	26	0	0
B13	5	16	20	80	0.8		1	20	27	100	25.23	2	0.2	16	0	0
B14	6	26	30	86.67	0.93	2	1	16.67	27	100	20.45	2	0.13	26	0	0
B15	6	22	30	73.33	0.87	2	1	16.67	27	100	22.5	4	0.27	22	0	0
B16	12	65	132	49.24	0.54		1	8.33	27	100	14.36	33.5	0.51	65	0.25	0.19
B17	17	92	272	33.82	0.43		1	5.88	27	100	12.44	90	0.66	92	10.23	3.76
B18	5	12	20	60	0.6		1	20	27	100	28.72	4	0.4	12	0	0
B19	27	127	702	18.09	0.29		1	3.7	27	100	10.55	287.5	0.82	127	78.43	11.17
B20	3	6	6	100	1	1	1	33.33	27	100	34.18	0	0	6	0	0
B21	4	10	12	83.33	0.92	2	1	25	27	100	33.75	1	0.17	10	0	0
B22	9	45	72	62.5	0.81	2	1	11.11	27	100	16.77	13.5	0.38	45	0	0
B23	9	30	72	41.67	0.43		1	11.11	27	100	20	21	0.58	30	0.5	0.69
B24	5	15	20	75	0.88	2	1	20	27	100	29.03	2.5	0.25	15	0	0
B25	12	62	132	46.97	0.53		1	8.33	27	100	14.67	35	0.53	62	1.7	1.29
B26	5	12	20	60	0.6		1	20	27	100	27	4	0.4	12	0	0
B27	27	129	702	18.38	0.3		1	3.7	27	100	10.55	286.5	0.82	129	49.93	7.11
B28	7	29	42	69.05	0.7		1	14.29	27	100	20.3	6.5	0.31	29	0	0

Figure 4. 36 Tennessee's Egonet basic Measures



Tennessee's network concerning each measure provided.

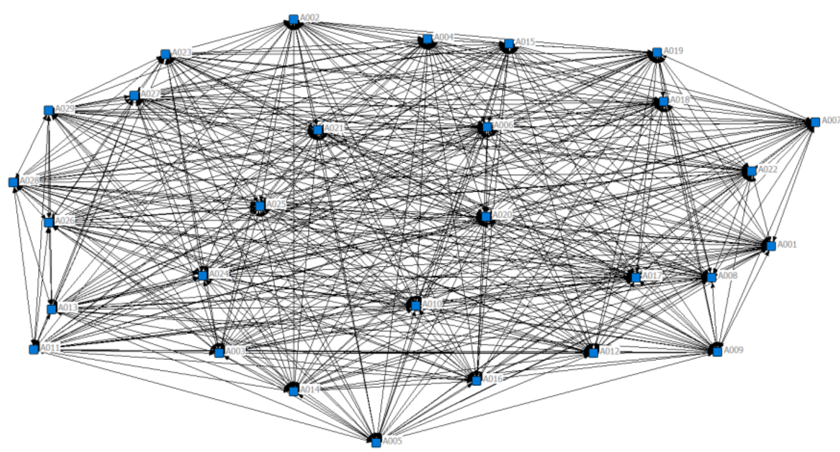
Reachability

Reachability between nodes is established by the existence of a path between the nodes which tells whether two actors are connected or not by way of either a direct or an indirect pathway of any length.

North Carolina

North Carolina's Q 14 table in Appendix I indicates every agent can reach every other agent, with the exception A27. However, A27 did not mark question 14. The connections are exhibited in the reachability network Figure 4.37.

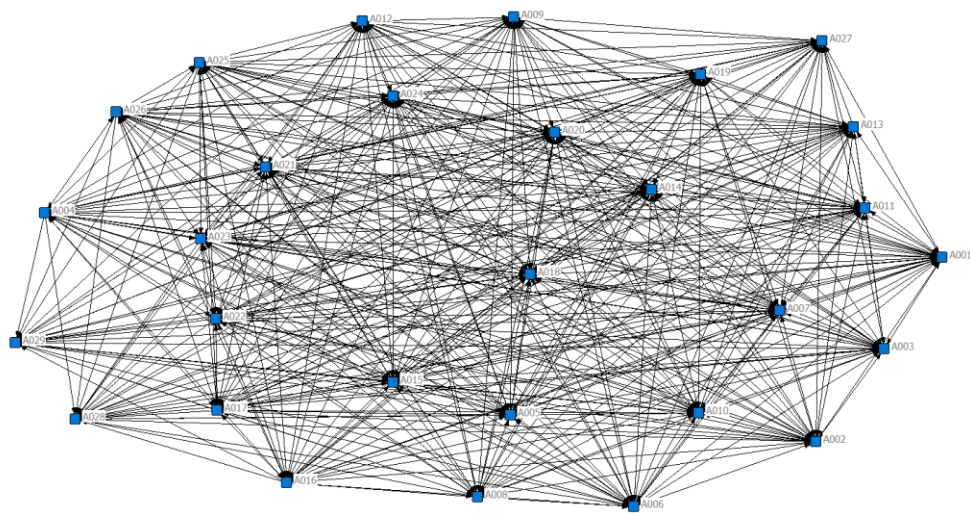
Figure 4. 37 North Carolina's Q 14 Reachability connections.



North Carolina's reachability network for Q 14. As with most of North Carolina's Network diagrams, it appears fully connected. While A27 did not indicate reach, the agent was marked as reachable by other agents

North Carolina’s Q 19, Appendix J indicates that all agents can reach other agents with the exception agents A027, A028, and A029. Since those agents did not complete the question, there is a possibility that the three agents can reach other agents. The connections are exhibited in the reachability network Figure 4.38.

Figure 4. 38 North Carolina’s Q 19 Reachability connections

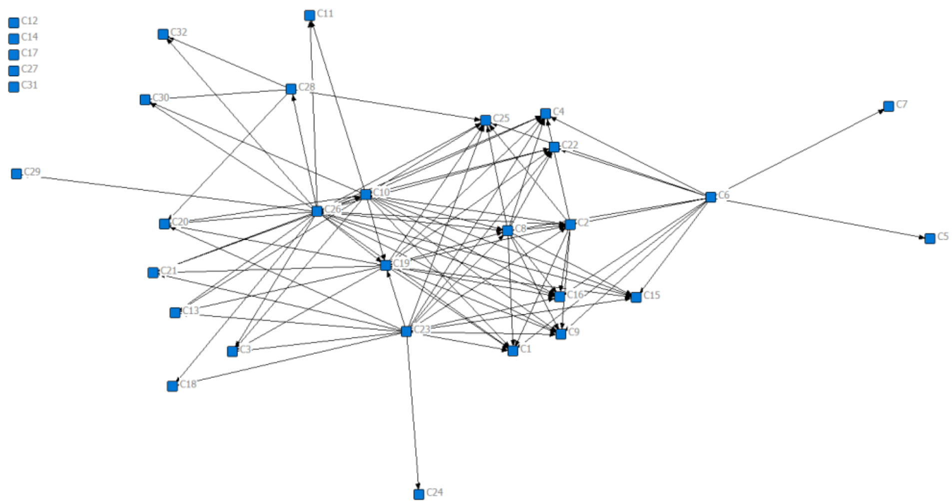


North Carolina's Reachability network for Q 19. While the overall appearance is similar to North Carolina's Q 14, you can notice some variance in the outer parameter in the upper right-hand corner and the agents are not in the same positions.

Georgia

Georgia's Q 14 table in Appendix I indicates the agent C27 is the only agent that can reach most other agents. The connections are sporadic indicated on agents C2, C6, C8, C10, C19, C23, C26, and C28. All other agents do not appear to be able to reach other agents. The connections are exhibited in the reachability network Figure 4.39.

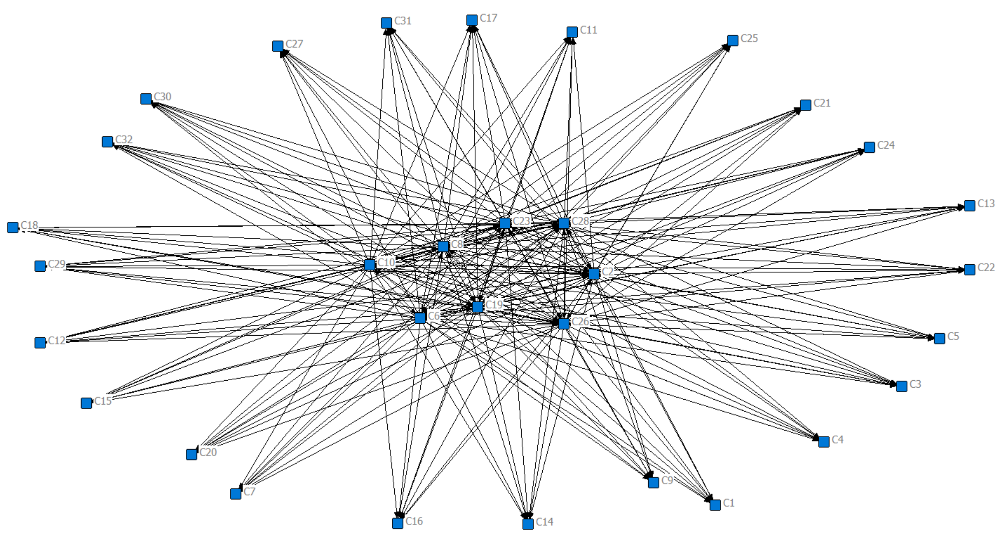
Figure 4. 39 Georgia's Q 14 Reachability connections



Georgia's budget agents reach for Q 14. On the upper left are the agents that are the isolates. All other agents are reachable by some of the networks. The shape is created by agents network connections of whom they can reach and who can reach them.

Georgia's Q 19, Appendix J indicates the agents C2, C6, C8, C10, C19, C23, C26, and C28 are connected to every other agent. All other agents do not appear to be able to reach other agents. The connections are exhibited in the reachability network Figure 4.40.

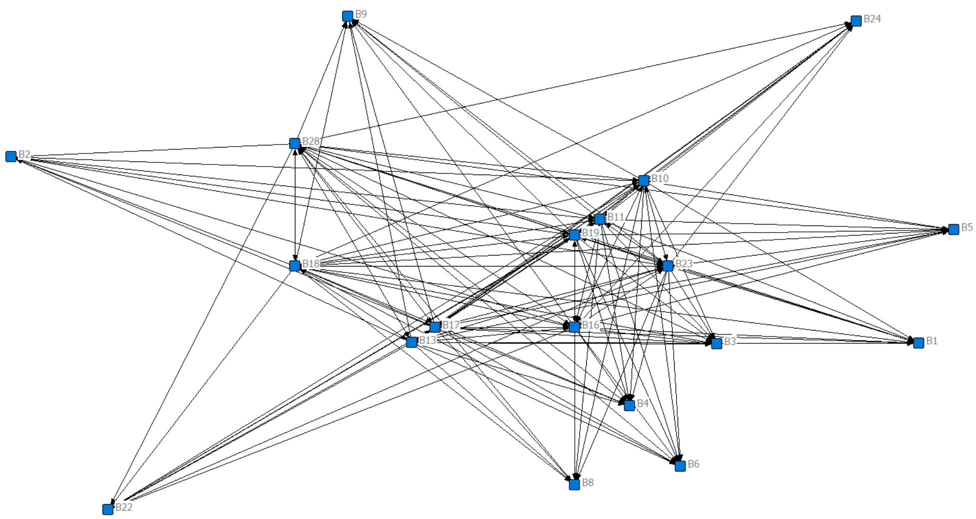
Figure 4. 40 Georgia's Q 19 Reachability connections



Georgia' Q 19 reachability network. Seen are eight agents that can reach the other agents grouped in the center of the circle. The outer ring is the agents that have zero reaches.

Tennessee’s Q 14 table in Appendix I indicates the agents B7, B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28 can reach every other agent. All other agents do not appear to be able to reach other agents. This could change if all agents participated. The connections are exhibited in the reachability network Figure 4.41.

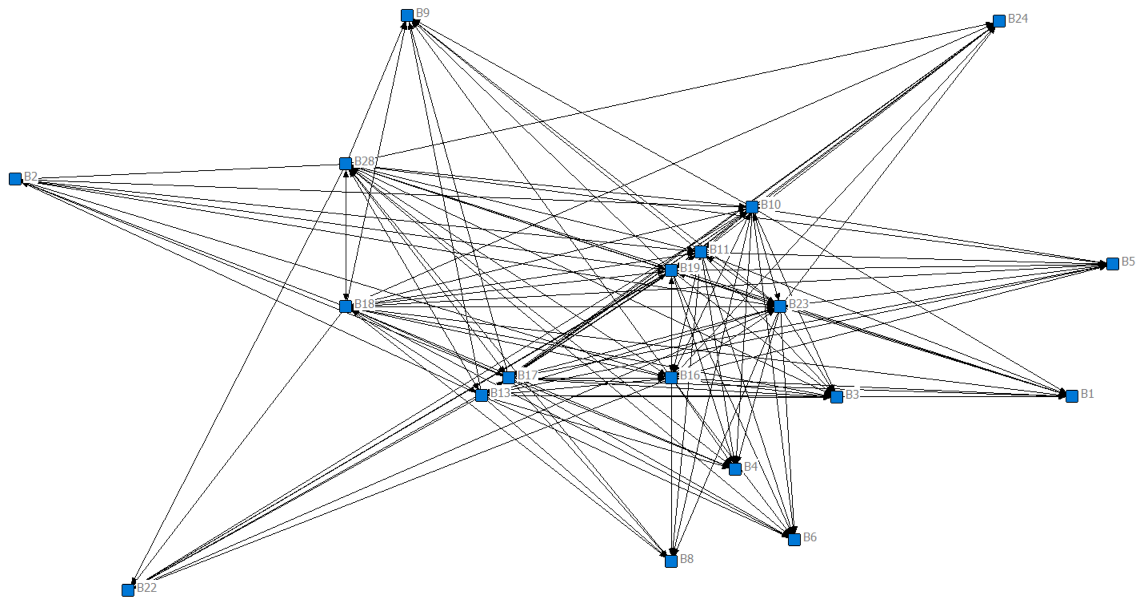
Figure 4. 41 Tennessee’s Q 14 Reachability connections.



Tennessee's reachability for question 14. The 19 agents that can reach and is reachable create a unique design according to the relational ties.

Tennessee’s question 19, the table in Appendix J indicates the agents B7, B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28 can reach every other agent. All other agents do not appear to be able to reach other agents. This could change if all agents had participated in the survey. The connections are exhibited in the reachability network Figure 4.42.

Figure 4. 42 Tennessee's Q 19 Reachability connections



Tennessee's reachability for Q 19. The 19 agents that can be reached and are reachable create a unique design according to the relational ties that are very similar to Tennessee's Q 14.

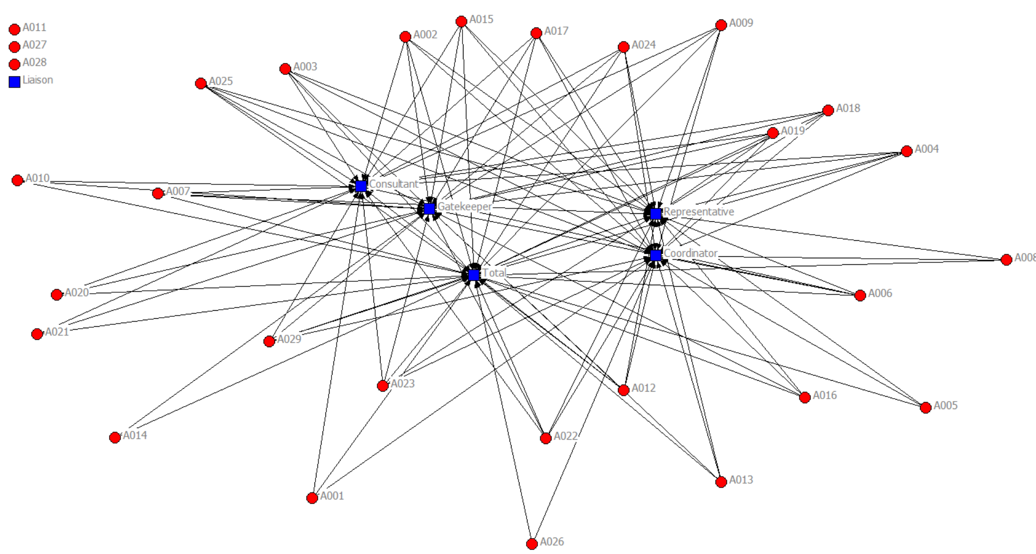
Brokerage

Brokerage information exchange relationships are relationships between disorganized others (Haythornthwaite, 1996, pp. 335). This position allows information to flow from one group of the budget agent to another group that may otherwise be separated. Another name for the broker would be gatekeeper because this budget agent would have the potential of controlling the flow of information from and to other budget agents (Hanneman & Riddle, 2005). Sometimes the broker may be connected to only a few other budget agents but because of their position within the structure of the network can have a disproportionate amount of influence or power between groups.

North Carolina

For North Carolina, budget agent A029 has 238 pairs of neighbors (Table 4.24). However, the normalized brokerage role depends on all possible connections in its network. This normalized number for A029 is 60 percent. This measure suggests that A029 brokers the flow of information between budget agents in its ego network or neighborhood. If budget agent A029 were removed from the network, the network would experience a significant disruption in information flow. Budget agent A027 has five pairs of neighbors. However, the normalized brokerage role depends on all possible connections in its network. This normalized number for A027 is 20 percent. This measure suggests that A027 does not broker the flow of information between budget agents in its ego network/neighborhood. If budget agent A027 were removed from the network, the network would experience a slight disruption in information flow. Visualization of the Gould and Fernandez Brokerage network is in Figure 4.43.

Figure 4. 43 North Carolina's Gould & Fernandez Brokerage Network



North Carolina's agents in the relation of each node to the different types of broker roles.

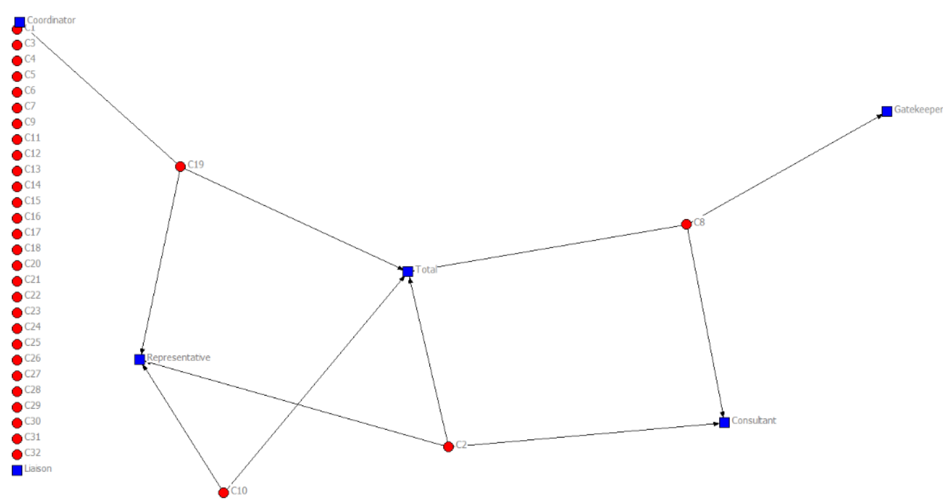
Table 4. 24 North Carolina's Ego Network Basic Network Brokerage measures

	Broker	nBroke
A001	55	0.4
A002	78	0.5
A003	102	0.5
A004	91	0.5
A005	22	0.3
A006	237	0.6
A007	42	0.4
A008	57	0.5
A009	139	0.6
A010	36	0.5
A011	17	0.4
A012	31	0.5
A013	79	0.5
A014	17	0.4
A015	77	0.5
A016	63	0.4
A017	69	0.5
A018	76	0.4
A019	236	0.6
A020	122	0.5
A021	57	0.5
A022	152	0.6
A023	97	0.5
A024	239	0.6
A025	29	0.4
A026	15	0.4
A027		0.2
A028	8.5	0.3
A029	238	0.6

Georgia

In the case of Georgia budget agent C19 has 109 pairs of neighbors (Table 4.25). However, the normalized brokerage role depends on all possible connections in its network. This normalized number for C19 is 91 percent. This measure suggests that C19 brokers the flow of information between budget agents in its ego network or neighborhood. If budget agent C19 were removed from the network, the network would experience a significant disruption in information flow. Budget agent C3, C5, C7, C12, C14, C17, C24, C27, C29, and C31 0 pairs of neighbors. However, the normalized brokerage role depends on all possible connections in its network. This normalized number for C7, C12, C14, C17, C24, C27, C29, and C31 is 0 percent. This measure suggests that C3, C5, C7, C12, C14, C17, C24, C27, C29, and C31 do not broker the flow of information between budget agents in their ego network/neighborhood. If these budget agents were removed from the network, the network would experience no disruption in information flow. The visualization of the Gould and Fernandez Brokerage network is in Figure 4.44.

Figure 4. 44 Georgia's Gould & Fernandez Brokerage Network



Georgia's agents concerning each node to the different types of broker roles.

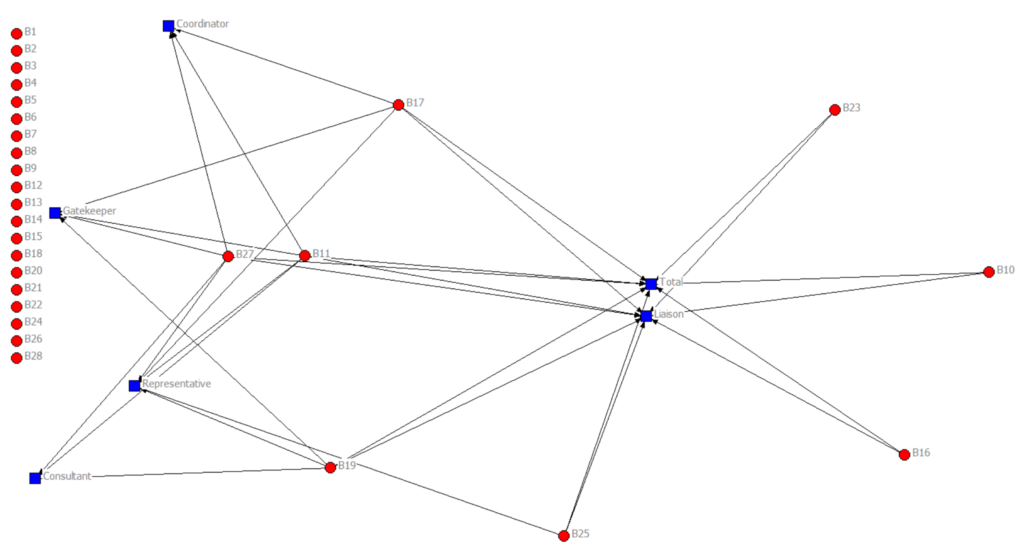
Table 4. 25 Georgia's Ego Network Basic Network Brokerage measures

	Broker	nBroke
C1	0.5	0.5
C2	30	0.8
C3	0	
C4	4	0.7
C5	0	
C6	5.5	0.9
C7	0	
C8	12	0.8
C9	3.5	0.6
C10	17	0.8
C11	0.5	0.5
C12	0	0
C13	0.5	0.5
C14	0	0
C15	2	0.7
C16	1.5	0.5
C17	0	0
C18	1	1
C19	109	0.9
C20	7.5	0.8
C21	0.5	0.5
C22	0.5	0.5
C23	19	0.9
C24	0	
C25	4	0.7
C26	70	0.9
C27	0	0
C28	8	0.8
C29	0	
C30	2	0.7
C31	0	0
C32	0.5	0.5

Tennessee

For Tennessee, budget agent B19 has 287.5 pairs of neighbors (Table 4.26). However, the normalized brokerage role depends on all possible connections in its network. This normalized number for B19 is 82 percent. This measure suggests that B19 brokers the flow of information between budget agents in its ego network or neighborhood. If budget agent B19 were removed from the network, the network would experience a significant disruption in information flow. Budget agent B9 and B20 0 pairs of neighbors. However, the normalized brokerage role depends on all possible connections in its network. This normalized number for B9 and B20 is 0 percent. This measure suggests that B9 and B20 do not broker the flow of information between budget agents in their ego network/neighborhood. If these budget agents were removed from the network, the network would experience no disruption in information flow. The visualization of the Gould and Fernandez Brokerage network is in Figure 4.45.

Figure 4. 45 Tennessee's Gould & Fernandez Brokerage Network



Tennessee's agents concerning each node to the different types of broker roles.

Table 4. 26 Tennessee's Ego Network Basic Network Brokerage measures

	Broker	nBroke
B1	26	0.5
B2	19	0.4
B3	1	0.1
B4	1	0.1
B5	1	0.1
B6	3.5	0.2
B7	98	0.7
B8	14	0.4
B9	0	0
B10	130	0.8
B11	239	0.8
B12	2	0.1
B13	2	0.2
B14	2	0.1
B15	4	0.3
B16	34	0.5
B17	90	0.7
B18	4	0.4
B19	288	0.8
B20	0	0
B21	1	0.2
B22	14	0.4
B23	21	0.6
B24	2.5	0.3
B25	35	0.5
B26	4	0.4
B27	287	0.8
B28	6.5	0.3

Betweenness

Betweenness is an aspect of the broader concept of "centrality." Ego is "between" two other actors if ego lies on the shortest directed path from one to the other. The ego betweenness measure indexes the percentage of all geodesic paths from alter to alter that pass-through ego.

(UCINET information accessed from http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

Normalized Betweenness compares the actual betweenness of ego to the maximum possible betweenness in the neighborhood of the size and connectivity of egos. The "maximum" value for betweenness would be achieved where ego is the center of a "star" network; that is, no neighbors communicate directly with one another, and all directed communications between pairs of neighbors go through ego. Ego betweenness centrality and normalized ego betweenness centrality measure indicates how many times each ego crosses the shortest paths budget agents reaching each other. A budget agent with a high betweenness centrality implies a position at the crossroads of information exchange (sending/receiving information) and carries the potential of transformative insights. The normalized betweenness indicates how likely budget agents are likely to be at the center of a star-network where all budget agents inquire with ego (a particular budget agent) but not each other. Normalization allows for comparison of networks with different population sizes. High measures suggest a role at the crossroads of different inquiries that are otherwise invisible to each other.

(UCINET information accessed at http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html)

North Carolina

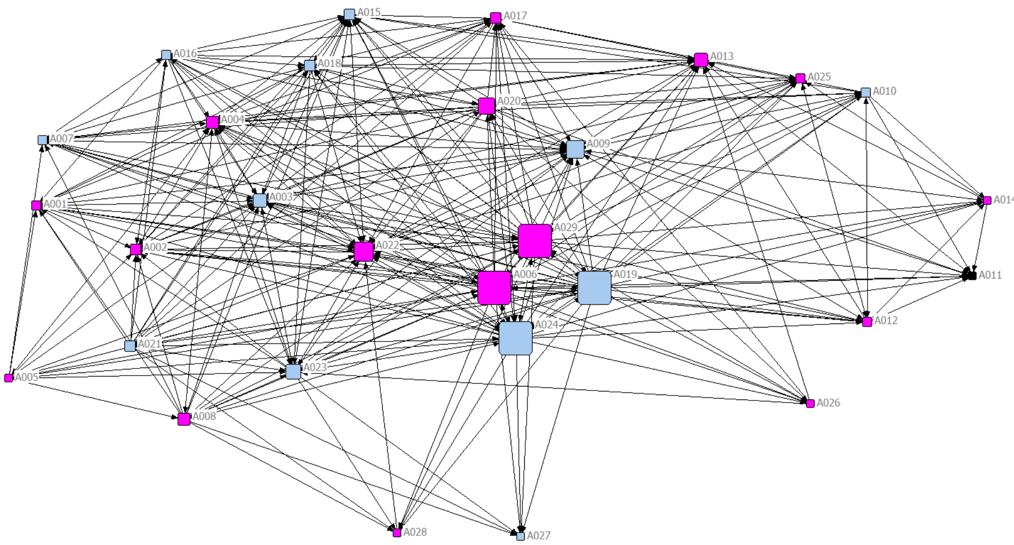
North Carolina's budget agents A011, A027, and A028 are not on any paths with an ego betweenness and normalized ego betweenness measure of 0 (Table 4.27 & Figure 4.46). Budget agent A024 has an ego betweenness of 73 which means the agent is between

73 other budget agents. North Carolina's budget agents have a normalized ego network betweenness centrality measure range of 0 to 16.94. The measure of 0 for budget agents A011, A027, and A028 mean they do not connect or lie between any other budget agents. Budget agent A025 has a measure of 16.94, which means they lie between 16.94% of budget agents.

Table 4. 27 North Carolina's Ego Network betweenness

NC	EgoBet	nEgoBe
A001	0.9	0.34
A002	6.4	1.86
A003	38	9.13
A004	59	15.59
A005	0.5	0.34
A006	40	5.29
A007	4.9	2.33
A008	6.7	2.79
A009	54	10.74
A010	4.2	2.67
A011	0	0
A012	5.7	4.32
A013	7.2	2.34
A014	1.7	1.85
A015	23	6.73
A016	6.8	2.21
A017	6.5	2.14
A018	15	4.26
A019	5.1	0.68
A020	5.1	1.1
A021	0.8	0.31
A022	37	6.75
A023	9.4	2.48
A024	73	9.71
A025	22	16.94
A026	0.3	0.46
A027	0	0
A028	0	0
A029	71	9.37

Figure 4. 46 North Carolina's Betweenness Centrality Measure



North Carolina's Betweenness Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node concerns the agent's Betweenness centrality. The larger the node, the higher the centrality.

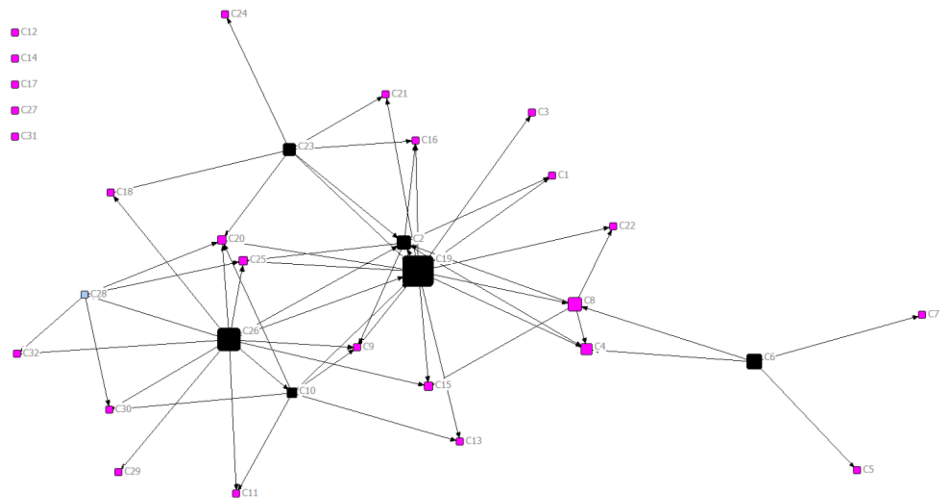
Georgia

Georgia's budget agents C1, C3, C4, C5, C6, C7, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21. C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, and C32 are not on any paths with an ego betweenness and normalized ego betweenness measure of 0 or blank (Table 4.28 & Figure 4.47). Budget agent C19 has an ego betweenness of 23 which means the agent is between 23 other budget agents. Georgia budget agents have a normalized ego network betweenness centrality measure range of 0 or blank to 10.42. The measure of 0 or blank measures are for budget agents C1, C3, C4, C5, C6, C7, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21. C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, and C32 means they do not connect or lie between any other budget agent's information exchange paths. Budget agent C2 has a measure of 10.42, which means they lie between 10.42% of budget agents.

Table 4. 28 Georgia's Ego Network betweenness

GA	EgoBet	nEgoBe
C1	0	0
C2	7.5	10.42
C3	0	
C4	0	0
C5	0	
C6	0	0
C7	0	
C8	3	10
C9	0	0
C10	0.5	1.19
C11	0	0
C12	0	0
C13	0	0
C14	0	0
C15	0	0
C16	0	0
C17	0	0
C18	0	0
C19	23	9.58
C20	0	0
C21	0	0
C22	0	0
C23	0	0
C24	0	
C25	0	0
C26	0	0
C27	0	0
C28	0	0
C29	0	
C30	0	0
C31	0	0
C32	0	0

Figure 4. 47 Georgia's Betweenness centrality Measure



Georgia's Betweenness Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node concerns the agent's Betweenness centrality. The larger the node, the higher the centrality.

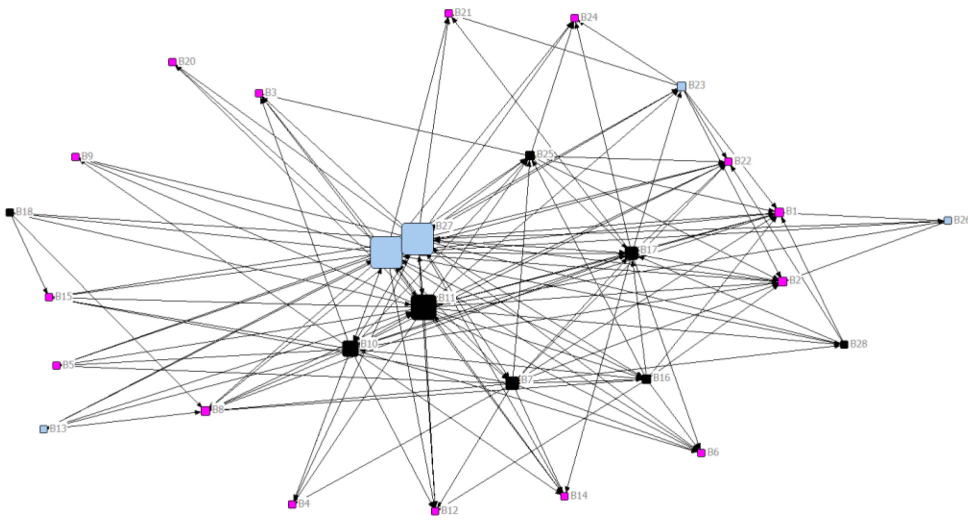
Tennessee

Tennessee's budget agents B1, B2, B3, B4, B5, B6, B7, B8, B9, B12, B13, B14, B15, B18, B20, B21, B22, B24, B26, B28 are not on any paths with an ego betweenness and normalized ego betweenness measure of 0. Budget agent B11 has an ego betweenness of 78.43 which means the agent is between 78.43 other budget agents. Tennessee budget agents have a normalized ego network betweenness centrality measure range of 0 to 11.17. Budget agent B19 has a normalized ego network betweenness measure of 11.17, which means the agent lies between 11.17% of budget agents. (Table 4.29 & Figure 4.48)

Table 4. 29 Tennessee's Ego Network betweenness

TN	EgoBet	nEgoBe
B1	0	0
B2	0	0
B3	0	0
B4	0	0
B5	0	0
B6	0	0
B7	0	0
B8	0	0
B9	0	0
B10	2.6	0.8
B11	42	7.1
B12	0	0
B13	0	0
B14	0	0
B15	0	0
B16	0.3	0.2
B17	10	3.8
B18	0	0
B19	78	11
B20	0	0
B21	0	0
B22	0	0
B23	0.5	0.7
B24	0	0
B25	1.7	1.3
B26	0	0
B27	50	7.1
B28	0	0

Figure 4. 48 Tennessee's Betweenness Centrality Measure



Georgia's Betweenness Centrality. The color of the nodes indicates gender (female=pink, male=blue, no-response=black. The size of the node concerns the agent's Betweenness centrality. The larger the node, the higher the centrality.

Strength of Tie

Strength of Ties describes the ties or relationship of information exchange between the budget agents. This measure, in general, can depend on the number and types of relationships which a pair maintains and the strength of each relationship (Haythornthwaite, 1996, p. 327). In network science, reciprocity is a measure of the likelihood of budget agents in a directed network to be mutually linked. Reciprocity is a quantitative measure used to study complex networks (Hanneman & Riddle, 2005). Using UCINET, this will be measured using the Reciprocity and homophily measures.

Reciprocity

For reciprocity, with directed data, there are four possible dyadic relationships: A and B are not connected, A sends to B, B sends to A, or A and B send to each other. A mutual interest in reviewing directed dyadic relationships is the extent to which ties are reciprocated. In UCINET the reciprocity measure has three reciprocity measures, Arc, Dyad, and Hybrid. For this study arc-based and dyad-based will be used. An arc is an ordered pair (x,y) where x sends a tie to y. An arc (x,y) is said to be reciprocated if the arc (y,x) is also present (Arc Reciprocity = R/(R+U)). Of all dyads in which there is at least one arc (i.e., either x-->y or y-->x), what proportion are symmetric? i.e., what proportion have both x-->y and y-->x (Reciprocity = R/(R+2U))? Some researchers believe there is an equilibrium inclination toward dyadic relationships to be either null or reciprocated, and that unbalanced relationships could be unstable. A network that has a numerousness of null or reciprocated relationships over asymmetric connections may be a more "equal" or "stable" network than one with numerousness asymmetric connections (which might be more of a hierarchy). (UCINET information accessed from http://faculty.ucr.edu/~hanneman/nettext/C18_Statistics.html)

Homophily

Homophily refers to the tendency for people to have positive relationships with people who are like themselves in socially significant ways. Homophily limits people's social worlds in a way that has powerful implications for the information they receive, the attitudes they form, and the interactions they experience. Relationships between non-similar budget agents can break at a higher rate, which sets the stage for the formation of niches or specialized functions within social networks.

Reciprocity

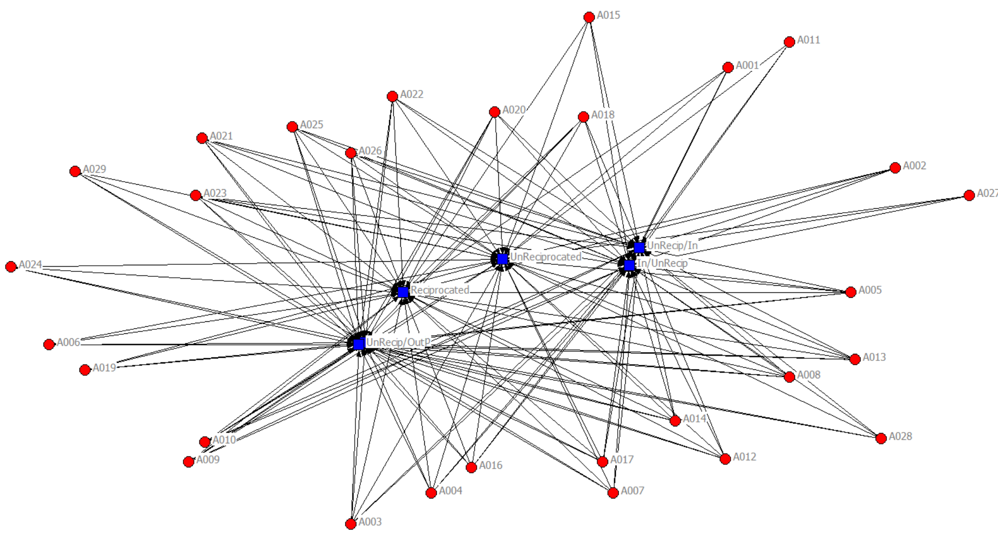
North Carolina

For North Carolina, of all pairs of actors, or dyad reciprocity, measured by binary data (Q 14) of whether there is a relationship that has any connection, 24.7% (see Table 4.30) of the pairs have a dyadic arc reciprocated connection (visual can be seen Figure 4.49). This on the "low" end and does suggest a small degree of institutionalized horizontal connection within this organizational population. The arc method of "arc" reciprocity (not shown here) yields a result of .3962 (Table 4.30). That is, of all the relations in the network, 39.62% are parts of reciprocated information exchange relationships (Figure 4.50).

Table 4. 30 North Carolina Reciprocity Measures

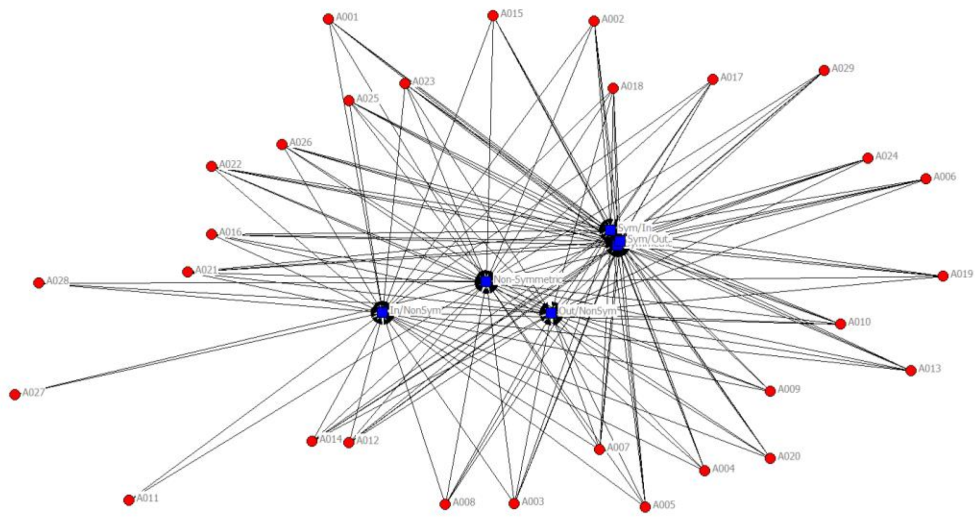
NC	Measures
Recip Arcs	126
Unrecip Arcs	192
All Arcs	318
Arc Reciprocity	0.3962
Sym Dyads	63
Asym Dyads	192
All Dyads	255
Dyad Reciprocity	0.247

Figure 4. 49 North Carolina Q 14 Arc Based Reciprocity



Each agent connected to each of the arc reciprocity measures.

Figure 4. 50 North Carolina Q 14 Dyad Based Reciprocity



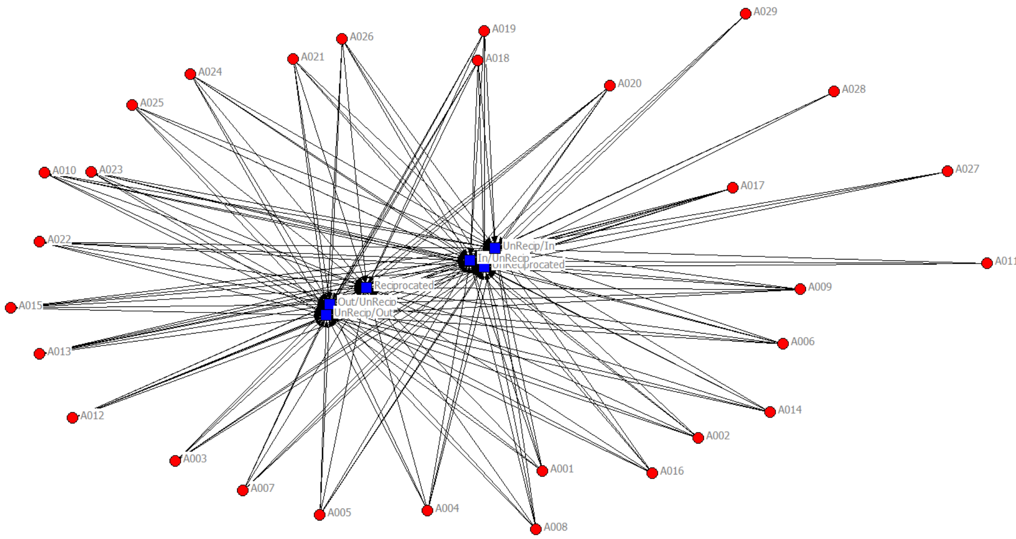
Each agents connection to each of the dyadic reciprocity measures.

For North Carolina, of all pairs of budget agents, or dyad reciprocity, measured by valued data (Q 19) of the type of relationship that has any connection, 75% (Table 4.31) of the pairs have a dyadic arc reciprocated connection (Visual can be seen Figure 4.51). This on the "high" end and does suggest a high degree of institutionalized horizontal information exchange relationships within this organizational population. The arc method of "arc" reciprocity (not shown here) yields a result of .857 (Table 4.31). That is, of all the relations in the network, 85.7% are parts of reciprocated information exchange relationships (Figure 4.52).

Table 4. 31 North Carolina's Q 19 Reciprocity Measures

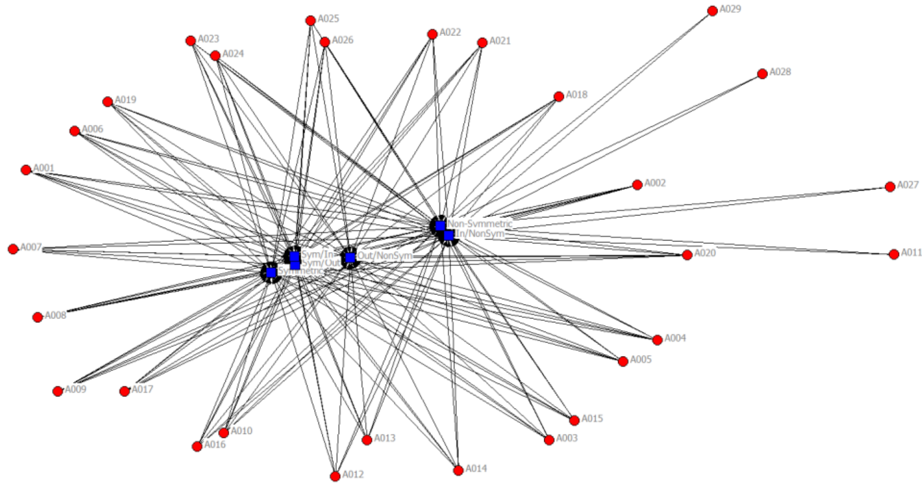
NC	Measures
Recip Arcs	600
Unrecip Arcs	100
All Arcs	700
Arc Reciprocity	0.857
Sym Dyads	300
Asym Dyads	100
All Dyads	400
Dyad Reciprocity	0.75

Figure 4. 51 North Carolina Q 19 Arc Based Reciprocity



Each agents connection to each of the arc reciprocity measures.

Figure 4. 52 North Carolina Q 19 Dyad Based Reciprocity



Each agents connection to each of the dyadic reciprocity measures.

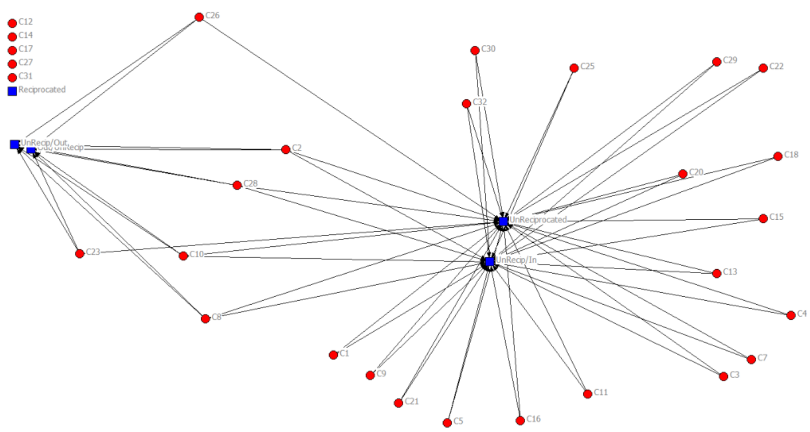
Georgia

For Georgia, of all pairs of actors that have any connection, measured by binary data (Q 14) of whether there is a relationship 0% (see Table 4.32) of the pairs have a dyadic arc reciprocated connection (Figure 4.53). There are no reciprocated connections and no degree of institutionalized horizontal connection within this organizational population. The arc method of "arc" reciprocity (not shown here) yields a result of .0 (Table 4.32). That is, of all the relations in the network, 0% are parts of reciprocated information exchange relationships (Figure 4.54).

Table 4. 32 Georgia's Reciprocity Measures

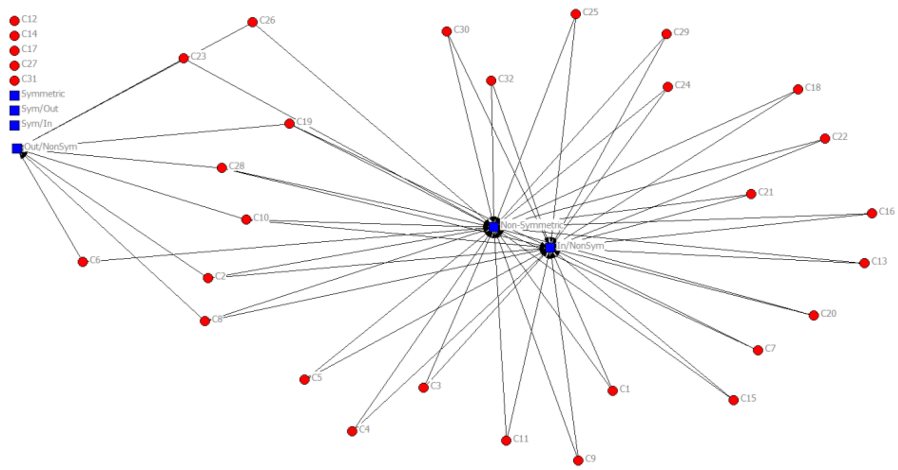
GA	Measures
Recip Arcs	0
Unrecip Arcs	56
All Arcs	56
Arc Reciprocity	0
Sym Dyads	0
Asym Dyads	56
All Dyads	56
Dyad Reciprocity	0

Figure 4. 53 Georgia Q 14 Arc Based Reciprocity



Each agents connection to each of the arc reciprocity measures.

Figure 4. 54 Georgia Q 14 Dyad Based Reciprocity



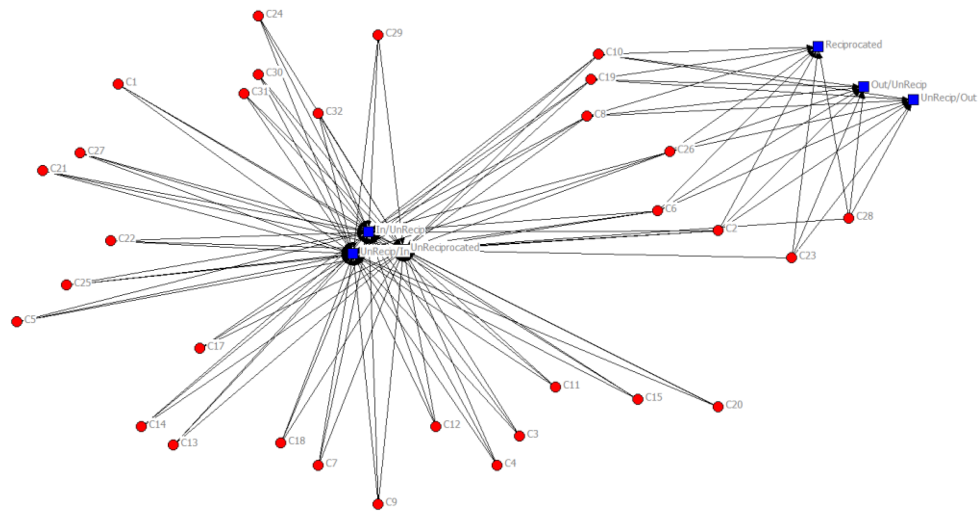
Each agents connection to each of the dyadic reciprocity measures.

For Georgia, of all pairs of actors, or dyad reciprocity, measured by valued data (Q 19) of the type of relationship that has any connection, 12.4% (Table 4.33) of the pairs have a dyadic arc reciprocated connection (Figure 4.55). This on the "low" end and does suggest a small degree of institutionalized horizontal connection within this organizational population. The arc method of "arc" reciprocity (not shown here) yields a result of .221 (Table 4.33). That is, of all the relations in the network, 22.1% are parts of reciprocated information exchange relationships (Figure 4.56).

Table 4. 33 Georgia's Q 19 Reciprocity Measures

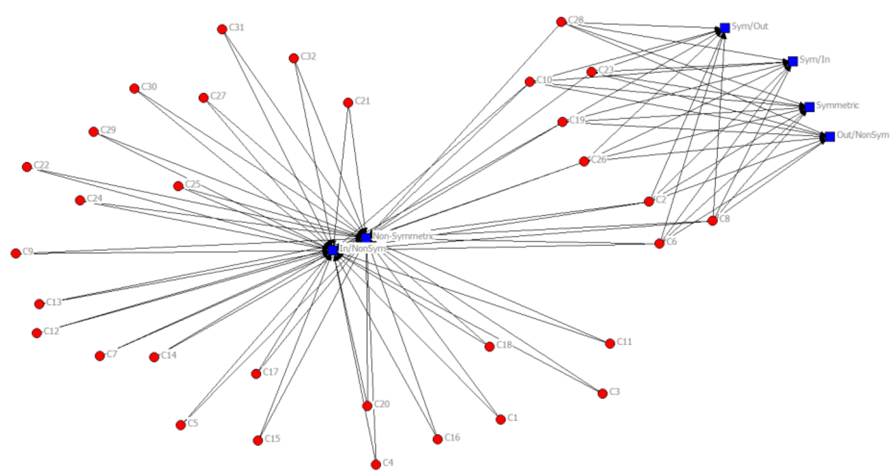
GA	Measures
Recip Arcs	54
Unrecip Arcs	190
All Arcs	244
Reciprocity	0.221
Sym Dyads	27
Asym Dyads	190
All Dyads	217
Reciprocity	0.124

Figure 4. 55 Georgia Q 19 Arch Based Reciprocity



Each agents connection to each of the arc reciprocity measures.

Figure 4. 56 Georgia Question 19 Dyad Based Reciprocity



Each agents connection to each of the dyadic reciprocity measures.

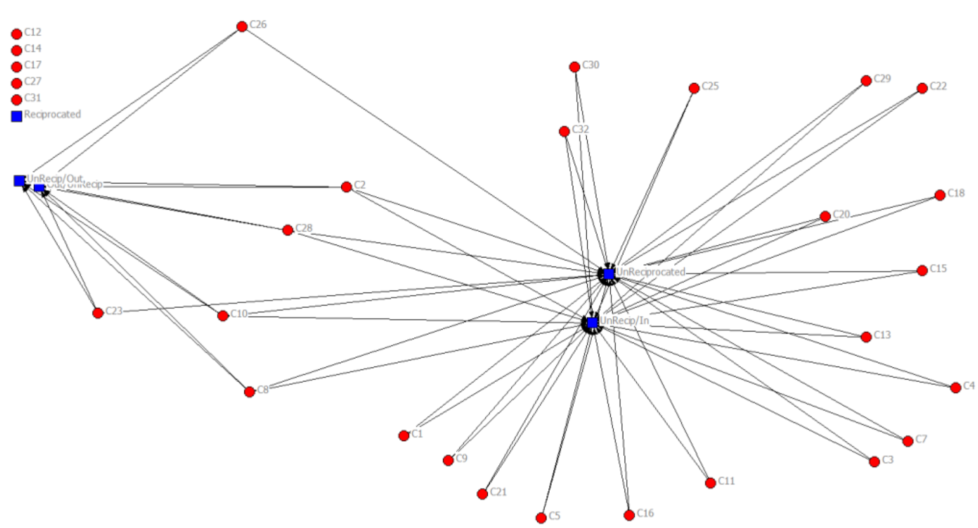
Tennessee

For Tennessee, of all pairs of actors that have any connection, measured by binary data (Q 14) of whether there is a relationship 16.3% (Table 4.34) of the pairs have a dyadic arc or reciprocated connection. This on the "low" end and does suggest a minimal degree of institutionalized horizontal connection within this organizational population (Figure 4.57). The arc method of "arc" reciprocity yields a result of .2805 (Table 4.34). That is, of all the relations in the graph, 28.05% are parts of reciprocated information exchange relationships (Figure 4.58).

Table 4. 34 Tennessee's Arc Reciprocity Measures

TN	Measure
Recip Arcs	46
Unrecip Arcs	118
All Arcs	164
Arc Reciprocity	0.2805
Sym Dyads	23
Asym Dyads	118
All Dyads	141
Dyad Reciprocity	0.163

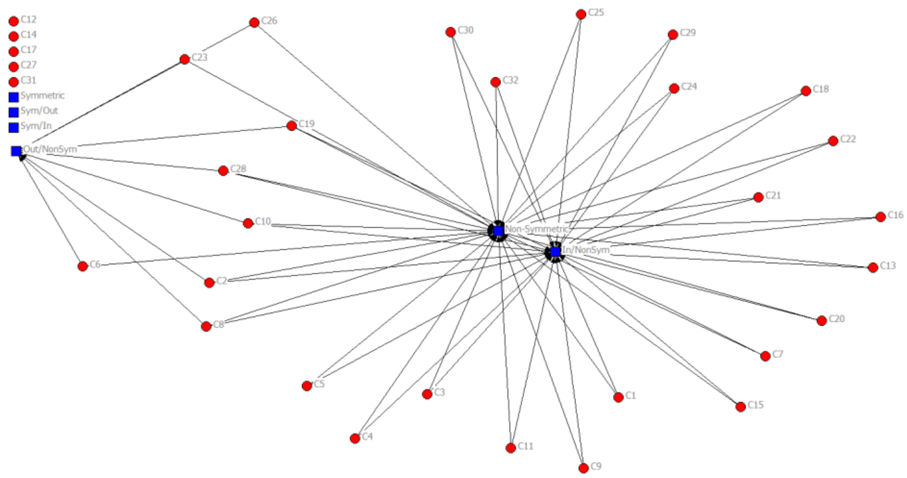
Figure 4. 57 Tennessee Q 14 Arc Based Reciprocity



Each agents connection to each of the arc reciprocity measures

.

Figure 4. 58 Tennessee Q 14 Dyad Based Reciprocity



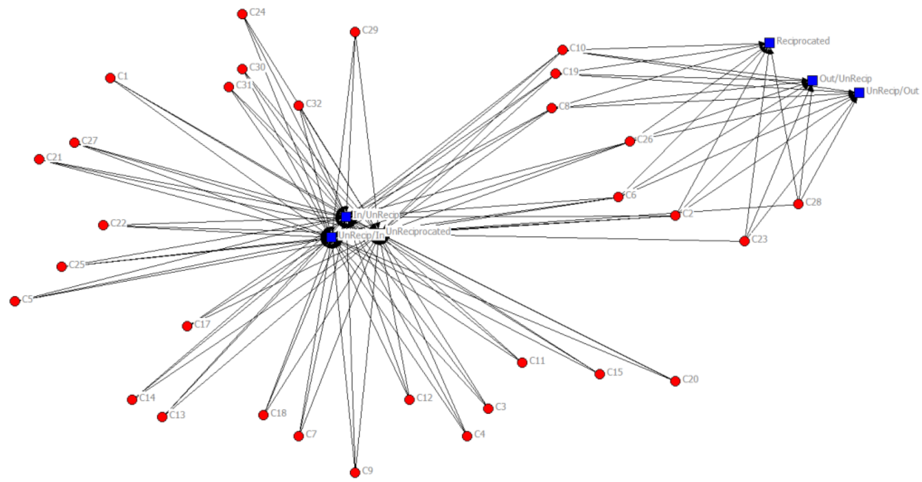
Each agents connection to each of the dyadic reciprocity measures.

For Tennessee, of all pairs of actors, or dyad reciprocity, measured by valued date (Q 19) of the type of relationship that has any connection, 28.7% (Table 4.35) of the pairs have a reciprocated connection (Figure 4.59). This on the "low" end and does suggest a small degree of institutionalized horizontal connection within this organizational population. The arc method of "arc" reciprocity (not shown here) yields a result of .446 (Table 4.35). That is, of all the relations in the network, 44.6% are parts of reciprocated information exchange relationships (Figure 4.60).

Table 4. 35 Tennessee's Question 19 Reciprocity Measures

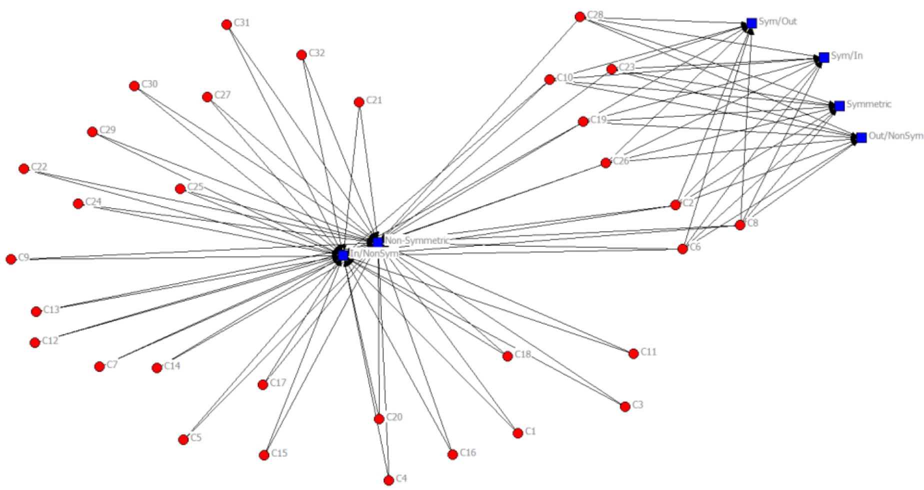
TN	Measure
Recip Arcs	156
Unrecip Arcs	194
All Arcs	350
Arc Reciprocity	0.446
Sym Dyads	78
Asym Dyads	194
All Dyads	272
Dyad Reciprocity	0.287

Figure 4. 59 Tennessee Q 19 Arc Based Reciprocity



Each agents connection to each of the arc reciprocity measures.

Figure 4. 60 Tennessee Q 19 Dyad Based Reciprocity



Each agents connection to each of the dyadic reciprocity measures.

Homophily

Homophily refers to the correlation between ego attributes and alters attributes. This measure considers actors' attributes and examines the degree to which budget analysts have an information exchange relationship to budget analysts with the same attributes. For example, we might measure the extent to which egos tend to have relationships with alters of the same gender as themselves. In attribute data, such as gender, similarity is measured by being in the same category (e.g., female). This routine in UCINET accepts network data and attribute dataset then measures how often ego' alters are in the same category for that attribute, computed across a variety of measures. (UCINET information accessed from http://faculty.ucr.edu/~hanneman/nettext/C18_Statistics.html).

Given the partition of each state budget network gender, age, ethnicity, education level and area of study groups, the E-I index is the number of ties external to the groups minus the number of ties that are internal to the group divided by the total number of ties. The E-I index treats the edges as binary and ignores any values on the edges. In UCINET there are two homophily measures Cohesion measure Ego-alter similarity and Ego Networks Ego-Alter similarity. The purpose of calculating cohesion ego-alter similarity is to calculate measures of homophily on the whole network associated with a given partition. This value can range from 1 to -1 and be a measure of the extent a group chooses themselves a value of -1 showing homophily and a value of +1 showing heterophily. For valued data, it is the sum of the tie strengths instead of the number of ties. (UCINET information accessed from http://faculty.ucr.edu/~hanneman/nettext/C18_Statistics.html)

The purpose for calculating ego network ego-alter similarity is to provide various measures of each ego's homophily with its alters based on a specified attribute (See Appendix C for the measures). Homophily refers to the correlation between ego attributes and alters attributes. For example, we might measure the extent to which egos tend to have ties with alters of the same gender as themselves. In categorical data, such as gender, similarity is measured by being in the same category (e.g., female). This routine accepts a network dataset, and an attribute dataset and measures how often ego's alters are in the same category for that attribute, computed across a variety of measures (Hanneman &

Riddle, 2005). The output includes a table with various measures of homophily for each ego in the network specified by the input file. The first column or output is Pct same; it is the number of ties between ego and an alter in the same attribute category divided by ego's total number of ties. The second column, E-I Index, this is the average/median/max of ego's alters (e.g., how prestigious). The third column, matches, is a measure of homophily that accounts for both the presence of homophilous ties and the absence of heterophilous ties divided by the total number of possible ties. The fourth column, yules Q, is a measure of similarity which ranges from -1 for perfect heterophily to +1 for perfect homophily. A value of 0 means no pattern of homophily. The fifth column, cohen kap, is a measure of categorical agreement on the specified attribute for the ego with each alter. A value of 1 means complete agreement. A value of 0 means no more agreement than expected by chance. The sixth column, corr/phi, calculates the correlation between the presence or absence of a tie between ego and each alter in the network and a vector indicating ego and alter's similarity on the selected attribute. The seventh and eight columns, fInGroup and fOutGroupAs a correlation, a value of 1 indicates perfect correlation (i.e., perfect homophily) and a value of -1 indicates a perfect negative correlation (i.e., perfect heterophily).

North Carolina

Gender - ego network ego-alter similarity

North Carolina's homophily measures are low to moderate. The ego network ego-alter similarity measures are by attribute. For gender, the pct column measures range from 0.407 to 0.556. For E-I index the measures range from -0.111 to 0.185. For matches, it ranges from 0.407 to 0.556. The yules column is blank except A027, A028, and A029.

A027 has a measure of 1 and A028, and A029 has a measure of 0.12. For cohen kap, all are 0 except A027, A028, and A029. A027 has a measure of 0.104, and A028 & A029 have a measure of 0.018. For corr/phi all are blank except for A027, A028, and A029. A027 has a measure of .235, and A028 & A029 have a measure 0.32. The fInGroup have counts of 11, 14, and 15 and fOutGroup have counts of 11, 12, 14, and 16. (See Appendix C for the measures)

Age - ego network ego-alter similarity

For age, the pct column measures are from 0.185 to 0.4. For the E-I index the measures range from 0.2 to 0.63. For matches, it ranges from 0.185 to 0.4. The yules column is blank except A027, A028, and A029. A027 and A028 have a measure of -0.28 and A029 have a measure 1. For cohen kap, all are 0 except A027, A028, and A029. A027 and A028 have a measure of -0.031 and A029 has a measure 0.09. For corr/phi all are blank except for A027, A028, and A029. A027 and A028 have a measure of -0.076 and A029 has a measure of 0.217. The fInGroup has counts of 5, 9, and 10 and fOutGroup have counts of 15, 16, 17, and 22. (See Appendix C for the measures)

Ethnicity - ego network ego-alter similarity

For Ethnicity the pct same column measures are between -0.074 to 0.92. Most of the pct same column have a measure of 0.889 For E-I index the measures range from -0.778 to 0.852. Most of the E-I Index has a measure of -0.778. For matches, it ranges from 0.074 to 0.889. Most of the measures being 0.889. The yules column is blank except A027, A028, and A029. A027 has a measure of 1 and A028, and A029 has a measure of 0.84. For cohen kap, all are 0 except A027, A028, and A029. A027 has a measure of 0.013 and A028, and A029 has a measure of 0.341. For corr/phi all are blank except for A027, A028, and A029. A027 has a measure of 0.08 and A028, and A029 has a measure of 0.35. The fInGroup has counts of 2, 23, and 24 (most are 24) and fOutGroup has counts of 2, 3, 23, and 25 (most were 3). (See Appendix C for the measures)

Education Level - ego network ego-alter similarity

For Ed Level, the pct column measures are from 0.04 to 0.667. For E-I index the measures range from -0.333 to 0.926. For matches, it ranges from 0.111 to 0.667. The yules column is blank except A027, A028, and A029. A027 and A028 have a measure of 0.36 and A029 have a measure 1. For cohen kap, all are 0 except A027, A028, and A029. A027 and A028 have a measure of 0.069 and A029 have a measure of 0.006. For corr/phi all are blank except for A027, A028, and A029. A027 and A028 have a measure of 0.1 and A029 have a measure of 0.055. The fInGroup has counts of 1, 6, 17 and 18 and fOutGroup have counts of 8, 9, 21, and 24. (See Appendix C for the measures)

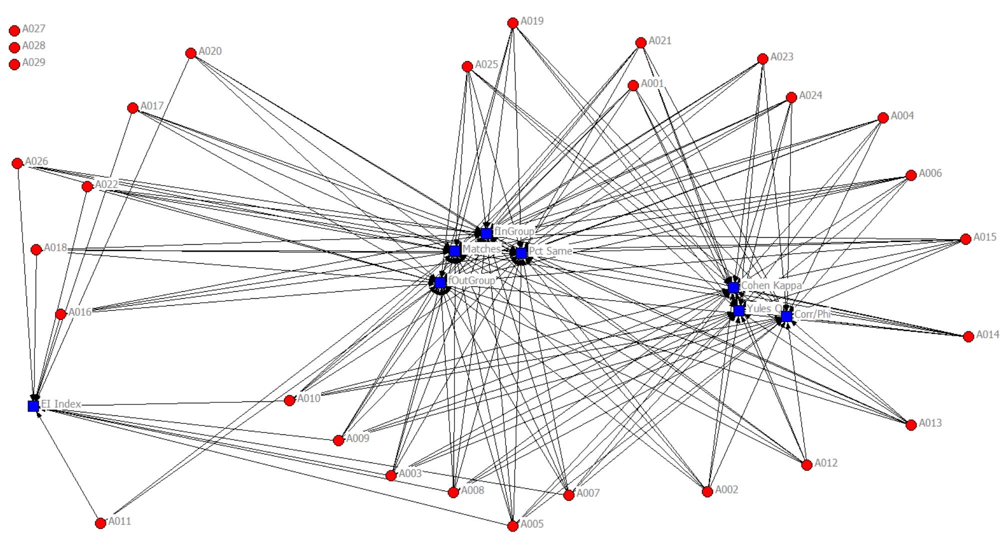
Area of Study - ego network ego-alter similarity

For the area of study, the pct column measures are range from 0.074 to 0.481. For E-I index the measures range from -0.04 to 0.852. For matches, it ranges from 0.074 to 0.556. The yules column is blank except A027, A028, and A029. A027 and A029 have a measure of -0.52 and A028 have a measure 1. For cohen kap, all are 0 except A027, A028, and A029. A027 and A029 have a measure of -0.155 and A028 has a measure of 0.273. For corr/phi all are blank except for A027, A028, and A029. A027 and A029 have a measure of -0.155 and A028 has a measure of 0.273. The fInGroup has counts of 2, 6, 7, and 13 and fOutGroup have counts of 14, 19, 20, and 25. (See Appendix C for the measures)

Ego-Alter Similarity

North Carolina's calculations of cohesion ego-alter similarity homophily measure the homophily on the whole network associated with a given set of attributes. This measure was run on Q 19, relationship with each budget network member (see Appendix A for full question), because this measure is designed for valued data that can be associated with different levels of relationships (0 for do not associate to 9 families with work relationship, 10 is family do not associate, but those would be removed so it would not skew the results). Each attribute has a table for the node partition (which attributes are associated with the budget agent) and the number of ties within and between the two groups (ex. Male to male, male to female and vice versa). The two measures that are utilized are the E-I Index and correlation that is computed by UCINET's cohesion ego-alter similarity measure (Figure 4.61).

Figure 4. 61 North Carolina's Ego-Network Ego-Alter similarity Homophily Measures



North Carolina's agents connection to the ego network ego-alter similarity Homophily Measures.

Gender - Ego-Alter Similarity

For North Carolina's E-I Index the measures are gender 0.038 and correlation is 0.088 (Table 4.38). Male, female, and no-response group the rows and columns. The male to male group has the most significant number of ties (560 ties 16 budget agents), and the no response (1 budget agent) to no response has the smallest (Table 4.36 and Table 4.37). The female to female group has the smallest (334 ties 12 budget agents) excluding the no-response row and column (Table 4.37 and Table 4.38); otherwise, it would be the no-response row with counts of all 0 to any other group.

Table 4. 36 North Carolina's Whole Network Homophily Gender Node Partition

Node Partition	Freq	Members
Male	16	A001, A002, A004, A005, A006, A008, A012, A013, A014, A017, A020, A022, A025, A026, A028, A029
Female	12	A003, A007, A009, A010, A015, A016, A018, A019, A021, A023, A024, A027
No Response	1	A011

Table 4. 37 North Carolina's Whole Network Homophily Gender Number of Ties between and within

No of Ties	Male	Female	No response
Male	560	455	39
Female	443	334	28
No Response	0	0	0

Table 4. 38 North Carolina's Whole Network Homophily Gender Measures

		E-I Index	Correlation
1	Sheet 1	0.038	0.088

Age - Ego-Alter Similarity

For age, the E-I Index is 0.364, and the correlation is 0.042 (Table 4.41). No response groups the rows and columns, 30 – 39 (11 budget agents), 40 – 49 (11 budget agents), and 50 – 59 (6 budget agents) (Table 4.39). The 30 - 39 to 40 - 49 group has the most significant number of ties (278), and the no response to no response has the smallest with all 0s to any group (Table 4.40). The 50 - 59 to female group has the smallest (334) if you exclude the no-response column and row.

Table 4.39

Table 4. 39 North Carolina's Whole Network Homophily Age Node Partition

Node Partition	Freq	Members
No Response	1	A011
30-39	11	A005, A008, A010, A012, A014, A019, A020, A021, A023, A027, A028
40-49	11	A001, A003, A004, A006, A007, A017, A018, A022, A024, A026, A029
50-59	6	A002 ,A009, A013, A015, A016, A025

Table 4. 40 North Carolina's Whole Network Homophily Age Number of Ties between and within

No. Of Ties	No Response	30-39	40-49	50-59
No Response	0	0	0	0
30-39	24	256	278	152
40-49	21	259	247	147
50-59	22	183	182	85

Table 4. 41 North Carolina's Whole Network Homophily Age Measures

Whole Network		E-I Index	Correlation
1	Sheet 1	0.364	0.042

Ethnicity - - Ego-Alter Similarity

For ethnicity, the E-I Index is -0.607 and the correlation is 0.253 (Table 4.44). The rows and columns are grouped by no response (1 budget agent), White (25 budget agents), and African American (3 budget agents) (Table 4.42). The White and no response groups have the most significant number of ties (1485), and the no response to no response has the smallest with all 0s to any group (Table 4.43). The African American to White group has the smallest (4) if you exclude the no-response column and row.

Table 4. 42 North Carolina's Whole Network Homophily Ethnicity Node Partition

Node Partition	Freq	Members
No Response	1	A011
White	25	A001, A002, A003, A004, A005, A006, A007, A008, A009, A010, A012, A013, A014, A015, A016, A017, A019, A020, A021, A023, A024, A025, A026, A028, A029
African American	3	A018, A022, A027

Table 4. 43 North Carolina's Whole Network Homophily Ethnicity Number of Ties between and within

No. of Ties	No Response	White	African American
No Response	0	0	0
White	1485	63	188
African American	110	4	9

Table 4. 44 North Carolina's Whole Network Homophily Ethnicity Measures

Whole Network Measures		**E-I Index**	**Correlation**
1	Sheet 1	-0.607	0.253

Education Level - Ego-Alter Similarity

For the education level, the E-I Index is 0.23, and the correlation is 0.05 (Table 4.47). The rows and columns are grouped by no response (1), bachelors (7), masters (19), and professional (2) (Table 4.45). The masters to a master group have the most significant number of ties (794), and the no response to no response has the smallest. The professional to professional group has the smallest (6) if you exclude the no-response column and row (Table 46).

Table 4. 45 North Carolina's Whole Network Homophily Ed Level Node Partition

Node Partition	Freq	Members
No Response	1	A011
Bachelors	7	A007, A009, A016, A017, A020, A022, A026
Masters	19	A001, A002, A003, A004, A005, A006, A008, A012, A013, A014, A015, A018, A019, A021, A023, A024, A025, A027, A028
Professional	2	A010, A029

Table 4. 46 North Carolina's Whole Network Homophily Ed Level Number of Ties between and within

No of Ties	No Response	Bachelors	Masters	Professional
No Response	0	0	0	0
Bachelors	20	108	339	36
Masters	43	311	794	85
Professional	4	29	84	6

Table 4. 47 North Carolina's Whole Network Homophily Ed Level Measures

Whole Network Measures		**E-I Index**	**Correlation**
1	Sheet 1	0.23	0.05

Area of Study - Ego-Alter Similarity

Finally, the area of study, the E-I Index is 0.378, and the correlation is 0.013 (Table 4.50). The rows and columns are grouped by no response (1), other (3), business administration (8), public admin/public policy (14), and social sciences (3) (Table 4.48). The public admin/public policy to public admin/public policy group has the most significant number of ties (433), and the no response to no response has the smallest (0) (Table 4.49). The social sciences to business administration group have the smallest (7) if you exclude the no-response column and row.

Table 4. 48 North Carolina's Whole Network Homophily Area of Study Node Partition

Node Partition	Freq	Members
No Response	1	A011
Other	3	A003, A009, A010
Business Administration	8	A016, A017, A018, A020, A022, A026, A027, A029
Public Admin/Public Policy	14	A001, A002, A004, A006, A012, A013, A014, A015, A019, A021, A023, A024, A025, A028
Social Sciences	3	A005, A007, A008

Table 4. 49 North Carolina's Whole Network Homophily Area of Study Number of Ties between & within

No of Ties	No Response	Other	Business Administration	Public Admin/Public Policy	Social Sciences
No Response	0	0	0	0	0
Other	21	73	10	137	29
Business Administration	43	106	16	205	40
Public Admin/Public Policy	107	262	34	433	98
Social Sciences	28	67	7	125	18

Table 4. 50 North Carolina's Whole Network Homophily Area of Study Measures

Whole Network Measures		**E-I Index**	**Correlation**
1	Sheet 1	0.378	0.013

Georgia

Gender - ego network ego-alter similarity

Georgia's homophily measures are low to high. The ego network ego-alter similarity measures are by attribute. For gender, the pct column measures are between 0.0 (C28) to 0.774 (C8). For E-I index the measures range from -0.548 (C8) to 1 (C28) with most being 0.75. For matches, it ranges from 0 (C28) to 0.774 (C8) with the most being 0.032. The yules column has a few blanks but the measures mostly -1 with C12 having the only -0.937. For cohen kap, there are a few 0s (C2, C6, C8, C19, and C28) most are -0.53 with C12 having a cohen kap measure of -0.27 and C10 having a measure of 0.013. For corr/phi there are a few blank (C2, C6, C8, C19, and C28). C10, C23, and C26 have a measure of 0.08 and C12 have a measure of -0.602, all others have a measure of 0.916. The fInGroup has counts of 0, 1, 5, and 24, most budget agents measuring 1. The fOutGroup has counts of 7, 25, 26, and 31 (most budget agents measuring 7). (See Appendix C for the measures)

Age - ego network ego-alter similarity

For age, the pct column measures are between 0.0 (C2) to 0.774 (C8). For E-I index the measures range from -0.548 (C8) to 1 (C2) with most being 0.75. For matches, it ranges from 0 (C2) to 0.774 (C8) with the most being 0.032. The yules column has a few blanks (C2, C6, C8, C19, and C28) but the measures mostly -1 with C12 having the only measure at -0.937. For cohen kap, there are a few 0s (C2, C6, C8, C19, and C28) most are -0.53 with C10, C23, and C26 measuring 0.013 and C12 measured -0.27. For corr/phi there are a few blank (C2, C6, C8, C19, and C28). C10, C23, and C26 have a measure of 0.08 and C12 have a measure of -0.602, all others have a measure of 0.916 and all other budget agents measured -0.916. The fInGroup has counts of 0, 1, 5, and 24 (most budget agents measuring 1). The fOutGroup has counts of 7, 25, 26, and 31 (most budget agents measuring 7). (See Appendix C for the measures)

Ethnicity - ego network ego-alter similarity

For Ethnicity the pct same column measures are between 0 (C2 & C6) to 0.774 (C8). Most of the pct same column have a measure of 0.125 For E-I index the measures range from -0.548 (C8) to 1 (C2, & C6). Most of the E-I Index has a measure of 0.75. For matches it ranges from 0 (C2 & C6) to 0.774 (C8). Most of the measures being 0.038. The yules column has a few blanks (C2, C6, C8, C19, and C28), most budget agents have a -1 and C12 are -0.937. For cohen kap, there are a few 0s (C2, C6, C8, C19, and C28), C10 has a measure of 0.07, C12 has a measure of -0.27 C10, and C26 have a measure of 0.01, C12 has a measure of -0.27, and the rest have a measure of -0.53. For corr/phi all there are a few blanks (C2, C6, C8, C19, and C28), C10, C23, and C26 have a measure of 0.07, C12 has a measure of -0.602, and the rest have a measure of -0.916. The fInGroup has counts of 0, 1, 4, and 24 (most measures are 1) and fOutGroup has counts of 7, 26, 27, and 31 (most measures are 7). (See Appendix C for the measures)

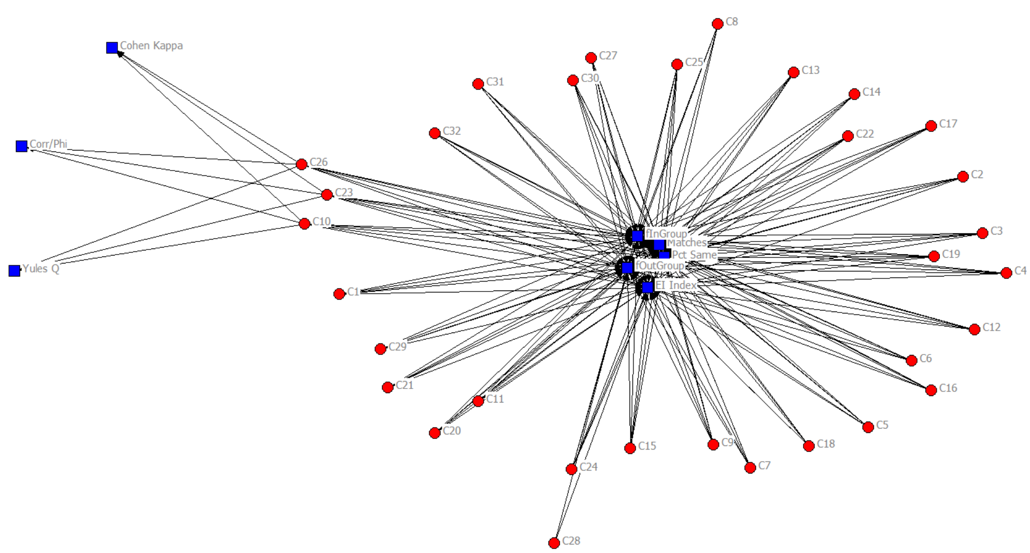
Education Level - ego network ego-alter similarity

For Ed Level, the pct column measures are range from 0.032 to 0.129. For E-I index the measures range from -0.548 (C8) to 0.935 (C2), most measures are 0.75. For matches, the measures range from 0.032 (most measures) to 0.774 (C8). The yules column has a few blanks (C2, C6, C8, C19, and C28), most budget agents have a -1 and C12 are -0.937. For cohen kap, there are a few 0s (C2, C6, C8, C19, and C28), C10, C23, and C26 have a measure of 0.07, C12 has a measure of -0.27, and the rest have a measure of -0.53. For corr/phi all there are a few blanks (C2, C6, C8, C19, and C28), C10, C23, and C26 have a measure of 0.06, C12 has a measure of -0.602, and the rest have a measure of -0.916. The fInGroup has counts of 1, 4, and 24 (most measures are 1) and fOutGroup have counts of 4, 7, 26, 27, and 30 (most measures are 7). (See Appendix C for the measures)

Area of Study - ego network ego-alter similarity

For an area of study, the pct column measures are between 0 (C28) to 0.774, most measure 0.125. For E-I index the measures range from -0.548 (C8) to 1 (C28), most measures are 0.75. For matches it ranges from 0 (C28) to 0.774 (C8), most measures are 0.032). The yules column has a few blanks (C2, C6, C8, C19, and C28), most budget agents have a -1 and C12 are -0.937. For cohen kap, there are a few 0s (C2, C6, C8, C19, and C28), C10, C23, and C26 have a measure of 0.007, C12 has a measure of -0.27, and the rest have a measure of -0.53. For corr/phi all there are a few blanks (C2, C6, C8, C19, and C28), C10, C23, and C26 have a measure of 0.06, C12 has a measure of -0.602, and the rest have a measure of -0.916. The fInGroup has counts of 0, 1, 3, and 24 (most measures are 1) and fOutGroup have counts of 7, 27, 28, 30, and 31 (most measures are 7). (Figure 4.62 & Appendix C for the measures)

Figure 4. 62 Georgia's ego-network ego-alter similarity Homophily Measures



Georgia's agents connection to the ego network ego-alter similarity Homophily Measures.

Gender - Ego-Alter Similarity

For Georgia's E-I Index the measures are gender 0.55 and correlation is -0.451 (Table 4.53). The rows and columns are grouped by no response (25), male (1), and female (6) (Table 4.51). The female to no response group has the most significant number of ties (147), and the no response to male and male to male has the smallest (0) (Table 4.52).

Table 4. 51 Georgia's Whole Network Homophily Gender Node Partition

Node Partition	Freq	Members
No Response	25	C1, C3, C4, C5, C7, C8, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21, C22, C24, C25, C27, C29, C30, C31, C32
Male	1	C28
Female	6	C2, C6, C10, C19, C23, C26

Table 4. 52 Georgia's Whole Network Homophily Gender Number of Ties

No. of Ties	No Response	Male	Female
No Response	24	0	6
Male	25	0	6
Female	147	6	30

Table 4. 53 Georgia's Whole Network Homophily Gender Number of Ties

		E-I Index	**Correlation**
1	Sheet 1	0.55.	-0.451

Age - Ego-Alter Similarity

For age, the E-I Index is 0.546, and the correlation is -0.447 (Table 4.56). The rows and columns are grouped no-response (25), 20 – 29 (6), and 50 – 59 (1) (Table 4.54). The male to a male group has the most significant number of ties (147) and the no response and 20 - 29 to 20 - 29 groups have the smallest (0) (Table 4.55).

Table 4. 54 Georgia's Whole Network Homophily Age Node Partition

Node Partition	Freq	Members
No Response	25	C1, C3, C4, C5, C7, C8, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21, C22, C24, C25, C27, C29, C30, C31, C32
20-29	6	C6, C10, C19, C23, C26, C28
50-59	1	C2

Table 4. 55 Georgia's Whole Network Homophily Age Number of Ties

No. of Ties	No Responses	20-29	50-59
No Response	24	0	6
20-29	25	0	6
50-59	147	6	30

Table 4. 56 Georgia's Whole Network Homophily Age Number of Ties

Whole Network Measures		E-I Index	Correlation
1	Sheet 1	0.546	-0.447

Ethnicity - Ego-Alter Similarity

For ethnicity, the E-I Index is 0.616, and the correlation is -0.472 (Table 4.59). The rows and columns are grouped by no-response (25), White (5), African American (1), and Asian/Pacific Islander (1) (Table 4.57). The white to no response group has the most significant number of ties (122), and the African American to African America and Asian/Pacific Islander to Asian/Pacific Islander has the smallest (0) (See Table 4.58).

Table 4. 57 Georgia's Whole Network Homophily Ethnicity Node Partition

Node Partition	Freq	Members
No Response	25	C1, C3, C4, C5, C7, C8, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21, C22, C24, C25, C27, C29, C30, C31, C32
White	5	C10, C19, C23, C26, C28
African American	1	C2
Asian Pacific Islander	1	C6

Table 4. 58 Georgia's Whole Network Homophily Ethnicity Number of Ties

No of Ties	No Response	White	African American	Asian Pacific Islander
No Response	24	4	1	1
White	122	20	5	5
African American	25	5	0	1
Asian Pacific Islander	25	5	1	0

Table 4. 59 Georgia's Whole Network Homophily Ethnicity Measures

		E-I Index	**Correlation**
1	Sheet 1	0.616	-0.472

Education Level - Ego-Alter Similarity

For the education level, the E-I Index is 0.23, and the correlation is 0.05 (Table 4.62). The rows and columns are grouped no-response, bachelors, and masters (Table 4.61). The masters to no response group have the most significant number of ties (122), and the no response to bachelors has the smallest (1) (Table 4.62).

Table 4. 60 Georgia's Whole Network Homophily Ed Level Node Partition

Node Partition	Freq	Members
No Response	25	C1, C3, C4, C5, C7, C8, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21, C22, C24, C25, C27, C29, C30, C31, C32
Bachelors	2	C2, C28
Masters	5	C6, C10, C19, C23, C26

Table 4. 61 Georgia's Whole Network Homophily Ed Level Number of Ties between and within

No. of Ties	No Response	Bachelors	Masters
No Response	24	1	5
Bachelors	50	2	10
Masters	122	10	20

Table 4. 62 Georgia's Whole Network Homophily Ed Level Measures

Whole Network		E-I Index	Phi
1	Sheet 1	0.613	-0.472

Area of Study - Ego-Alter Similarity

Finally, the area of study, the E-I Index is 0.669, and the correlation is -0.492 (Table 4.65). The rows and columns are grouped by no-response (25), business administration (2), public admin/public policy (4), and social science (1) (Table 4.63). The public admin/public policy to no response group has the most significant number of ties (97), and the no response to social science plus social science to social science groups have the smallest (0) (Table 4.64).

Table 4. 63 Georgia's Whole Network Homophily Area of Study Node Partition

Node Partition	Freq	Members
No Response	25	C1, C3, C4, C5, C7, C8, C9, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21, C22, C24, C25, C27, C29, C30, C31, C32
Business Administration	2	C2, C6
Public Administration	4	C10, C119, C23, C26
Social Sciences	1	C28

Table 4. 64 Georgia's Whole Network Homophily Area of Study Number of Ties between and within

No. of Ties	No Response	Business Administration	Public Admin/Public Policy	Social Sciences
No Response	24	2	4	0
Business Administration	50	2	8	2
Public Administration	97	8	12	4
Social Sciences	25	2	4	0

Table 4. 65 Georgia's Whole Network Homophily Area of Study Measures

		E-I Index	Correlation
1	Sheet 1	0.669	-0.492

Tennessee

Gender - ego network ego-alter similarity

Tennessee's homophily measures are low to moderate. The ego network ego-alter similarity measures are by attribute. For gender, the pct column measures are range from 0 to 0.259. For E-I index the measures range from 0.462 to 1. For matches, it ranges from 0 to 0.259. The yules column has a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28) and all other budget agents measure -1. For cohen kap, there are a few 0s (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28) most are -0.997 with B7 having a cohen kap measure of 0.027 and B21 having a measure of -0.918. For corr/phi there are a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28) and a few 0s (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). B7 measures 0.116 and B21 measures -0.928. The fInGroup has counts of 0, 4, and seven most budget agents measuring 0. The fOutGroup has counts of 13, 19, 20, and 23 (most budget agents measuring 13). (See Appendix C for the measures)

Age - ego network ego-alter similarity

For age, the pct column measures are range from 0 to 0.192. For the E-I index the measures range from 0.615 to 1. For matches, it ranges from 0 to 0.222. The yules column has a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28) and all other budget agents measure -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). For cohen kap, there are a few 0s (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28) most are -0.997 with B7 having a cohen kap measure of 0.017 and B21 having a measure of -0.918. For corr/phi there are a few blanks (B10, B11,

B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28) and a few -1s (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). B7 measures 0.093 and B21 measures -0.928. The fInGroup has counts of 0, 1, 4, and five most budget agents measuring 0. The fOutGroup has counts of 12, 13, 22, 23, and 26 (most budget agents measuring 13). (See Appendix C for the measures)

Ethnicity - ego network ego-alter similarity

For Ethnicity, the pct same column measures are range from 0 to 0.423 (B7). Most of the pct column has a measure of 0 For E-I index the measures range from 0.154 (B7) to 1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). All other budget agents have an E-I Index measure of 0.185. For matches, it ranges from 0 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24) to 0.444 (B7). B21 measures 0.037 and all other budget agents' measures 0.407. The yules column has a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), most budget agents have a -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). For cohen kap, there are a few 0s (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), B7 has a measure of 0.052, B21 has a measure of -0.918. Budget agents 0 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24 have a measure of -0.997. For corr/phi all there are a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), most budget agents have a -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). The fInGroup has counts of 0, and 11 (most measures are 0) and fOutGroup have counts of 12, 13, 15, 16, and 27 (most measures are 13). (See Appendix C for the measures)

Education Level - ego network ego-alter similarity

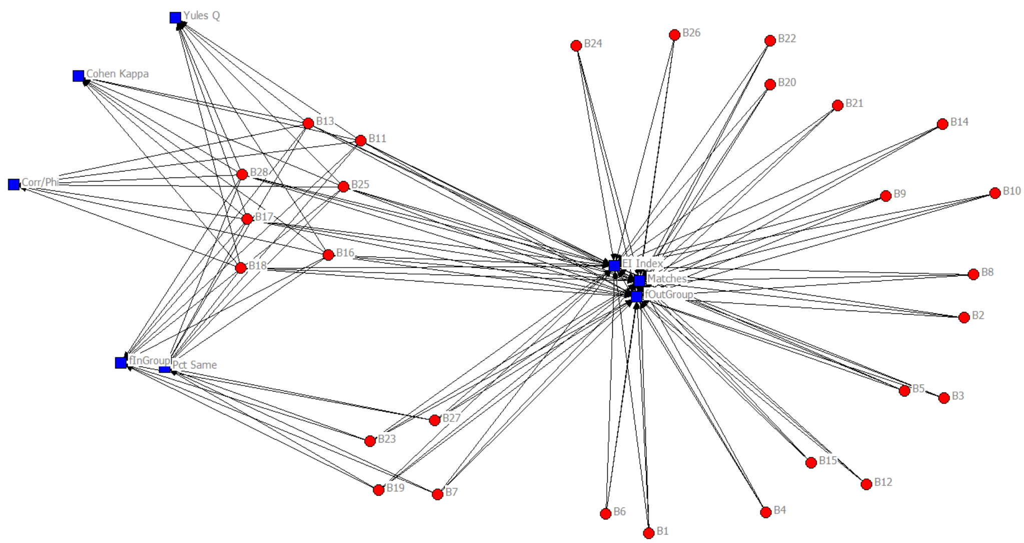
For Ed Level, the pct same column measures are range from 0 to 0.222. For E-I index the measures range from 0.538 (B7) to 1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). For matches, it ranges from 0 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24) to 0.259 (B7). The yules column has a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), most budget agents have a -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). For cohen kap, there are a few 0s (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), B7 has a measure of 0.022, B21 has a measure of -0.918. Budget agents B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24 have a measure of -0.997. For corr/phi all there are a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), most budget agents have a -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). Budget agent B7 has a measure of 0.105, and budget agent B21 has a measure of -0.928. The fInGroup has counts of 0, 1, 3, and 6 (most measures are 0) and fOutGroup has counts of 12, 13, 20, 21, 24, and 26 (most measures are 13). (See Appendix C for the measures)

Area of Study - ego network ego-alter similarity

For the area of study, the pct same column measures are range from 0 to 0.154 (B7). For E-I index the measures range from 0.692 (B7) to 1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24). For matches, it ranges from 0 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24) to 0.185 (B7). The yules column has a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), most budget agents have a -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and

B24). For cohen kap, there are a few 0s (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), B7 has a measure of 0.013, and B21 has a measure of -0.918. Budget agents 0 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24 have a measure of -0.997. For corr/phi all there are a few blanks (B10, B11, B13, B16, B17, B18, B19, B23, B25, B26, B27, and B28), most budget agents have a -1 (B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B22, and B24), B7 measure is 0.082, and B21 measure is -0.928. The fInGroup has counts of 0, 1, 3, and 4 (most measures are 0) and fOutGroup has counts of 12, 13, 22, 23, 24, 26, and 27 (most measures are 13). (Figure 4.63 & Appendix C for the measures)

Figure 4. 63 Tennessee's Ego-Network Ego-Alter similarity Homophily Measures



Tennessee's agents connection to the ego network ego-alter similarity Homophily Measures.

Gender - Ego-Alter Similarity

For Tennessee's E-I Index the measures are gender 0.567 and correlation is -0.239 (Table 4.68). The rows and columns are grouped by no-response (15), male (5), and female (8) (Table 4.66). The female to no response group has the most significant number of ties

(373), and the no response to all other groups have the smallest (0) (Table 4.67). The male to a male group has the smallest (54) if you exclude the no-response column and row.

Table 4. 66 Tennessee's Whole Network Homophily Gender Node Partition

Node Partition	Freq	Members
No Resp	15	B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B21, B22, B24
Male	5	B13, B19, B23, B26, B27
Female	8	B7, B10, B11, B16, B17, B18, B25, B28

Table 4. 67 Tennessee's Whole Network Homophily Gender Number of Ties between and within

No of Ties	No Resp	Male	Female
No Resp	0	0	0
Male	211	54	113
Female	373	113	170

Table 4. 68 Tennessee's Whole Network Homophily Gender Measures

		E-I Index	Correlation
1	Sheet 1	0.567	-0.239

Age - Ego-Alter Similarity

Age, the E-I Index is 0.677, and the correlation is -0.278 (Table 4.71). The rows and columns are grouped by no-response (15), 20 – 29 (6), 40 – 49 (5), and 50 – 59 (2) (Table 4.69). The 20 - 29 to no response group has the most significant number of ties (262), and the no response to all other groups have the smallest (0) (Table 4.70). The 50 - 59 to 50 - 59 group has the smallest (6) if you exclude the no-response column and row.

Table 4. 69 Tennessee's Whole Network Homophily Age Node Partition

Node Partition	Freq	Members
No Resp	15	B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B21, B22, B24
20-29	6	B7, B10, B11, B13, B16, B18
40-49	5	B17, B19, B23, B26, B28
50-59	2	B25, B27

Table 4. 70 Tennessee's Whole Network Homophily Age Number of Ties between and within

No of Ties	No Resp	20-29	40-49	50-59
No Resp	0	0	0	0
20-29	262	107	81	31
40-49	204	82	54	27
50-59	118	35	27	6

Table 4. 71 Tennessee's Whole Network Homophily Age Measures

		E-I Index	Correlation
1	Sheet 1	0.677	-0.278

Ethnicity - Ego-Alter Similarity

For ethnicity, the E-I Index is 0.28, and the correlation is 0.133 (Table 4.74). The rows and columns are grouped by no-response (15), White (12), and African American (1) (Table 4.72). The white to no response group has the most significant number of ties (533), and the no response to all other groups and African American – African Americans have the smallest (0) (Table 4.73).

Table 4. 72 Tennessee's Whole Network Homophily Ethnicity Node Partition

Node Partition	Freq	Members
No Resp	15	B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B21, B22, B24,
White	12	B7, B10, B11, B16, B17, B18, B19, B23, B25, B26, B27, B28
African America	1	B13

Table 4. 73 Tennessee's Whole Network Homophily Ethnicity Number of ties between and within

No of Ties	No Response	White	African American
No Resp	0	0	0
White	533	372	38
African America	51	40	0

Table 4. 74 Tennessee's Whole Network Homophily Ethnicity Measures

		E-I Index	**Correlation**
1	Sheet 1	0.28	-0.133

Education level - Ego-Alter Similarity

For the education level, the E-I Index is 0.691, and the correlation is -0.295 (Table 4.77). The rows and columns are grouped by no-response (15) some college no degree (2), bachelors (4), and masters (7) (Table 4.75). The masters to no response group have the most significant number of ties (275), and the no response to all other groups has the smallest (0) (Table 4.76). Some college but no degree to some college but no degree group has the smallest (7) if you exclude the no-response column and row.

Table 4. 75 Tennessee's Whole Network Homophily Ed Level Node Partition

Node Partition	Freq	Members
No Resp	15	B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B21, B22, B24
Some College No Degree	2	B19, B28
Bachelors	4	B10, B17, B25, B27
Masters	7	B7, B11, B13, B16, B18, B23, B26

Table 4. 76 Tennessee's Whole Network Homophily Ed Level Number of Ties between and within

No of Ties	No Response	Some College No Degree	Bachelors	Masters
No Resp	0	0	0	0
Some College No Degree	95	7	26	45
Bachelors	214	25	36	83
Masters	275	41	70	117

Table 4. 77 Tennessee's Whole Network Homophily Ed Level Measures

		E-I Index	Correlation
1	Sheet 1	0.691	-0.295

Area of Study - Ego-Alter Similarity

Finally, the area of study, the E-I Index is 0.803, and the correlation is -0.343 (Table 4.80). The rows and columns are grouped by no-response (15), not available (2), business administration (4), communication (1), public admin/public policy (5), and social sciences (1) (Table 4.78). The public admin/public policy to no response group has the most significant number of ties (214), and the no response to all other groups, communication to communication, and social science to social science groups have the smallest (0) (Table 4.79).

Table 4. 78 Tennessee's Whole Network Homophily Area of Study Node Partition

Node Partition	Freq	Members
No Response	15	B1, B2, B3, B4, B5, B6, B8, B9, B12, B14, B15, B20, B21, B22, B24
N/A	2	B19, B28
Business Administration	4	B16, B17, B23, B25
Communication	1	B10
Public Admin/Public Policy	5	B7, B11, B13, B18, B27
Social Sciences	1	B26

Table 4. 79 Tennessee's Whole Network Homophily Area of Study Number of Ties between and within

No of Ties	No Response	N/A	Business Administration	Communication	Public Admin/Public Policy	Social Sciences
No Response	0	0	0	0	0	0
N/A	95	7	27	6	34	4
Business Administration	195	24	31	12	56	9
Communication	51	7	13	0	18	2
Public Admin/Public Policy	214	31	56	16	64	9
Social Sciences	29	4	8	2	10	0

Table 4. 80 Tennessee's Whole Network Homophily Area of Study Measures

		E-I Index	Correlation
1	Sheet 1	0.803	-0.343

Discussion

The social network field is an interdisciplinary research methodology that allows for analysis of budget process networks. UCINET 6.669 (Borgatti, Everett, & Freeman, 2002) is used for network measures, and Netdraw Network Visualization 2.166 (Borgatti, S.P., 2002) is used for visualization. This produces a structural map of North Carolina, Georgia, and Tennessee's budget agent network for information exchange.

Multiple network measures or indicators can be computed using relational data: measures which describe the network structure (e.g. size, density); measures related with one node (ego-measures), usually associated with the role it performs in the network (e.g., in-degree, out-degree) Besides measuring network size, possible ties, and survey participation rate for the information exchange relationship the following measures are used to identify internal transparency as variable of North Carolina's, Georgia's, and Tennessee's budget process network: cohesion (density & centralization), structural equivalence (CONCOR - Convergence of iterated Correlations), prominence (in-degree centrality, out-degree centrality, closeness centrality, & betweenness centrality), range (ego-net basic measures), brokerage (Ego Networks Gould & Fernandez Brokerage roles), and strength of ties (reciprocity & homophily). The analysis will walk through all the measures comparing North Carolina's, Georgia's, and Tennessee's measure

Cohesion

Cohesion arises when connections create information exchange relationships between budget agents to one another and the whole network. Cohesion can be defined as the tendency for budget agents to be in unity while working towards the goal of creating the budget. For North Carolina, their density measure and centralization measures moderate to high levels and looking at Figure 4.5.1 you can see that there are many connections which support the alternative hypothesis (*H1*): If a sample state's budget process has moderate to high levels of density and centralization then the budget network is a cohesive group and internal transparency exists.

Georgia has low-density measures and what appears to be a decentralized network. Looking at Figure 4.5.2 you can see fewer lines/relationships which support the null hypothesis (*H0*): If a sample state's budget process agents do not have moderate to high density and centralization, then the budget network is not a cohesive group, and internal transparency does not exist.

For Tennessee, there are mixed results: low density and low in/out-centralization measures indicating low cohesion. Figure 4.3 is a comparison to North Carolina, and although it is slightly above Georgia's cohesion, it also supports the null hypothesis (*H0*): If a sample state's budget process agents do not have moderate to high density and centralization then the budget network is not a cohesive group and internal transparency does not exist.

Density

Density is the ratio of the number of links over the possible number of links and is a global measure of cohesion. North Carolina's density is 0.407 or a 40.7% chance that one budget agent is exchanging information with another budget agent. Georgia's density is 0.056 or a 5.6% chance that information will be exchanged between budget agents. Tennessee's density is 0.217 or 21.7% chance that information will be exchanged between two budget agents. From these measures, it appears that North Carolina is more cohesive and information exchange is more likely to occur than in Georgia and Tennessee. North Carolina supports density's alternative hypothesis (*H1*): If the southeastern state's budget network has a high density, then information is more likely to be disseminated to the necessary budget actors within five days indicating that internal transparency is a normative value.

However, Georgia has lower density scores that support the null hypothesis (*H0*): If the southeastern state's budget network has a low density, then information is more likely to be disseminated to the necessary budget actors after five days indicating that internal transparency is not a normative value.

Tennessee's density is lower than North Carolina's but higher than Georgia's and can be considered moderate and supports the second alternative hypothesis (*H2*): If a sample state's budget process has moderate to high levels of density or centralization, then the budget network is a moderately cohesive group and internal transparency exists.

If the response rate was higher, the density measures should increase. Looking at the response rates between North Carolina (96.55%), Georgia (46.43%), and Tennessee (25%) you can see the higher response rate has the higher density measure and the lower response rate has the lowest density measure. Figures 4.5.1, 4.5.2, and 4.5.3.

Centralization

Centralization is calculated based on the differences in degree centrality between nodes divided by the maximum possible sum of differences. It measures the degree to which an entire network is focused around a few central nodes. In a decentralized network, the information exchange relationships are more or less evenly distributed among budget agents.

In general, using Q 14, North Carolina has an in-centralization measure of 44.52% and an out-centralization measure of 63.01%, which is considered a high level of centralization. North Carolina supports the alternative hypothesis (*H1*): If a sample state's budget network is a centralized structure, then information is likely to be disseminated within five days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Georgia has an in-centralization measure of 10.82% and an out-centralization measure of 81.21%, which means there is a moderate amount of centralization. Georgia supports alternative Hypothesis (*H2*): If a sample state's budget network is a distributed structure, then information is likely to be disseminated within ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Tennessee has an in-centralization measure of 19.75% and an out-centralization measure of 37.46%, which is considered a low to moderate level of centralization. Tennessee supports the alternative hypothesis (*H2*): If a sample state's budget network is a distributed structure, then information is likely to be disseminated within ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

For the start of the budget process (Q 20) and the end of the budget process (last question), North Carolina has an in-centralization measure of 3.35% (Q 20) and 3.44% (Q 28) and an out-centralization measure of 5.66% (Q 20) and 5.52% (Q 28), which is considered a low-level centralization or decentralized. Georgia has in-centralization measures of 0.63% and 0.82% and out-centralization measures of 0.47% and 11.43%, which means there is a low amount of centralization or decentralized. Tennessee has an in-centralization measure of 0.17% and 3.15% and an out-centralization measure of 11.45% and 12.75, which is considered a low level of centralization or decentralized. North Carolina, Georgia, and Tennessee support the null: If a sample state's budget network is a de-centralized structure then information is not likely to be disseminated in a timely fashion to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network. This behavior may be due to the time in the budget process rather than being reflective of the overall centralization of the sample state budget networks.

Structural Equivalence

Structural equivalence is the extent to which two budget agents are connected to the same budget agents. CONCOR computes and then splits (into groups or blocks) row and column correlations into groups or blocks. North Carolina CONCOR measures are moderate with a moderate good fit measure and moderate level of proportion of matches supporting the alternative hypothesis (*H1*) for structural equivalence: If a sample state's budget network has moderate to high levels of structural equivalence exhibited by CONCOR and Exact Matches measures then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

Georgia's CONCOR measures were low with a low goodness to fit R-squared and high proportion of matches supporting the null hypothesis (*H0*) for structural equivalence: If a sample state's budget network has moderate to high levels of structural equivalence exhibited by CONCOR or Exact Matches but not both measures then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

Tennessee's CONCOR measures were moderate with moderate goodness of fit and high levels of the proportion of matches. This supports the alternative hypothesis (*H1*): If a sample state's budget network has high levels of structural equivalence exhibited by CONCOR and Exact Matches measures then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

CONCOR

North Carolina's block model indicates that row six is completely connected across the columns and have 100% information exchange density and therefore indicates internal transparency. However, the eight by eight density matrix shows sixteen blocks out of the sixty-four blocks that are not connected and ten blocks that are 100% connected. Since North Carolina has a moderate level of structural equivalence it appears to support the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high levels of correlating pairs as exhibited by pair density measures and goodness of fit block model then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

Georgia's block model indicates that row four and five are completely disconnected across the columns and indicate information exchange density is 0 and therefore indicates no internal transparency. However, the seven by seven density matrix shows thirty-five blocks out of the sixty-four blocks that are not connected and only two blocks that are 67% connected. Georgia exhibits a low level of structural equivalence.

Tennessee's block model indicates that row six is completely connected across the columns, except for column two which is only 37% connected, indicating information exchange density is high and therefore indicates high internal transparency for those budget actors. However, the eight by eight density matrix shows thirty-eight blocks out of the sixty-four blocks that are not connected and only nine blocks that are 100% connected. Tennessee exhibits a low to moderate level of structural equivalence.

For both Georgia and Tennessee, it appears their measures support the null hypothesis (*H0*): If the state's budget network is a decentralized structure then information is less likely to be disseminated in a timely fashion to the necessary budget actors indicating that internal transparency is not a normative value within the southeastern state's budget network.

Proportion of Matches

The proportion of matches for North Carolina, Georgia, and North Carolina evaluate the relationships in common between agents. North Carolina's measures indicate moderate to high levels of the proportion of matches between agents for both columns and rows on Q 14 and moderate on both columns and rows for Q 19. This supports hypotheses (*H1*): If a sample state's budget network has moderate to high levels number of exact matches then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

Georgia's measures indicate high levels of the proportion of matches between agents for both columns and rows on Q 14. Q 19 has several high and several low proportions of matches measures for Columns and predominantly high measures for rows. This supports hypotheses (*H1*) If a sample state's budget network has moderate to high levels number of exact matches then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

Tennessee's measures indicate several high and several low proportions of matches' measures for rows on Q 14. The columns measures are predominantly high between agents for Q14. Q 19 has some highs but is predominantly low to moderate proportion of matches for rows. In general, q 19 column measures are high. This supports hypotheses (*H1*), maybe not as strongly as North Carolina and Georgia, but the sample state's budget network has moderate to high levels number of exact matches then information symmetry, is present indicating that internal transparency is a normative value within the state's budget network.

Prominence

North Carolina has moderate to high levels of both degree centrality and closeness centrality. While having only a few budget agents with measures high enough to be considered prominent and prestigious which indicates a more centralized network meaning information can be disseminated quickly. The prominence measures for North Carolina tend to support the alternative hypothesis (*H1*): If a sample state's budget network has prominent budget actors as indicated by moderate to high levels of In-degree/Out-degree centrality and Global/Closeness Centrality then information is likely to be disseminated within five days to other budget actors indicating that internal transparency is a normative value within the state's budget network.

Georgia's degree centrality measures and closeness centrality measures are low. This supports the null hypothesis (*H0*): If a sample state's budget network does not have prominent budget agents as indicated by low levels of In-degree/Out-degree centrality and Global/Closeness Centrality then information is likely to be disseminated in more than ten days to other budget actors indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's degree centrality measures and closeness centrality measures are low. This supports the null hypothesis (*H0*): If a sample state's budget network does not have prominent budget agents as indicated by low levels of In-degree/Out-degree centrality and Global/Closeness Centrality then information is likely to be disseminated in more than ten days to other budget actors indicating that internal transparency is not a normative value within the state's budget network.

Degree Centrality

North Carolina's mean degree centrality measures 39.16 %. While having only a few budget agents with measures high enough to be considered prominent and prestigious which indicates a more centralized network meaning information can be disseminated quickly. The Degree Centrality supports the alternative hypothesis (*H1*): If a sample state's budget network has high levels of In-degree and out-degree centrality, then information is likely to be disseminated in five or fewer days indicating that internal transparency is a normative value within the state's budget network.

Georgia's mean degree centrality measures 5.645 %. With low degree centrality, there are no budget agents considered prominent and prestigious which indicates a decentralized network meaning information cannot be disseminated quickly. The Degree Centrality supports the alternative hypothesis (*H0*): If a sample state's budget network has low levels of In-degree and out-degree centrality, then information is not likely to be disseminated in more than ten days indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's mean degree centrality measure is 21.693 %. With low degree centrality, there are no budget agents considered prominent and prestigious which indicates a decentralized network meaning information cannot be disseminated quickly. The Degree

Centrality supports the alternative hypothesis (*H0*): If a sample state's budget network has low levels of In-degree and out-degree centrality, then information is not likely to be disseminated in more than ten days indicating that internal transparency is not a normative value within the state’s budget network.

Global/Closeness Centrality

North Carolina's closeness centrality 0.2 to 1 for out-closeness and 0.4 to 0.718 for in-closeness which indicates that the budget agents can interact instead quickly. The Closeness Centrality measures support the alternative hypothesis (*H1*): If a sample state’s budget network has moderate to high levels of Global/Closeness Centrality then information is likely to be disseminated within five days to other budget actors indicating that internal transparency is a normative value within the state’s budget network.

Georgia’s closeness centrality 0.25 to 0.449 for out-closeness and 0.25 to 0.295 for in-closeness which indicates that budget agents will disseminate information at a slower rate than North Carolina supporting the null hypothesis (*H0*): If a sample state's budget network has low levels of Global/Closeness centrality then information is not likely to be disseminated within five days to other budget actors indicating that internal transparency is not a normative value within the state’s budget network.

Tennessee's closeness centrality 0.25 to 1 for out-closeness and 0.333 to 0.71838 for in-closeness which indicates that the budget agents can interact instead moderately. With a moderate overall degree centrality and the ability to interact slowly. The low to moderate supports the null hypothesis (*H0*): If a sample state's budget network has low levels of Global/Closeness centrality, then information is not likely to be disseminated within five days to other budget actors indicating that internal transparency is not a normative value within the state's budget network.

Range

Range denotes the selection of sources to which a budget agent has access (Hanneman & Riddle, 2005). The more connections the budget agents maintain, the more access to social resources or information and the more access to information the more other budget agents are likely to make a connection to retrieve information. This is measured by ego network basic measures and reachability.

Overall North Carolina has a supports the first alternative hypothesis for Ego-Network Basic Measures and Reachability which supports the first alternative hypothesis (*H1*) for range: If a sample state's budget network has a high ego-neighborhood and high reachability, then information is likely to be disseminated within five days. To the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Georgia's network supported the null hypothesis for both ego-network basic measures and reachability which supports the null hypothesis (*H0*) for the overall range of the network: If a sample state's budget network has low range as exhibited by low ego-network basic measures and low reachability distance then information is not likely to be disseminated within five days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's network supported the null hypothesis for both ego-network basic measures and reachability which supports the second alternative hypothesis (*H2*) for the overall range of the network: If a sample state's budget network has a moderate ego-network basic measures and moderate reachability then information is likely to be disseminated within five to ten days to the necessary budget actors indicating that internal transparency is a normative value within the state’s budget network.

Ego-network Basic Measures

North Carolina's budget agent's information exchange ego-network size is from 9 budget agents to 28 budget agent connections, with the minimum number of ties being 32 to a maximum of 283 and density measures ranging from 36.9 % to 76.9% of the respective networks being connected and few of the budget agents are highly connected. The reach efficiency measures range from 5.81% to 17.07%, and information can be diffused to a no more than 17.07% of the network, meaning it will take more two-step relations than Georgia or Tennessee's measures to indicate. Overall, North Carolina's measures support the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high levels of ego- neighborhood measures then information is likely to be disseminated in a timely fashion to the necessary budget actors indicating that internal transparency is a normative value within the state’s budget network.

Georgia's budget agent's information exchange ego-network size is from 0 budget agents to 19 budget agent connections, with the minimum number of ties being 0 to a maximum of 22 and density measures ranging from 0 % to 50% of the respective networks being connected and few of the budget agents are highly connected. The reach efficiency measures range from 0% to 77.42%, and information might be diffused to a little more than three-fourths of the network. The range ego-network is overall on the low end, even though there are some moderate to high measures, supporting the null hypothesis (*H0*): If a sample state's budget network has low levels of ego- neighborhood measures then information is not likely to be disseminated in a timely fashion to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's budget agent's information exchange ego-network size is from 3 budget agents to 27 budget agent connections, with the minimum number of ties being 6 to a maximum of 127 and density measures ranging from blank because of the no responses to 86.67% of the respective networks being connected and few of the budget agents are highly connected. The reach efficiency measures range from 10.55% to 34.18%, and information can be diffused to no more than one-third of the network. Overall, both Tennessee's measures support the null hypothesis (*H2*): If a sample state's budget network has moderate levels of ego- neighborhood measures, then information is likely to be disseminated within five to ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Reachability

North Carolina's reachability measures (Appendix I) for Q 14 indicate all but one agent has a reach, and Q 19 indicates all but three agents can reach other agents. However, these agents can be reached by all other agents indicating high reachability supporting the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high reachability measure then information is likely to be disseminated in five or fewer days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Georgia's reachability measures (Appendix I) for Q 14 and Q 19 indicate eight agents have a sporadic low reach to the network's other agents. The low reach measures support the null hypothesis (*H0*): If a sample state's budget network has low reachability measures then information is likely to be disseminated ten or more days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's reachability measures (Appendix I) for Q 14 and Q 19 indicate 13 agents have complete reachability to other agents. The moderate reachability measures support the second alternative hypothesis (*H2*): If a sample state's budget network has moderate reachability measure then information is likely to be disseminated in five to ten days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Brokerage

Brokerage is defined by the number of nodes that fall on the paths between alters that are otherwise not directly connected in their information exchange network. However, the normalized brokerage role depends on all possible connections in its network.

Normalized Brokerage

North Carolina's appears to have six possible brokers with normalized brokerage measure of 60% and ties ranging from 152 to 239 (compared to 406 possible connections). North Carolina appears to support the alternative hypothesis (*H1*): If a sample state's budget network has moderate levels of brokers, then information is likely to be disseminated five or fewer days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Georgia appears to have one possible broker with a normalized brokerage measure of 90% and 109 ties (compared to 496 possible connections). Georgia appears to support the null hypothesis (*H0*): If a sample state's budget network has no or few brokers, then information is likely to be disseminated five or more days to the necessary budget actors indicating that internal transparency is not a normative value within the state's budget network.

Tennessee appears to have three possible brokers with normalized brokerage measure of 80% and ties ranging from 130 to 288 (compared to 378 possible connections). Tennessee appears to support the null hypothesis: If the southeastern state's budget network is a centralized structure, then information is likely to be disseminated in a timely fashion to the necessary budget actors indicating that internal transparency is a normative value within the Southeastern state's budget network. Like North Carolina, Tennessee appears to support the alternative hypothesis (*H1*): If a sample state's budget network has moderate levels of brokers, then information is likely to be disseminated five or fewer days to the necessary budget actors indicating that internal transparency is a normative value within the state's budget network.

Betweenness Centrality

Ego betweenness centrality and normalized ego betweenness centrality measure indicates how many times each ego crosses the shortest paths budget agents reaching each other. North Carolina's betweenness centrality measures indicate a range of 0 for a few agents up to 73 for other agents. The overall measures indicate moderate to high level of betweenness which supports the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high levels of both betweenness centrality, then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

However, Georgia's betweenness measures indicate a range of 0 for several agents up to 23 for one agent. The overall betweenness appears to be low which supports the null hypothesis (*H0*): If a sample state's budget network has low levels of betweenness centrality, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's betweenness measures indicate a range of 0 for a few agents up to 78. The overall measures indicate moderate to high level of betweenness which supports the alternative hypothesis (*H2*): If a sample state's budget network has moderate to high levels of both betweenness centrality, then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Strength of Ties

Strength of a tie is a quantifiable property that characterizes the link between two nodes. Tie strength is a "combination of the amount of time, the emotional intensity, the intimacy (mutual confiding) and reciprocal services which characterize the tie" (Granovetter, 1973, p1361). Reciprocity is a measure of the likelihood of budget agents in a directed network to be mutually linked. Reciprocity can be considered an indicator of balance or stability in the state's budget process networks. Network level reciprocity measures the extent to which ties among a group of budget agents are mutual. Reciprocity is measured as a proportion of reciprocal links to the overall number of links in a network. Homophily refers to the correlation between ego attributes and alters attributes. The purpose for calculating ego network ego-alter similarity is to provide various measures of each ego's homophily with its alters based on a specified attribute.

North Carolina, Georgia and Tennessee all have moderate levels of reciprocity, and low levels of homophily supporting the alternative hypothesis and North Carolina appears to support the first alternative hypothesis (*H2*): If a sample state's budget network has high levels for reciprocity and low levels for homophily indicating a prominence of weak ties then information asymmetry is present indicating that internal transparency is a normative value within the state's budget network.

Reciprocity

North Carolina’s budget network shows 24.7% of budget agent dyadic pairs have having reciprocated relationships. However, reciprocity for the whole network, not just dyadic pairs, is 39.62% which indicates s moderate strength of tie. This supports the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high levels of reciprocity, then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Georgia’s budget network shows 12.4% of budget agent dyadic pairs have having reciprocated relationships. However, reciprocity for the whole network, not just dyadic pairs, is 22.1% which indicates s moderate strength of tie supporting the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high levels of reciprocity then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Tennessee’s budget network shows 16.3% of budget agent dyadic pairs have having reciprocated relationships. However, reciprocity for the whole network, not just dyadic pairs, is 28.05% which indicates s moderate strength of tie supporting the alternative hypothesis (*H1*): If a sample state's budget network has moderate to high levels of reciprocity then information symmetry occurs indicating that internal transparency is a normative value within the southeastern state's budget network.

Homophily

North Carolina's homophily measures for gender are E-I Index 0.038 and Correlation 0.088; this does not indicate homophily based on gender. For age, the E-I Index 0.364 and the correlation is 0.04, which does not support homophily based on age. For ethnicity, the E-I Index -0.607 and the correlation is 0.25, which does not support homophily based on ethnicity. This would be indicative of heterophily based on ethnicity. For the education level, the E-I Index - 0.23 and the correlation is 0.05, which does not support homophily based on education level. For the area of study, the E-I Index 0.378 and the correlation is 0.013, which does not support homophily based on the area of study. Overall homophily does not appear to be prominent among any of the attributes supporting the null hypothesis (*H0*): If a sample state's budget network has low levels of homophily, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

Georgia's homophily measures for gender are E-I Index 0.55 and Correlation -0.451; this does not indicate homophily based on gender. For age, the E-I Index 0.546 and the correlation is -0.447, which does not support homophily based on age. For ethnicity, the E-I Index 0.616 and the correlation is -0.472, which does not support homophily based on ethnicity. This would be indicative of heterophily based on ethnicity. For the education level, the E-I Index 0.691 and the correlation is -0.295, which does not support homophily based on age. For the area of study, the E-I Index 0.669 and the correlation is 0.492, which does not support homophily based on age. Homophily does not appear to be prominent in the Georgia network which supports the null hypothesis (*H0*): If a sample state's budget network has low levels of reciprocity, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

Tennessee's homophily measures for gender are E-I Index 0.567 and Correlation -0.239; this may indicate some homophily based on gender. However, the majority of the responses were no responses, if they responded the measure could stay the same or change drastically in either direction. For age, the E-I Index 0.677 and the correlation is -0.278, which does not support homophily based on age. For ethnicity, the E-I Index 0.28 and the correlation is -0.133, which does not support homophily based on ethnicity. This would be indicative of heterophily based on ethnicity. For the education level, the E-I Index 0.691 and the correlation is -0.295, which does not support homophily based on age. For the area of study, the E-I Index 0.803 and the correlation is -0.343, which does not support homophily based on age. For both Tennessee homophily does not appear to be prominent in the network which supports the null hypothesis (*H0*): If a sample state's budget network has low levels of reciprocity, then information asymmetry occurs indicating that internal transparency is not a normative value within the state's budget network.

Key Results

Patterns of internal transparency cannot be adequately supported with one relationship measure. In reviewing the results of all measures, North Carolina supports the overall alternative hypothesis (*H1*): If a sample budget network shows the budget agents are highly connected, then internal transparency is present as a core element within the state's budget process and the budget agents are more likely to have maximized budget decisions. However, Georgia and Tennessee measures support the overall null hypothesis (*H0*): If a sample budget network shows the budget agents are not highly connected then internal transparency is not present as a core element within each state's budget process and the budget agents are less likely to make budget decisions based on adequate information, enough to maximize decision making.

CHAPTER V

FINDINGS AND CONCLUSION

Analysis of supported Hypothesis.

Table 5. 1 This study's findings of supported hypothesis for each category and measure.

Hypothesis/Measure	North Carolina	Georgia	Tennessee
Cohesion Hypothesis	H1	H0	H0
Density Hypothesis	H1	H0	H2
Centralization Hypothesis	H1	H2	H2
Structural Equivalence Hypothesis	H1	H0	H1
CONCOR/Block Model	H1	H0	H0
Proportion of Matches	H1	H1	H1
Prominence Hypothesis	H1	H0	H0
Degree (In & Out) centrality	H1	H0	H0
Closeness Centrality	H1	H0	H0
Range Hypothesis	H1	H0	H2
Ego Network Basic Measures	H1	H0	H2
Reachability	H1	H0	H2
Brokerage Hypothesis	H1	H0	H1
Normalized Brokerage	H1	H0	H1
Betweenness Centrality	H1	H0	H2
Strength of Tie Hypothesis	H2	H2	H2
Reciprocity	H1	H1	H1
Homophily	H0	H0	H0
Overall Hypothesis	H1	H0	H0

Each category of measure (Cohesion, Structural Equivalence, Prominence, Range, Brokerage, and Strength of Tie) has two supporting measures as indicated in Table 5.1.

If a sample state supports an alternative hypothesis for at least one measure in the category, this will support internal transparency. However, if the sample state's analysis supports all alternative hypothesis, then there is more indication of internal transparency than if there is only support of one measure in a category. If a sample state does not support at least one of the measures in a category meaning a null hypothesis is supported for both measures in the overall category, then internal transparency is not a normative variable of the budget process.

Internal Transparency in Three State Budget Networks

The statistical analysis revealed that North Carolina, Georgia, and Tennessee networks have different characteristics. The social network analysis could not confirm absolutely that internal transparency is a core element of the budget process. North Carolina's network-level and budget-agent level analysis suggests support for internal transparency as a core element of the budget process.

North Carolina also suggests that moderate to high levels of connectedness and strength of ties increase the level of internal transparency as determined by information flow and strength of relationship measured by several different tests for connectedness. However, Georgia and Tennessee network-level and budget-agent level analysis suggest little or no support for internal transparency as a core element of the budget process. Their measures suggest low levels of connectedness and strength of ties which would not indicate internal transparency as a budget process norm. However, their response rate was 46.43% for Georgia and 25% for Tennessee, where North Carolina had a 96.55% response rate.

Also, the network selected is not the only information exchange path. Individuals in other agencies participate in the budget process. With a higher participation rate and an expanded network to include other budget process participants, measures would possibly be more supportive of alternative hypotheses which identifies internal transparency as a normative value of the budget process.

Normative Budget Theory Implications

A key finding of this study is that through social network analysis of identified variables such as this study's internal transparency variable, it is possible to empirically study normative behaviors in the budget process. This measurement corrects a deficit in the development of normative budget theory which suggests that such values cannot be measured.

Additional and more whole-network analysis may reveal new variables and patterns that bring insight into the complex system of the budget process. Also, just as social network analysis has helped intergovernmental research, the method would help managers identify blocks in the flow of information during the budget process. The study of different budget participants and budget office structures could reveal emergence of new patterns and normative variables.

Future Research

What new things could we discover if budget students took time to complete more social network research on budgeting processes? This budget process study is a start to advancing normative budget theory. The strength of information exchange relations was identified as a possible indicator of internal transparency and was neither confirmed nor rejected as a normative variable of the budgeting process.

More behavioral studies on North Carolina, Georgia, and Tennessee need to be completed to help perfect the data collection methods to limit erroneous information either deliberately, hastily, or accidentally collected. Also, completion of research on the other 47 states, especially the states that do not have a central budget office, would aid in the development of more predictive normative variables. Further, additional survey questions related to existing organizational culture would add a dimension of understanding to the pattern illustrated in network analysis. Likewise, future research should explore at what point in the development of information exchange relationships internal transparency becomes a norm.

Conclusion

While a first step only, this study supports the use of social network analysis to identify patterns of normative organizational behavior in the budget process. This may assist students of budgeting in multiple disciplines develop an empirically based normative budget theory.

This study collected data from budget agents for three states in the southeastern region of the United States and completed a social network analysis. Using the measures set forth by Caroline Haythornthwaite's article "Social Network Analysis: An Approach and Technique for the Study of Information Exchange," the data collected was analyzed to reveal patterns of budget agent interaction. The data revealed the possibility of internal transparency as an emergent norm within budget agent relationships, although not all the states showed support for internal transparency as a variable.

As such, this study made a small step towards normative budget theory by providing a new area of exploration for budget researchers. Framing the budget dialogue within the paradigm of complexity sciences allows research studies to include budgeting elements such as inter-relationship, inter-action, and inter-connectivity within a budget network, between agencies, and their environment.

In addition, employing SNA as a lens for examining the budget process and as the methodology for mapping budget agent relationships will take dedication and further research to uncover patterns that will ultimately lead to a normative budget theory or perhaps theories.

Normative budget theory in any discipline is a complex study demanding special tools with which to build a predominant budget theory. This researcher acknowledges that without the budgeting pioneers and their critical question, normative budget theory would not have a starting point. I also hope a new and fresh look at ways to study the budget process will create dialogue, options, and agendas to continue taking steps toward the realization of normative budget theory.

REFERENCES

Axelrod, R. (2008). *The complexity of cooperation: Agent-based models of competition and collaboration*. Princeton (N.J.): Princeton University Press.

Balkundi, P., & Kilduff, M. (2006). The ties that lead: A social network approach to leadership. *The Leadership Quarterly, 17*(4), 419-439. doi: 10.1016/j.leaqua.2006.01.001

Barton, Allen H. (1968). BRINGING SOCIETY BACK IN survey research and macro-methodology. The American Behavioral Scientist (Pre-1986), 12(2), 1. Retrieved fromhttp://spot.lib.auburn.edu/login?url=https://search.proquest.com/docview/194681283?accountid=8421

Bauhr, Monika and Grimes, Marcia (2012). What is Government Transparency? New Measures and Relevance for Quality of Government. QoG Working Paper Series, Department of Political Science, University of Gothenburg.

Biondi, Yuri and Giuseppe Marzo (October 17, 2010) Decision Making Using Behavioral Finance for Capital Budgeting. *Capital Budgeting Valuation: Financial Analysis for Today's Investment Decisions*, K. Baker & P. English, eds., Wiley, 2011. Available at SSRN: http://ssrn.com/abstract=1700154

Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2013). *Analyzing social networks*. Los Angeles (Calif.): Sage.

Borgatti, S. P., & Halgin, D. S. (n.d.). Analyzing Affiliation Networks. *The SAGE Handbook of Social Network Analysis*, 417-433. doi:10.4135/9781446294413.n28

Breiger, R. L., Boorman, S. A., & Arabie, P. (1975). An algorithm for clustering relational data with applications to social network analysis and comparison with multidimensional scaling. *Journal of Mathematical Psychology, 12*(3), 328-383. doi:10.1016/0022-2496(75)90028-0

Buck, A. E. (1929), *Public Budgeting: A Discussion of Budgetary Practice in the National, State and Local Governments of the United States***,** New York: Harper and Brothers.

Burt, Ronald S. (1992a) *Structural Holes*. Cambridge. MA: Harvard press.

Burt, Ronald S. (1992b). The Social Structure of Competition. In N. Norhis & R.G. Eccles (eds.), *Networks and Organizations: Structure, Form, and Action*. P. 57 – 91. Boston Ma: Harvard Business School Press.

Caiden, Naomi (1994) Budgeting in Historical and Comparative Perspective. Public Budgeting & Finance. P.44-57

Cohen, L. (1981). Can human irrationality be experimentally demonstrated? *Behavioral and Brain Sciences, 4*(3), 317-331. doi:10.1017/S0140525X00009092

Cook, K. S., & Cheshire, C. (2013). Social Exchange, Power, and Inequality In Networks. In *The Handbook of Rational Choice Social Research* edited by Rafael Wittek, Tom A.B. Snijders, Victor Nee (pp. 185-219). Stanford, CA: Stanford University Press.

Crecine, John P. (1969). Governmental Problem-Solving A Computer Simulation of Municipal Budgeting. Rnd McNally & Company. Chicago, IL.

Davis, Otto A, Dempster, M.A.H., & Wildavsky, Aaron (1966) A Theory of the Budget Process. The American Political Science Review. Vol. 60, No. 3. September 1966. P. 529 – 547.

Daniel, B. K., Mccalla, G. I., & Schwier, R. A. (2008). Social Network Analysis techniques: Implications for information and knowledge sharing in virtual learning communities. *International Journal of Advanced Media and Communication*, 2(1), 20. doi:10.1504/ijamc.2008.016212

Downs, Anthony (1957). *An Economic Theory of Democracy.* Harper and Row. New York, NY.

Eckstein, Harry (1997) Social Science as Cultural Science, Rational Choice as Metaphysics. Culture Matters: Essays in Honor of Aaron Wildavsky. Edited by Richard J Ellis and Michael Thompson. Westview Press. Boulder, CO. Pg 21 - 44.

Elsenbroich, C., & Gilbert, G. N. (2014). *Modelling norms*. Dordrecht: Springer.

Ferlie E, Nicolini D, Ledger J, D'Antreta D, Hravcenko D, & de Pury J. (2017) NHS top managers, knowledge exchange and leadership: the early development of Academic Health Science Networks – a mixed-methods study. *National Institute for Health Research Journals*, 5(17), Southampton (UK): Library; 2017 May. (Health Services and Delivery Research, No. 5.17.) References. Available from: https://www.ncbi.nlm.nih.gov/books/NBK436463/

Fisher, J., Frederickson, J. R., & Peffer, S. A. (2002a). The effect of information asymmetry on negotiated budgets: An empirical investigation. Accounting Organizations and Society,27, 27–43.

Fisher, J. G., Maines, L. A., Peffer, S. A., & Sprinkle, G. B. (2002b). Using budgets for performance evaluation: Effects of resource allocation and horizontal information asymmetry on budget proposals, budget slack, and performance. The Accounting Review, 77(4), 847–865.

Flynt, Wayne (2004) *Alabama in the Twentieth Century*. University of Alabama Press. Tuscaloosa, AL.

Forti, E., Franzoni, C., & Sobrero, M. (2013). Bridges or isolates? Investigating the social networks of academic inventors. *Research Policy, 42*(8), 1378-1388. doi:10.1016/j.respol.2013.05.003

Freeman, Linton (1979) "Centrality in Social Networks: Conceptual Clarification", *Social Networks*. Vol 1 No. 3, p. 215 - 239.

Freeman, Linton. (2004). *The Development of Social Network Analysis. A Study in the Sociology of Science.* Empirical Press. Laguna Beach. CA.

Gainforth, H. L., Latimer-Cheung, A. E., Athanasopoulos, P., Moore, S., & Ginis, K. A. (2014). The role of interpersonal communication in the process of knowledge mobilization within a community-based organization: A network analysis. *Implementation Science, 9*(1). doi:10.1186/1748-5908-9-59

Granovetter, M. (1973) The strength of weak ties. *American Journal of Sociology* 78, 6, 1360–1380.

Haythornthwaite, C. (1996). Social network analysis: An approach and technique for the study of information exchange. *Library & Information Science Research, 18*(4), 323-342. doi:10.1016/s0740-8188(96)90003-1

Haythornthwaite, C. & Wellman, B. (1998). Work, Friendship, and Media Use for Information Exchange in Networked Organization. *Journal of the American Society for Information Science.* 49(12):1101 - 1114

Hennig, M., Borgatti, S. P., Krempel, L., Schnegg, M., Brandes, U., Mergel, I., & Pfeffer, J. (2012). Studying social networks: A guide to empirical research. Frankfurt: Campus Verlag.

Hofstede, G. (1997). Cultures and Organizations: Software of the mind. New York: McGraw Hill. Downloaded on October 03, 2016 from website: https://www.tamu.edu/faculty/choudhury/culture.html

Huet, Philippe. (1978) The Rationalization of budget Choices in France. Albert C Hyde and Jay M Shafritz ed. *Government Budgeting: Theory, process, politics*. Moore Publishing Company, Inc. Oak Park, IL.

Kanigel, Robert (1997) *The One Best Way: Fredrick Winslow Taylor and the Enigma of Efficiency*. Penguin Books. New York, NY.

Kelly, Janet M, & William C. Rivenbark, (2008) "Budget theory in local government: the process-outcome conundrum", *Journal of Public Budgeting, Accounting & Financial Management*, Vol. 20 Issue: 4, pp.484-508, https://doi.org/10.1108/JPBAFM-20-04-2008-B005

Key, V.O. (Dec. 1940). The Lack of a Budgetary Theory, *The American Political Science Review*. Vol. 34, No. 6, P. 1137 – 1144. DOI: 10.2307/1948194

Kilduff, M., & Krackhardt, D. (2008). *Interpersonal networks in organizations: Cognition, personality, dynamics, and culture*. Cambridge: Cambridge University Press.

Koptis, George and Craig, Jon (January 1998). Transparency in Government Operations. International Monetary Fund, Washington D.C.

Knoke, David. 1993. “Networks of Elite Structure and Decision Making.” *Sociological Methods & Research* 22:23-45.

Knoke, David (1993). “Networks as Political Glue: Explaining Public Policy-Making.” Pp. 164- 184 in *Sociology and the Public Agenda*, edited by William Julius Wilson. Newbury Park, CA: Sage.

Knoke D. and Guilarte M. (1994) “The Network Analysis of Social Structure.” *Current Perpectives in Social Theory*, Supplement 1:77-115.

Krackhardt, D., & Stern, R. (1988). Informal Networks and Organizational Crises: An Experimental Simulation. *Social Psychology Quarterly*, 51(2), 123-140. Retrieved from http://www.jstor.org/stable/2786835

Krackhardt, D. (1992). "The Strength of Strong Ties: The Importance of Philos in Organizations" In N. Nohria & R. Eccles. Networks and Organizations: Structure, Form, and Action. Boston, MA: Harvard Business School Press. pp. 216–239.

Krackhardt, David and Daniel J Brass (1994) Intraorganizational Networks: The Micro Side. *Advances in Social network Analysis: Research in the Social and Behavioral Sciences*. Ed Stanley Wasserman, Joseph Galaskiewicz. Sage Publications. Thousand Oaks. CA. p. 207- 229.

Lasswell, H (1930) Psychopathology and Politics. Chicago Ill. University of Chicago Press. Pg 195.

Latour, Bruno (1987*) Science In Action How to Follow Scientists and Engineers Through Society* Harvard University Press: Cambridge, MA

Lazenby, Scott Douglas (2013) *The Human Side of Budgeting: Budget Games & How to End Them*, Erehwon Press: Sandy, Oregon.

Leach, Edmond (1968) A Runaway World Reith Lectures 1967 downloaded on May 13, 2016 from website: https://monoskop.org/images/e/e9/Leach_Edmund_A_Runaway_World_1968.pdf

Leach, E. R. "Ritual", International Encyclopedia of the Social Sciences, 13, N.Y., Macmillan and Free Press, 1968.

Lewis, Verne. (1952). “Toward a Theory of Budgeting” Public Administration Review. 12(1) p. 42 – 54.

Liu, Wenlin & Sidhu, Anupreet & Beacom, Amanda & Valente, Thomas. (2017). Social Network Theory. 10.1002/9781118783764.wbieme0092

Lorrain, F., & White, H. C. (1971). Structural Equivalence Of Individuals In Social Networks. *Journal of Mathematical Sociology,* 49-80. doi:10.1080/0022250X.1971.9989788

MacLean, Richard (2011) Internal Transparency, Environment Quality Management, Autum, 2011 pp. 103 -110.

March, J. G., Simon, H. A., & Guetzkow, H. S. (1993). *Organizations* (2nd ed.). Cambridge, MA: Blackwell.

Martin, Virginia (November 2015) Alabama gets a D+ grade in 2015 State Integrity Investigation: A String of Corruption Trials is Nothing New. Downloaded on June 20, 2016 from website: https://www.publicintegrity.org/2015/11/09/18322/alabama-gets-d-grade-2015-state-integrity-investigation.

Marsden Peter V, Lin Nan. (1982). Social Structure and Network Analysis. Sage Publishing, Beverley Hills, CA.

McGregor, (1960) *The Human Side of Enterprise*. McGraw-Hill. New York. NY. P. 33-34.

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*, *27*(1), 415-444. doi: 10.1146/annurev.soc.27.1.415

Menachemi, N., Rahurkar, S., Harle, C. A., & Vest, J. R. (2018). The benefits of health information exchange: An updated systematic review. *Journal of the American Medical Informatics Association*, 25(9), 1259-1265. doi:10.1093/jamia/ocy035

Meyer, D. A. (2004). Complexity of Allocation Processes: Chaos and Path Dependence. In *Unifying Themes In Complex Systems* (Vol. II, Complexity, pp. 569-580). Cambridge, MA: Westview Press.

Mills, John Stuart (2011) On Liberty, e-book downloaded on April 11, 2016 from website: http://www.gutenberg.org/files/34901/34901-h/34901-h.htm.

Miller, J. H., & Page, S. E. (2007). *Complex adaptive systems: An introduction to computational models of social life*. Princeton, NJ: Princeton Univ. Press.

Mitchell, Melanie (2009). *Complexity A Guided Tour*. Oxford University Press. New York: N.Y.

National Association of State Budget Officers (2015). The Fiscal Survey of States. National Association of State Budget Officers. Washington DC.

Nersessian, N. (1995). Opening the Black Box: Cognitive Science and History of Science. *Osiris, 10*, 194-211. Retrieved from http://www.jstor.org/stable/301919

Neuby, Barbara L. (1997) On the Lack of a Budget Theory. Public Administration Quarterly. Vol 21. No. 2 Summer, 1997. Pp. 131 – 142.

Ngo, Robert (2014) World's Oldest Accounting System Withstood Invention of Writing: Neo-Assyrian clay tokens provide new insight into accountin in Mesopotamia. Biblical History Daily downloaded on February 28, 2019 from website: https://www.biblicalarchaeology.org/daily/ancient-cultures/ancient-near-eastern-world/worlds-oldest-accounting-system-withstood-invention-of-writing/

Niskanen Jr., William A. (2017). Bureaucracy and Representative Government. Rutledge Taylor & Francis Group. New York.NY

Nohria, Nitin. (1992). Introduction: Is a network perspective a useful way of studying organizations? In N. Norhis & R.G. Eccles (eds.), *Networks and Organizations: Structure, Form, and Action*. P. 1 – 22. Boston Ma: Harvard Business School Press.

Page, Scott E. (2011). *Diversity and Complexity*. Princeton University Press; 1 ed. Princeton, NJ.

Popova-Nowak, Irina V. (2011). What is Transparency? *A Guide to Owning Transparency: How Federal Agencies Can Implement and Benefit from Transparency*. Ed by Wayne Mases Burke and Maxine Teller. Open Forum Foundation. Washington DC. Retrieved on April 19, 2016 from website: http://openforumfoundation.org/wp-content/uploads/2011/10/A-Guide-to-Owning-Transparency.pdf.

Reagans, R., and McEvily, B., (2003). Network Structure and Knowledge Transfer: The Effects of Cohesion and Range. *Administrative Science Quarterly* 48 (2), 240–267.

Robinson, Kent S. and Morgan, Douglas F (2014) Local Government as Polity Leadership: Implications for New Public Governance (Chapter 12) New Public Governance: A Regime-Centered Perspective Douglas F Morgan and Brian J Cook editors. Routledge Taylor & Francis Group London and New York.

Sasaki, Takao & Pratt, Stephen C. (2001) Emergence of group rationality from irrational individuals, Behavioral Ecology, Volume 22, Issue 2, March-April 2011, Pages 276–281, https://doi.org/10.1093/beheco/arq198

Schnackenberg, Andrew K. and Edward C. Tomlinson (2014). Organizational Transparency: A New Perspective on Managing Trust in Organization-Stakeholder Relationships. *Journal of Management*. Advance online publication. doi:10.1177/0149206314525202.

Seligman, Edwin R. A. (1926). The Social Theory of Fiscal Science I. *Political Science Quarterly, 41*(2), 193-218. doi:10.2307/2142093

Seligman, Edwin R. A. (1926). The Social Theory of Fiscal Science II. *Political Science Quarterly, 41*(3), 354-383. doi:10.2307/2142127

Schick, Allen (1988). “Inquiry into the possibility of Budgeting Theory” in Irene Rubin (ed.) New Directions in Budgetary Theory. Albany, NY: State University of New York.

Schick, Allen (1990). *The Capacity to Budget*. Washington D.C. Urban Institute press.

Schick, Allen (1995). *The Federal Budget: Politics, Policy, Process* (No ed., pp. 32 - 97). Washington D.C.: The Brookings Institute.

Scott, John. (2000). *Social Network Analysis: A Handbook*. Los Angeles: Sage Publishing.

Simon, Herbert. (1945) Administrative Behavior, 4th Edition (1997). The Free Press; New York. NY.

Simon, Herbert A (1946). "The Proverbs of Administration." *Public Administration Review*, Vol 6. No 1. Pg 53 – 57.

Simon, Herbert A. (1957) Models of Man: Social and Rational. New York: John Wiley and Sons, Inc., 1957, 279 pp.

Simonsen, Jesper (1994) Herbert A Simon: Administrative Behavior How Organizations can be understood in terms of decision processes. Downloaded on April 8, 2011 from website: http://jespersimonsen.dk/Downloads/Simon-introduction.pdf.

Straussman, Jeffery D. (1985), "V.O. Key's 'The Lack of a Budget Theory': Where are we Now?" *International Journal of Public Administration*. 7(4), p. 345-374.

Stadelmann, David, Marco Portmann and Reiner Eichenberger (2014). Full Transparency of Politicians' Actions Does Not Increase the Quality of Political Representation. Journal of Experimental Political Science, 1, pp 16-23 doi:10.1017/xps.2014.1.

Stiglitz, J. E. (1999), "On Liberty, the Right to Know and Public Disclosure: The Role of Transparency in Public Life", Oxford Amnesty Lecture.

Thurmaier, Kurt. (1992) "Budgetary Decision Making in Central Budget Bureaus: An Experiment." Journal of Public Administration Research and Theory. 2(4), p. 463-487

Thurmaier, K. (1995). Decisive Decision Making in the Executive Budget Process: Analyzing the Political and Economic Propensities of Central Budget Bureau Analysts. *Public Administration Review, 55*(5), 448-460. doi:10.2307/976769

Turner, John C & Reynolds, Katherine J (2012) "Self-Categorization Theory". *Handbook of Theories on Social Psychology*. Ed. Paul A. M. Van Lange, Arie W. Kruglanski & E. Tory Higgins. Sage Publishing. London.UK P. 399 – 417 http://dx.doi.org/10.4135/9781446249222.n46

Wasserman, Stanley & Faust, Katherine. (1994). Social Network Analysis. Cambridge, MA: Cambridge University Press.

Wellman, B (1988) Structural Analysis: From Method and Metaphor. B Wellman & SD Berkowitz eds. Social Structures: A Network Approach, Cambridge University Press. Cambridge. MA p. 19 – 61.

Wildavsky, Aaron (1961) Political Implications of Budgetary Reform *Public Administration Review* in Vol 52, no. 6 (November/December 1192).

Wildavsky, Aaron. (1975). Budgeting*: A Comparative Theory of Budgetary Processes* (p. 5). Boston: Little, Brown, and Company.

Wildavsky, A. (1979). *The Politics of the Budgetary Process*. Boston, MA: Little, Brown and Company.

Wildavsky, Aaron (1988*). New Politics of the Budgetary Process*. Glenview, IL. Scott, Foresman.

Wildavsky, Aaron. (1998). *Culture and Social Theory*. New Brunswick, NJ: Transaction Publisher.

Wittenbaum, G. M., & Stasser, G. (1996). Management of information in small groups. In J. L. Nye & A. M. Brower (Eds.), What's social about social cognition? Research on socially shared cognition in small groups (pp. 3-28). Thousand Oaks, CA: Sage.

Wu, Yu & Zhang Yu. (2011). Pattern Analysis in Social Networks with Dynamix Connections. At 4th International Conference, SPB College Park, 2011. *Social Computing, Behavioral-Cultural Modeling and Prediction. Ed.* John Salero, Shanchieh Yang, Jay, Dana Nau, and Sun-Ki Chai. Pg. 163-171. Springer Publishing Verlag. Heidelberg, Germany.

Young, N., Nguyen, V. M., Corriveau, M., Cooke, S. J., & Hinch, S. G. (2016). Knowledge users' perspectives and advice on how to improve knowledge exchange and mobilization in the case of a co-managed fishery. *Environmental Science & Policy, 66*, 170-178. doi: 10.1016/j.envsci.2016.09.002

Zengerle, Jason (June 22, 2016) The Love Song of Robert Bentley, Alabama's Horndog Governor. Downloaded on June 22, 2016 from website: http://www.gq.com/story/affair-robert-bentley-alabama-governor

Zouboulakis, M. (2005). On the social nature of rationality in Adam Smith and John Stuart Mill. *Cahiers d'économie Politique / Papers in Political Economy*, 49(2), 51-63. doi:10.3917/cep.049.0051.

Appendix A – State's Research Invite

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

Mr. Charles Perusse
State Budget Director of North Carolina
charles.perusse@osbm.nc.gov
919-807-4717

RE: Permission to Conduct Research Study

Dear Mr. Perusse:

I would like to request your permission to allow me, Kimberly Payne, to conduct a survey among the budget participants listed on the North Carolina's Budget and Management staff directory. The survey will provide data needed to complete my dissertation entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the North Carolina Budget Process: A Step toward Normative Budget Theory*. This study is a social network analysis of budget participants interactions based on information dissemination. I am currently enrolled in the Public Administration and Public Policy program at Auburn University in Auburn, Alabama. Additionally, I am employed with the Alabama Department of Revenue as a Revenue Examiner and as part of my duties I focus on fiscal policy and its impact on Revenue processes. Professor Keren Deal, one of my dissertation committee members, recommended North Carolina as the budget process to be used for my study. Upon review of the North Carolina budget process and Professor Deal's recommendations North Carolina has an exemplary budget process as demonstrated by the awards shown on the Government Finance Officers Association website.

I hope that you will allow me to recruit the budget participants listed on the North Carolina Budget and Management staff directory web page (https://www.osbm.nc.gov/contact/directory) to anonymously complete a survey questionnaire (copy attached). The survey will take about 15 minutes and would be completed online. Each participant will receive a consent form to sign and return to me (copy enclosed).

Your assistance in the completion of my dissertation is sincerely appreciated. The week of October 5th I will follow up with a telephone call and would be happy to answer any questions or concerns that you may have at that time. My e-mail address: kap0031@tigermail.auburn.edu.

If you agree, kindly reply to this e-mail granting your permission to complete the survey for my dissertation.

Sincerely,

Kimberly Payne
Auburn University

Attached:

Cc: Professor Linda Dennard, Research Advisor, ldennard@aum.edu

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

Ms. Teresa MacCartney
Director of Georgia Governor's Office of Planning and Budget
Teresa.maccartney@opb.georgia.gov
(404) 656-3820

RE: Permission to Conduct Research Study

Dear Ms. MacCartney:

I would like to request your permission to allow me, Kimberly Payne, to conduct a survey among the budget participants listed on the Georgia's Budget Analyst Agency Assignments. The survey will provide data needed to complete my dissertation entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the South Eastern States Budget Process: A Step toward Normative Budget Theory*. This study is a social network analysis of budget participants interactions based on information dissemination. I am currently enrolled in the Public Administration and Public Policy program at Auburn University in Auburn, Alabama. Additionally, I am employed with the Alabama Department of Revenue as a Revenue Examiner and as part of my duties I focus on fiscal policy and its impact on Revenue processes. Professor Linda Dennard, my dissertation committee Chair, recommended Georgia as one of the State's budget processes to be used for my study. Upon review of the Georgia's budget process and Professor Dennard's recommendations Georgia has an exemplary budget process and would work perfectly for me to complete my dissertation.

I hope that you will allow me to recruit the budget participants listed on the Georgia Governor's Office of Planning and Budget Divisions web page (https://opb.georgia.gov/divisions) and the Copy of Analyst Assignments pdf to anonymously complete a survey questionnaire (copy attached). The survey will take about 15 minutes and would be completed online. Each participant will receive a consent form to sign and return to me (copy enclosed).

Your assistance in the completion of my dissertation is sincerely appreciated. The week of October 22nd, I will follow up with a telephone call and would be happy to answer any questions or concerns that you may have at that time. My e-mail address: kap0031@tigermail.auburn.edu.

If you agree, please send me a signed approval on official letterhead denoting permission to complete the survey for my dissertation. You may scan the form and e-mail it to kap0031@tigermail.auburn.edu.

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019. Protocol #17-304 EP 1711, Payne.

Sincerely,

Kimberly Payne
Auburn University

Attached: Survey & Informed Consent

Cc: Professor Linda Dennard, Research Advisor, ldennard@aum.edu

The Auburn University Institutional Review Board has approved this Document for use from 10/10/2018 to 10/31/2019 Protocol # 17-304 EP 1711

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

Mr. David Thurman
State Budget Director of Tennessee
David.Thurman@tn.gov
(615) 532-8158

RE: Permission to Conduct Research Study

Dear Mr. Thurman:

I would like to request your permission to allow me, Kimberly Payne, to conduct a survey among the budget participants listed on the Tennessee's Budget Analyst Agency Assignments. The survey will provide data needed to complete my dissertation entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the South Eastern States Budget Process: A Step toward Normative Budget Theory*. This study is a social network analysis of budget participants interactions based on information dissemination. I am currently enrolled in the Public Administration and Public Policy program at Auburn University in Auburn, Alabama. Additionally, I am employed with the Alabama Department of Revenue as a Revenue Examiner and as part of my duties I focus on fiscal policy and its impact on Revenue processes. Professor Keren Deal, one of my dissertation committee members, recommended Tennessee as one of the State's budget processes to be used for my study. Upon review of the Tennessee budget process and Professor Deal's recommendations Tennessee has an exemplary budget process and would work perfectly for me to complete my dissertation.

I hope that you will allow me to recruit the budget participants listed on the Tennessee Budget Analyst Agency Assignments web page (https://www.tn.gov/finance/fa/fa-budget-information/fa-budget-agency.html) to anonymously complete a survey questionnaire (copy attached). The survey will take about 15 minutes and would be completed online. Each participant will receive a consent form to sign and return to me (copy enclosed).

Your assistance in the completion of my dissertation is sincerely appreciated. The week of October 22nd, I will follow up with a telephone call and would be happy to answer any questions or concerns that you may have at that time. My e-mail address: kap0031@tigermail.auburn.edu.

If you agree, please send me a signed approval on official letterhead denoting permission to complete the survey for my dissertation. You may scan the form and e-mail it to kap0031@tigermail.auburn.edu.

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019 . Protocol #17-304 EP 1711, Payne.

Sincerely,

Kimberly Payne
Auburn University

Attached: Cc: Professor Linda Dennard, Research Advisor, ldennard@aum.edu

The Auburn University Institutional
Review Board has approved this
Document for use from
10/10/2018 to 10/31/2019
Protocol # 17-304 EP 1711

Appendix B - Budget Agents Research Invite

DEPARTMENT OF POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

October 10, 2017

Dear North Carolina Budget Staff:

My name is Kimberly Payne, and I am a PhD candidate for Public Administration and Public Policy at Auburn University. I have received consent from North Carolina's State Budget Director, Charles Perusse, to conduct a survey that will provide data needed to complete my dissertation entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the North Carolina Budget Process: A Step toward Normative Budget Theory.* This study is a social network analysis of budget participant's interactions based on information dissemination.

The purpose of this survey is to identify connections amongst the North Carolina's state budget staff to determine whether budget agent's interactions are indicators of internal transparency. I would like to determine if internal transparency is a core element within the budget process. In addition, your participation will also help me to assess whether the level of connectedness and the strength of ties correlates to the level of internal transparency within budget processes.

After printing and signing the attached informed consent form, please scan and e-mail the form to kap0031@tigermail.auburn.edu. Alternately, you may mail the form to following address:

Kimberly Payne
830 Possum Trot Rd
Deatsville, AL. 36022

Once your signed informed consent form is received, an e-mail will be sent to your e-mail address listed on the North Carolina Budget and Management Staff Directory website (https://www.osbm.nc.gov/contact/directory), with the link to the survey. I realize that your time is valuable, so I greatly appreciate your cooperation to complete this survey. Thank you for your vital input to this research!

Sincerely,

Kimberly Payne
Auburn University

Cc: Professor Linda Dennard, Research Advisor, ldennard@aum.edu

The Auburn University Institutional Review Board has approved this Document for use from
11/01/2017 to 10/31/2018
Protocol # 17-304 EP 1711

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

October 10, 2017

Dear Georgia Budget Staff:

My name is Kimberly Payne, and I am a PhD candidate for Public Administration and Public Policy at Auburn University. I have received consent from Georgia's Director of Office of Planning and Budget, Teresa MacCarthey, to conduct a survey that will provide data needed to complete my dissertation entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the South Eastern States Budget Process: A Step toward Normative Budget Theory*. This study is a social network analysis of budget participant's interactions based on information dissemination.

The purpose of this survey is to identify connections amongst the Georgia's state budget staff to determine whether budget agent's interactions are indicators of internal transparency. I would like to determine if internal transparency is a core element within the budget process. In addition, your participation will also help me to assess whether the level of connectedness and the strength of ties correlates to the level of internal transparency within budget processes.

After printing and signing the attached informed consent form, please scan and e-mail the form to kap0031@tigermail.auburn.edu. Alternately, you may mail the form to following address:

Kimberly Payne
830 Possum Trot Rd
Deatsville, AL. 36022

Once your signed informed consent form is received, an e-mail will be sent to your e-mail address listed on the Georgia Governor's Office of Planning and Budget Divisions web page (https://opb.georgia.gov/divisions), with the link to the survey. I realize that your time is valuable, so I greatly appreciate your cooperation to complete this survey. Thank you for your vital input to this research!

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019. Protocol #17-304 EP 1711, Payne.

Sincerely,

Kimberly Payne
Auburn University

Cc: Professor Linda Dennard, Research Advisor, ldennard@aum.edu

The Auburn University Institutional Review Board has approved this Document for use from 10/10/2018 to 10/31/2019
Protocol # 17-304 EP 1711

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

October 26, 2018

Dear Tennessee Budget Staff:

My name is Kimberly Payne, and I am a PhD candidate for Public Administration and Public Policy at Auburn University. I have received consent from Tennessee's State Budget Director, David Thurman, to conduct a survey that will provide data needed to complete my dissertation entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the South Eastern States Budget Process: A Step toward Normative Budget Theory*. This study is a social network analysis of budget participant's interactions based on information dissemination.

The purpose of this survey is to identify connections amongst the Tennessee's state budget staff to determine whether budget agent's interactions are indicators of internal transparency. I would like to determine if internal transparency is a core element within the budget process. In addition, your participation will also help me to assess whether the level of connectedness and the strength of ties correlates to the level of internal transparency within budget processes.

After printing and signing the attached informed consent form, please scan and e-mail the form to kap0031@tigermail.auburn.edu. Alternately, you may mail the form to following address:

Kimberly Payne
830 Possum Trot Rd
Deatsville, AL. 36022

Once your signed informed consent form is received, an e-mail will be sent to your e-mail address listed on the Tennessee Budget Analyst Agency Assignments web page (https://www.tn.gov/finance/fa/fa-budget-information/fa-budget-agency.html), with the link to the survey. I realize that your time is valuable, so I greatly appreciate your cooperation to complete this survey. Thank you for your vital input to this research!

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019. Protocol #17-304 EP 1711, Payne.

Sincerely,

Kimberly Payne
Auburn University

Cc: Professor Linda Dennard, Research Advisor, ldennard@aum.edu

The Auburn University Institutional Review Board has approved this Document for use from 10/10/2018 to 10/31/2019
Protocol # 17-304 EP 1711

Appendix C Participants Consent Form

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

INFORMED CONSENT
for a Research Study entitled

"Patterns of budget agent interaction as indicators of internal transparency in the South Eastern States Budget Process: A step toward normative budget theory."

You are invited to participate in a research study to *examine the patterns of information exchange in hopes to identify internal transparency as a variable of the South Eastern States budget process.* The study is being conducted by Kimberly A Payne, under the direction of Dr. Linda Dennard in the Auburn University Department of Political Science. You were selected as a possible participant because you are listed as a staff member of the North Carolina Budget Office and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete a survey that will identify your connections. By volunteering for this study, you will help identify internal transparency as a normative variable of the budget process and insight into social networks of budget processes. Your total time commitment will be approximately 15 minutes.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary and there will be no compensation for your participation. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Political Science. There are no costs, personal benefits or compensation to participate in this survey. Breach of confidentiality is the only known risks associated to participation in this study and is minimized by the separation of identifying data from the individual network interaction questions.

Your privacy will be protected. Any information obtained in connection with this study will remain confidential. Information obtained through your participation will be used to fulfill an educational requirement, and may be used to publish in a professional journal, presented at a professional meeting.

If you have questions about this study, please contact Kimberly A Payne at kap0031@tigermail.auburn.edu. A copy of this document will be returned to you for your records.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

Participant's signature   Date   Investigator obtaining consent   Date

Printed Name   Printed Name

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019. Protocol #17-304 EP 1711, Payne.

The Auburn University Institutional Review Board has approved this Document for use from
10/10/2018 to 10/31/2019
Protocol # 17-304 EP 1711

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

INFORMED CONSENT
for a Research Study entitled

"Patterns of budget agent interaction as indicators of internal transparency in the South Eastern States Budget Process: A step toward normative budget theory."

You are invited to participate in a research study to *examine the patterns of information exchange in hopes to identify internal transparency as a variable of the South Eastern States budget process.* The study is being conducted by Kimberly A Payne, under the direction of Dr. Linda Dennard in the Auburn University Department of Political Science. You were selected as a possible participant because you are listed as a staff member of the Governor's Office of Planning and Budget of Georgia and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete a survey that will identify your connections. By volunteering for this study, you will help identify internal transparency as a normative variable of the budget process and insight into social networks of budget processes. Your total time commitment will be approximately 15 minutes.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary and there will be no compensation for your participation. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Political Science. There are no costs, personal benefits or compensation to participate in this survey. Breach of confidentiality is the only known risks associated to participation in this study and is minimized by the separation of identifying data from the individual network interaction questions.

Your privacy will be protected. Any information obtained in connection with this study will remain confidential. Information obtained through your participation will be used to fulfill an educational requirement, and may be used to publish in a professional journal, presented at a professional meeting.

If you have questions about this study, please contact Kimberly A Payne at kap0031@tigermail.auburn.edu. A copy of this document will be returned to you for your records.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

______________________________	______________________________
Participant's signature Date	Investigator obtaining consent Date
______________________________	______________________________
Printed Name	Printed Name

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019. Protocol #17-304 EP 1711, Payne.

The Auburn University Institutional Review Board has approved this Document for use from 10/10/2018 to 10/31/2019

DEPARTMENT OF
POLITICAL SCIENCE

AUBURN UNIVERSITY

COLLEGE OF LIBERAL ARTS

INFORMED CONSENT
for a Research Study entitled

"Patterns of budget agent interaction as indicators of internal transparency in the South Eastern States Budget Process: A step toward normative budget theory."

You are invited to participate in a research study to *examine the patterns of information exchange in hopes to identify internal transparency as a variable of the South Eastern States budget process.* The study is being conducted by Kimberly A Payne, under the direction of Dr. Linda Dennard in the Auburn University Department of Political Science. You were selected as a possible participant because you are listed as a staff member of the Tennessee's State Budget Office and are age 19 or older.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete a survey that will identify your connections. By volunteering for this study, you will help identify internal transparency as a normative variable of the budget process and insight into social networks of budget processes. Your total time commitment will be approximately 15 minutes.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary and there will be no compensation for your participation. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Political Science. There are no costs, personal benefits or compensation to participate in this survey. Breach of confidentiality is the only known risks associated to participation in this study and is minimized by the separation of identifying data from the individual network interaction questions.

Your privacy will be protected. Any information obtained in connection with this study will remain confidential. Information obtained through your participation will be used to fulfill an educational requirement, and may be used to publish in a professional journal, presented at a professional meeting.

If you have questions about this study, please contact Kimberly A Payne at kap0031@tigermail.auburn.edu. A copy of this document will be returned to you for your records.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

____________________________ ____________________________
Participant's signature Date Investigator obtaining consent Date

____________________________ ____________________________
Printed Name Printed Name

The Auburn University Institutional Review Board has approved this document for use from October 10, 2018 to October 31, 2019. Protocol #17-304 EP 1711, Payne.

The Auburn University Institutional Review Board has approved this Document for use from 10/10/2018 to 10/31/2019 Protocol # 17-304 EP 1711

Appendix D E-Mail with Link to Survey

Sender	Kimberly Payne
Sender Email	kap0031@mail1.sogosurveys.com
Reply-To Email	kap0031@mail1.sogosurveys.com
Subject	Research Study: Patterns of Budget Agents Interactions as Indicators of Internal Transparency in the South Eastern Budget process: A Step Toward Normative Budget Theory

This is how your email invitation will look when viewed from the participant's inbox.

Hello,

You are receiving this e-mail because I have received a consent form from you agreeing to participate in my research entitled *Patterns of Budget Agent Interaction as Indicators of Internal Transparency in the South Eastern States Budget Process: A Step toward Normative Budget Theory*. This study is a social network analysis of budget participant's interactions based on information dissemination.

Please access the survey from the button below and complete all of the questions. Your total time commitment will be approximately 15 minutes. I realize that your time is valuable, so I greatly appreciate your cooperation to complete this survey. Thank you for your vital input to this research!

Click Here

We thank you for your time and participation.

Sincerely,

Kimberly Payne

Auburn University

APPENDIX E – State's Surveys

North Carolina Budget Process Social Network Analysis:

Internal Transparency – In order to develop a normative budget theory researchers, need to identify measurable norms of an organizations budget process. Internal transparency is a norm that will allow researchers to measure information dissemination within the budget process.

Cohesion: The Idea of cohesion in a social network is connectedness. These questions will identify relationships and their position in the information flow of the budget process network.

Density: The idea of density in a social network is the degree of connectedness. These connections will identify the number of relationships an individual actor fosters and provide a general density level of the network as a whole.

Centrality: The idea of Centrality in a social network is the extent to which an actor interacts with other actors in the network.

Demographic Questions	
1. Name	
2. Gender	
3. Age	
4.Race/Ethnicity	
5. Level of Education	
6. Major Area of Study	
7. Agency	
8. Who is your Supervisor	
9. Who do you Supervise	
10. Short Job Description	

Network Questions:

11. Who initiates the budget season 'kick-off'?

12. How is the budget season 'kicked-off' for you? E-mail, Meeting, Memo

13. Who are your initial points of contact for the budget process?

14. Directions: Below you will find a list of names of the many people who participate in the North Carolina budget process. IN this section, we are interested in *your perceptions* of whom you might go to for help and advice. That is, if you have a question or problem at work, to whom would you go for help or advice? Please indicate your answer by placing a check to the ***left*** of the names of the people. If there is only one person you would go to, then just check that one person's name. If there are several people you might go to, then check these several names. If there is no one you would go to, then do not check any names. Please add any names not listed.

Who would you seek advice from?	
	List of Names Removed

15. Directions: Below you will find a list of names of the many people who participate in the North Carolina budget process. IN this section, we are interested in your perceptions of whom you might come to you for help and advice. That is, if another budget agent has a question or problem at work, which individuals would come to you for help or advice? (Check all that apply)

	Who would seek advice from you?
List of Names Removed	

16. Directions: Sometimes, one might find it helpful to talk to someone in particular at work about work-related matters, but for one reason or another the person is never approached. Please try to think of who such people might be. That is, who are the people you think would be helpful to talk to that you *don't* talk to? Please indicate your answer by placing a check to the ***left*** of the names of those people. Please add any additional names not listed.

	Who should you seek advice from?
List of Names Removed	

17. Directions: There might be some people at work who should talk to you but for some reason they do not. Try to think of who these people might be. That is, who do you think would find it helpful to talk to you but they never come to you with questions? Please indicate your answer by placing a check next to the name. (Check all that apply)

	Who should seek advice from you?
List of Names Removed	

18. Directions: Below you will find a list of names of the many people who are involved in North Carolina's budget process. IN this section, we are interested in your perception of who is most knowledgeable. Please rank the individuals in the order you would go to them for advice. Ex. 1 for the person you would go to first, 2 second, 3 third. Interaction is defined as actively seek advice or actively answering inquiries about the budget. Please add any additional names not listed.

	Rank 1 -- 32
List of Names Removed	

19. Directions: Below you will find a list of names of many people who participate in the North Carolina budget process. IN this section, we are interested in *your perceptions* of your relationship with the other agents. That is, the nature of the relationship between you and the person listed. Please indicate your answer by placing a check to the right of the name under the column that best describes your relationship. Please add any additional names not listed.

1. **Do not know**- have no knowledge about the individual.
2. **Know the individual by reputation only**- while you can identify the person, you do not have any interaction with the person.
3. **Acquaintance/Co-worker** – You ask an occasional question, work within the same office/agency, would say hello in passing, but do not have any personal interaction for lengthy amounts of time.
4. **Friends at work/Co-Workers** – You seek/ask advice, work within the same office/agency, share some personal information, eat lunch together occasionally at work only.
5. **Friends at & after work/Co-Workers** - You seek advice, eat lunch together at work, do things together outside of work, share personal information within and outside of work.
6. **Friends at work/ work in separate areas** - You seek/ask advice, DO NOT work within the same office/agency, share some personal information, eat lunch together occasionally at work only.
7. **Friends at & after work/work in separate areas** - You seek advice, eat lunch together at work, do things together outside of work, DO NOT work within the same office/agency, share personal information within and outside of work.
8. **Family/Co-Workers** - You seek advice, work in the same office, eat lunch together at work, you are related by blood or marriage, share personal information within and outside of work.
9. **Family/Work in separate areas** – You seek advice, DO NOT work in the same office eat lunch together at work, you are related by blood or marriage, share personal information within and outside of work.
10. **Family Do not associate at work**

Chart on next page.

	Relationship type 1 - 10
List of Names Removed	

20-28. Directions: Below you will find a list of names of many people who are involved in North Carolina's budget process. IN this section, we are interested in *the when your interactions* occur with those individuals you have a budget relationship. Please rank the calendars activity by placing the rank number (next to the interaction description, 1 for do not interact and 4 for heavily interact) in the appropriate calendar. Interaction is defined as actively seek advice or actively answering inquiries about the budget. Please add any additional names not listed.

11. Do not interact with the individual (no occurrences or 0 times)
12. Interact with the individual few (few occurrences, 1-2 times a week)
13. Interact with individual Moderately (most occurrences, or 3 to 5 times a week)
14. Interact with Individual Heavily (every occurrence, intentionally seek out, or 6 to 10 times a week)

	20. August 31 Budget Instructions & Forms mailed	21. October 15 - December 20 Exec Budget Hearings	22. November 1 Budget Request Due	23. December 1 Preliminary Budget Info to Gov,
List of Names Removed				

	24. December 8 Revenue Projections Finalizd	25. January 8 Gov's Budget Recommendations Finalized	26. January 21 - 31 Appropriations Bill prepared	27. February 4 Governor Present Budget to Legislators	28. February - May 18 Regular Session
List of Names Removed					

Georgia Budget Process Social Network Analysis:

Internal Transparency – In order to develop a normative budget theory researchers, need to identify measurable norms of an organizations budget process. Internal transparency is a norm that will allow researchers to measure information dissemination within the budget process.

Cohesion: The Idea of cohesion in a social network is connectedness. These questions will identify relationships and their position in the information flow of the budget process network.

Density: The idea of density in a social network is the degree of connectedness. These connections will identify the number of relationships an individual actor fosters and provide a general density level of the network as a whole.

Centrality: The idea of Centrality in a social network is the extent to which an actor interacts with other actors in the network.

Demographic Questions	
Name	
Gender	
Age	
Agency	
Race/Ethnicity	
Position	
Who Is your Supervisor	
Who do you Supervise	
Years of Education	
Major Area of Study (If Applicable)	
Short Job Description	

Network Questions:

1. Who initiates the budget season 'kick-off'?

2. How is the budget season 'kicked-off' for you? E-mail, Meeting, Memo

3. Who are your initial points of contact for the budget process?

4. Who are any additional contacts when searching for information to answer a budget question or gather required information?

5. Below is a list of names identified from Georgia Governor's Office of Planning and Budget Divisions web page (https://opb.georgia.gov/divisions).

Budget Sections

6. Directions: Below you will find a list of names of the many people who participate in the North Carolina budget process. IN this section, we are interested in *your perceptions* of whom you might go to for help and advice. That is, if you have a question or problem at work, to whom would you go for help or advice? Please indicate your answer by placing a check to the ***left*** of the names of the people. If there is only one person you would go to, then just check that one person's name. If there are several people you might go to, then check these several names. If there is no one you would go to, then do not check any names. Please add any names not listed.

Also, we are interested in *who you think might come to you for help or advice at work.* Please indicate the names of these people by placing a check to the ***right*** of their names. Again, you could check one name, many names, or no names at all, depending on how many people you perceive might come to you for help and advice at work.

Who would you seek advice from?		Who would seek advice from you?	Who would you seek advice from?		Who would seek advice from you?
	Budget Agent				

7. Directions: Sometimes, one might find it helpful to talk to someone in particular at work about work-related matters, but for one reason or another the person is never approached. Please try to think of who such people might be. That is, who are the people you think would be helpful to talk to that you *don't* talk to? Please indicate your answer by placing a check to the ***left*** of the names of those people. Please add any additional names not listed.

Similarly, there might be some people at work who should talk to you but does not. Try to think of who these people might be. That is, who do you think would find it helpful to talk to you but doesn't? Please indicate your answer by placing a check to the ***right*** of the names (or titles) of those people.

Again, you could check one name, many names, or no name at all, depending on your perceptions of who would find it helpful and who talks to whom.

Who might be helpful to talk to that you do not?		Who do you think might need to talk to you but does not?	Who might be helpful to talk to that you do not?		Who do you think might need to talk to you but does not?

8. Directions: Below you will find a list of names of many people who participate in the North Carolina budget process. IN this section, we are interested in *your perceptions* of your relationship with the other agents. That is, the nature of the relationship between you and the person listed. Please indicate your answer by placing a check to the right of the name under the column that best describes your relationship. Please add any additional names not listed.

15. **Do not know**- have no knowledge about the individual.
16. **Know the individual by reputation only**- while you can identify the person, you do not have any interaction with the person.
17. **Acquaintance/Co-worker** – You ask an occasional question, work within the same office/agency, would say hello in passing, but do not have any personal interaction for lengthy amounts of time.
18. **Friends at work/Co-Workers** – You seek/ask advice, work within the same office/agency, share some personal information, eat lunch together occasionally at work only.
19. **Friends at & after work/Co-Workers** - You seek advice, eat lunch together at work, do things together outside of work, share personal information within and outside of work.
20. **Friends at work/ work in separate areas** - You seek/ask advice, DO NOT work within the same office/agency, share some personal information, eat lunch together occasionally at work only.
21. **Friends at & after work/work in separate areas** - You seek advice, eat lunch together at work, do things together outside of work, DO NOT work within the same office/agency, share personal information within and outside of work.
22. **Family/Co-Workers** - You seek advice, work in the same office, eat lunch together at work, you are related by blood or marriage, share personal information within and outside of work.
23. **Family/Work in separate areas** – You seek advice, DO NOT work in the same office eat lunch together at work, you are related by blood or marriage, share personal information within and outside of work.
24. **Family Do not associate at work**

Chart on next page.

	Don't Know	Know Reputation Only	Acquaintance/ Co-Worker	Friends at work/ Co-workers	Friends at & after work/ Co-workers	Friends at work/ Separate areas	Friends at & after work/ Separate	Family/ Co-workers	Family/ Separate areas	Family do not associate at work

9. Directions: Below you will find a list of names of many people who are involved in North Carolina's budget process. IN this section, we are interested in *the when your interactions* occur with those individuals you have a budget relationship. Please rank the calendars activity by placing the rank number (next to the interaction description, 1 for do not interact and 4 for heavily interact) in the appropriate calendar. Interaction is defined as actively seek advice or actively answering inquiries about the budget. Please add any additional names not listed.

25. Do not interact with the individual (no occurrences or 0 times)
26. Interact with the individual few (few occurrences, 1-2 times a week)
27. Interact with individual Moderately (most occurrences, or 3 to 5 times a week)
28. Interact with Individual Heavily (every occurrence, intentionally seek out, or 6 to 10 times a week)

	Phase 1 Agencies	Phase 2 - OPB	Phase 3 - Governor	Phase 4 - Legislature	Phase 5 - Governor	Phase 6 – OPB & Auditor

10. Directions: Below you will find a list of names of the many people who are involved in Georgia's budget process. IN this section, we are interested in *your perception* of who is most knowledgeable. Please rank the individuals in the order you would go to them for advice. Ex. 1 for the person you would go to first, 2 second, 3 third. Interaction is defined as actively seek advice or actively answering inquiries about the budget. Please add any additional names not listed.

Name	Ranking

Tennessee Budget Process Social Network Analysis:

Internal Transparency – In order to develop a normative budget theory researchers need to identify measurable norms of an organizations budget process. Internal transparency is a norm that will allow researchers to measure information dissemination within the budget process.

Cohesion: The Idea of cohesion in a social network is connectedness. These questions will identify relationships and their position in the information flow of the budget process network.

Density: The idea of density in a social network is the degree of connectedness. These connections will identify the number of relationships an individual actor fosters and provide a general density level of the network as a whole.

Centrality: The idea of Centrality in a social network is the extent to which an actor interacts with other actors in the network.

Demographic Questions	
Name	
Gender	
Age	
Agency	
Race/Ethnicity	
Position	
Who Is your Supervisor	
Who do you Supervise	
Years of Education	
Major Area of Study (If Applicable)	
Short Job Description	

Network Questions:

11. Who initiates the budget season 'kick-off'?

12. How is the budget season 'kicked-off' for you? E-mail, Meeting, Memo

13. Who are your initial points of contact for the budget process?

14. Directions: Below you will find a list of names of the many people who participate in the Tennessee budget process. IN this section, we are interested in *your perceptions* of whom you might go to for help and advice. That is, if you have a question or problem at work, to whom would you go for help or advice? Please indicate your answer by placing a check to the ***left*** of the names of the people. If there is only one person you would go to, then just check that one person's name. If there are several people you might go to, then check these several names. If there is no one you would go to, then do not check any names. Please add any names not listed.

Who would you seek advice from?	

15. Directions: Below you will find a list of names of the many people who participate in the Tennessee budget process. IN this section, we are interested in your perceptions of whom you might come to you for help and advice. That is, if another budget agent has a question or problem at work, which individuals would come to you for help or advice? (Check all that apply)

Who would you seek advice from?	

16. Directions: Sometimes, one might find it helpful to talk to someone in particular at work about work-related matters, but for one reason or another the person is never approached. Please try to think of who such people might be. That is, who are the people you think would be helpful to talk to that you *don't* talk to? Please indicate your answer by placing a check to the ***left*** of the names of those people. Please add any additional names not listed.

Who might be helpful to talk to that you do not?	

17. Directions: There might be some people at work who should talk to you but for some reason they do not. Try to think of who these people might be. That is, who do you think would find it helpful to talk to you but they never come to you with questions? Please indicate your answer by placing a check next to the name. (Check all that apply)

Who might be helpful to talk to that you do not?	

18. Directions: Below you will find a list of names of the many people who are involved in Tennessee's budget process. IN this section, we are interested in your perception of who is most knowledgeable. Please rank the individuals in the order you would go to them for advice. Ex. 1 for the person you would go to first, 2 second, 3 third. Interaction is defined as actively seek advice or actively answering inquiries about the budget. Please add any additional names not listed.

Name	Ranking

19. Directions: Below you will find a list of names of many people who participate in the Tennessee budget process. IN this section, we are interested in *your perceptions* of your relationship with the other agents. That is, the nature of the relationship between you and the person listed. Please indicate your answer by placing a check to the right of the name under the column that best describes your relationship. Please add any additional names not listed.

29. **Do not know**- have no knowledge about the individual.
30. **Know the individual by reputation only**- while you can identify the person, you do not have any interaction with the person.
31. **Acquaintance/Co-worker** – You ask an occasional question, work within the same office/agency, would say hello in passing, but do not have any personal interaction for lengthy amounts of time.
32. **Friends at work/Co-Workers** – You seek/ask advice, work within the same office/agency, share some personal information, eat lunch together occasionally at work only.
33. **Friends at & after work/Co-Workers** - You seek advice, eat lunch together at work, do things together outside of work, share personal information within and outside of work.
34. **Friends at work/ work in separate areas** - You seek/ask advice, DO NOT work within the same office/agency, share some personal information, eat lunch together occasionally at work only.
35. **Friends at & after work/work in separate areas** - You seek advice, eat lunch together at work, do things together outside of work, DO NOT work within the same office/agency, share personal information within and outside of work.
36. **Family/Co-Workers** - You seek advice, work in the same office, eat lunch together at work, you are related by blood or marriage, share personal information within and outside of work.
37. **Family/Work in separate areas** – You seek advice, DO NOT work in the same office eat lunch together at work, you are related by blood or marriage, share personal information within and outside of work.
38. **Family Do not associate at work**

Chart on next page.

	Don't Know	Know Reputation Only	Acquaintance/ Co-Worker	Friends at work/ Co-workers	Friends at & after work/ Co-workers	Friends at work/ Separate areas	Friends at & after work/ Separate	Family/ Co-workers	Family/ Separate areas	Family do not associate at work

20-28. Directions: Below you will find a list of names of many people who are involved in Tennessee's budget process. IN this section, we are interested in *the when your interactions* occur with those individuals you have a budget relationship. Please rank the calendars activity by placing the rank number (next to the interaction description, 1 for do not interact and 4 for heavily interact) in the appropriate calendar. Interaction is defined as actively seek advice or actively answering inquiries about the budget. Please add any additional names not listed.

39. Do not interact with the individual (no occurrences or 0 times)

40. Interact with the individual few (few occurrences, 1-2 times a week)

41. Interact with individual Moderately (most occurrences, or 3 to 5 times a week)

42. Interact with Individual Heavily (every occurrence, intentionally seek out, or 6 to 10 times a week)

	July – Sseptember Planning & Estimation	October – January Budget Preparation	January – May Legislative Deliberation	June – Juy Budget Execution

Appendix F CONCOR Correlation Tables

North Carolina's CONCOR Correlation Table

	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011	A012	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	1	0.77	0.65	0.6	0.32	-0.3	0.36	0.15	0.42	0.12	-0.1	0.12	0.31	0.07	0.7	0.25	0.36	0.17	-0.3	0	0.12	0.62	0.55	-0.1	0.27	0.22	0.5	0.54	-0.3
A002	0.77	1	0.71	0.57	0.21	-0.3	0.39	0.18	0.38	0.27	-0	0.08	0.35	0.18	0.53	0.34	0.38	0.25	-0.3	0.01	0	0.75	0.57	-0.1	0.25	0.05	0.43	0.36	-0.3
A003	0.65	0.71	1	0.4	0.37	-0.1	0.42	0.37	0.44	0.17	-0.2	-0	0.31	0.03	0.48	0.44	0.41	0.42	-0.2	0.1	0.2	0.59	0.52	-0	0.3	0.26	0.37	0.4	-0.1
A004	0.6	0.57	0.4	1	0.39	-0	0.44	0.31	0.36	0.2	0.05	0.13	0.33	0.16	0.49	0.46	0.27	0.35	-0.1	0.02	-0	0.51	0.39	0.02	0.09	0.23	0.23	0.26	-0.1
A005	0.3	0.2	0.4	0.4	1	0.5	0.5	0.8	0.1	0.1	0.3	0.1	0	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.4	0.3	0.2	0.4	0.4	0.4	0.3
A006	-0.3	-0.3	-0.1	-0	0.47	1	0.31	0.58	-0.2	0.18	0.12	0.18	-0.2	0.07	-0.3	0.23	0.2	0.24	0.77	0.55	0.47	-0.4	0.08	0.59	0.02	0.23	0.02	0.06	0.8
A007	0.4	0.4	0.4	0.4	0.5	0.3	1	0.5	0.2	0.4	0.2	0.1	0.4	0.2	0.4	0.5	0.6	0.4	0.2	0.3	0.3	0.3	0.5	0.3	0.4	0.4	0.3	0.3	0.2
A008	0.15	0.18	0.37	0.31	0.8	0.58	0.47	1	-0.1	0.18	0.33	0.09	0.04	0.07	-0.1	0.38	0.34	0.3	0.47	0.29	0.48	0.11	0.51	0.32	0.22	0.3	0.21	0.27	0.43
A009	0.42	0.38	0.44	0.36	0.05	-0.2	0.18	-0.1	1	0.52	0.42	0.43	0.54	0.41	0.54	0.12	0.24	0.11	-0.2	-0	-0.2	0.4	0.23	-0	0.21	0.11	0.22	0.25	-0.2
A010	0.1	0.3	0.2	0.2	0.1	0.2	0.4	0.2	0.5	1	0.8	0.6	0.6	0.7	0.2	0.3	0.3	0.2	0.3	0.3	0.1	0.1	0.3	0.2	0.5	0.5	0.3	0.3	0.1
A011	-0.1	-0	-0.2	0.05	0.33	0.12	0.21	0.33	0.42	0.84	1	0.66	0.63	0.84	0.16	0.21	0.21	0.14	0.47	0.38	0.62	-0.1	0.14	0.05	0.75	0.62	0.25	0.25	-0.1
A012	0.12	0.08	-0	0.13	0.13	0.18	0.12	0.09	0.43	0.59	0.66	1	0.29	0.8	0.02	0.13	0.24	0.19	0.22	0.31	0.02	0.15	0.08	0.19	0.35	0.23	0.25	0.2	0.21
A013	0.31	0.35	0.31	0.33	0.02	-0.2	0.38	0.04	0.54	0.56	0.63	0.29	1	0.57	0.42	0.29	0.4	0.21	-0.2	0.04	0.01	0.44	0.31	-0.2	0.48	0.31	0.17	0.23	-0.3
A014	0.07	0.18	0.03	0.16	0.09	0.07	0.17	0.07	0.41	0.69	0.84	0.8	0.57	1	0.09	0.13	0.22	0.12	0.1	0.26	-0	0.08	0.06	-0	0.44	0.39	0.35	0.3	0.01
A015	0.7	0.53	0.48	0.49	0.14	-0.3	0.38	-0.1	0.54	0.17	0.16	0.02	0.42	0.09	1	0.34	0.38	0.24	-0.3	0.01	0.08	0.6	0.33	-0.1	0.16	0.14	0.43	0.46	-0.3
A016	0.3	0.3	0.4	0.5	0.3	0.2	0.5	0.4	0.1	0.3	0.2	0.1	0.3	0.1	0.3	1	0.7	0.9	0.4	0.7	0.5	0.3	0.4	0.4	0.4	0.5	0.2	0.3	0.2
A017	0.4	0.4	0.4	0.3	0.3	0.2	0.6	0.3	0.2	0.3	0.2	0.2	0.4	0.2	0.4	0.7	1	0.7	0.3	0.6	0.5	0.4	0.6	0.3	0.4	0.4	0.2	0.3	0.2
A018	0.2	0.3	0.4	0.4	0.3	0.2	0.4	0.3	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.9	0.7	1	0.4	0.6	0.5	0.3	0.4	0.4	0.3	0.4	0.2	0.2	0.3
A019	-0.3	-0.3	-0.2	-0.1	0.34	0.77	0.2	0.47	-0.2	0.31	0.47	0.22	-0.2	0.1	-0.3	0.37	0.34	0.39	1	0.69	0.6	-0.5	0.14	0.78	0.15	0.37	0.05	0.09	0.73
A020	0	0.01	0.1	0.02	0.26	0.55	0.32	0.29	-0	0.29	0.38	0.31	0.04	0.26	0.01	0.66	0.63	0.64	0.69	1	0.57	-0.1	0.27	0.6	0.18	0.38	0.17	0.22	0.54
A021	0.12	0	0.2	-0	0.33	0.47	0.3	0.48	-0.2	0.11	0.62	0.02	0.01	-0	0.08	0.51	0.47	0.5	0.6	0.57	1	-0.1	0.41	0.49	0.33	0.52	0.23	0.29	0.4
A022	0.62	0.75	0.59	0.51	0.17	-0.4	0.31	0.11	0.4	0.14	-0.1	0.15	0.44	0.08	0.6	0.34	0.38	0.3	-0.5	-0.1	-0.1	1	0.57	-0.3	0.1	0.02	0.35	0.37	-0.3
A023	0.6	0.6	0.5	0.4	0.4	0.1	0.5	0.5	0.2	0.3	0.1	0.1	0.3	0.1	0.3	0.4	0.6	0.4	0.1	0.3	0.4	0.6	1	0.3	0.2	0.3	0.5	0.5	0.2
A024	-0.1	-0.1	-0	0.02	0.3	0.59	0.29	0.32	-0	0.19	0.05	0.19	-0.2	-0	-0.1	0.36	0.34	0.44	0.78	0.6	0.49	-0.3	0.3	1	0.12	0.28	0.09	0.12	0.69
A025	0.27	0.25	0.3	0.09	0.19	0.02	0.36	0.22	0.21	0.5	0.75	0.35	0.48	0.44	0.16	0.36	0.37	0.26	0.15	0.18	0.33	0.1	0.19	0.12	1	0.41	0.23	0.29	-0.1
A026	0.2	0.1	0.3	0.2	0.4	0.2	0.4	0.3	0.1	0.5	0.6	0.2	0.3	0.4	0.1	0.5	0.4	0.4	0.4	0.4	0.5	0	0.3	0.3	0.4	1	0.4	0.5	0.2
A027	0.5	0.4	0.4	0.2	0.4	0	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.4	0.5	0.1	0.2	0.4	1	0.9	0.1
A028	0.5	0.4	0.4	0.3	0.4	0.1	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.5	0.3	0.3	0.2	0.1	0.2	0.3	0.4	0.5	0.1	0.3	0.5	0.9	1	0.1
A029	-0.3	-0.3	-0.1	-0.1	0.32	0.8	0.15	0.43	-0.2	0.11	-0.1	0.21	-0.3	0.01	-0.3	0.22	0.2	0.3	0.73	0.54	0.4	-0.3	0.24	0.69	-0.1	0.18	0.11	0.14	1

Georgia

GA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	1	0.33	0.7	0.69	-0	-0.1	-0	0.25	0.69	-0.1	-0	0	0.48	0	0.38	0.81	0	-0	-0.1	0.28	0.48	0.48	-0.1	-0	0.69	-0.1	0	-0.1	-0	-0	0	-0
C2	0.33	1	0.31	0.36	-0.1	0.07	-0.1	0.24	0.36	0.14	0.18	0	0.18	0	0.55	0.47	0	0.44	0.57	0.38	0.44	0.44	0.03	0.31	0.36	0.05	0	0.21	0.31	0.12	0	0.18
C3	0.7	0.31	1	0.49	-0	-0	-0	0.39	0.49	-0.1	-0	0	0.7	0	0.57	0.57	0	-0	0	0.43	0.7	0.7	-0.1	-0	0.49	-0.1	0	-0	-0	-0	0	-0
C4	0.69	0.36	0.49	1	0.49	-0.1	0.49	0.48	0.46	-0.1	-0.1	0	0.32	0	0.55	0.55	0	-0.1	-0.1	0.16	0.32	0.69	-0.1	-0	0.46	-0.1	0	-0.1	-0	-0.1	0	-0.1
C5	-0	-0.1	-0	0.49	1	0	1	0.39	-0	-0.1	-0	0	-0	0	-0	-0	0	-0	-0.1	-0	-0	-0	-0.1	-0	-0	-0.1	0	-0	-0	-0	0	-0
C6	-0.1	0.07	-0	-0.1	0	1	0	0.21	-0.1	-0.1	-0.1	0	-0.1	0	-0.1	-0.1	0	-0.1	0.14	-0.1	-0.1	-0.1	-0.1	-0	-0.1	-0.1	0	-0.1	-0	-0.1	0	-0.1
C7	-0	-0.1	-0	0.49	1	0	1	0.39	-0	-0.1	-0	0	-0	0	-0	-0	0	-0	-0.1	-0	-0	-0	-0.1	-0	-0	-0.1	0	-0	-0	-0	0	-0
C8	0.25	0.24	0.39	0.48	0.39	0.21	0.39	1	0.13	-0.1	-0.1	0	0.25	0	0.28	0.18	0	-0.1	0.38	0.1	0.25	0.43	0.05	-0	0.13	0.09	0	-0.1	-0	-0.1	0	-0.1
C9	0.69	0.36	0.49	0.46	-0	-0.1	-0	0.13	1	0.18	0.69	0	0.69	0	0.55	0.55	0	0.32	0.22	0.64	0.32	0.32	-0.1	-0	0.73	-0.1	0	0.16	0.49	0.55	0	0.32
C10	-0.1	0.14	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.18	1	0.39	0	-0	0	0.15	-0.1	0	0.22	0.32	0.13	-0.1	-0.1	0.19	-0.1	0.11	0.53	0	0.45	0.36	0.25	0	0.22
C11	-0	0.18	-0	-0.1	-0	-0.1	-0	-0.1	0.69	0.39	1	0	0.48	0	0.38	-0	0	0.48	0.31	0.62	-0	-0	-0.1	-0	0.32	-0.1	0	0.28	0.7	0.81	0	0.48
C12	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
C13	0.48	0.18	0.7	0.32	-0	-0.1	-0	0.25	0.69	-0	0.48	0	1	0	0.38	0.38	0	-0	0.23	0.62	0.48	0.48	-0.1	-0	0.32	-0.1	0	-0.1	-0	0.38	0	-0
C14	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
C15	0.38	0.55	0.57	0.55	-0	-0.1	-0	0.28	0.55	0.15	0.38	0	0.38	0	1	0.3	0	0.38	0.11	0.48	0.38	0.81	-0.1	-0	0.55	-0.1	0	0.21	0.57	0.3	0	0.38
C16	0.81	0.47	0.57	0.55	-0	-0.1	-0	0.18	0.55	-0.1	-0	0	0.38	0	0.3	1	0	0.38	0.11	0.48	0.81	0.38	-0.1	0.57	0.55	-0.1	0	-0.1	-0	-0.1	0	-0
C17	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
C18	-0	0.44	-0	-0.1	-0	-0.1	-0	-0.1	0.32	0.22	0.48	0	-0	0	0.38	0.38	0	1	0.31	0.62	0.48	-0	-0	0.7	0.32	-0.1	0	0.28	0.7	0.38	0	0.48
C19	-0.1	0.57	0	-0.1	-0.1	0.14	-0.1	0.38	0.22	0.32	0.31	0	0.23	0	0.11	0.11	0	0.31	1	0.31	0.23	-0.1	0.32	0.22	0.04	0.19	0	0.23	0.22	0.21	0	0.1
C20	0.28	0.38	0.43	0.16	-0	-0.1	-0	0.1	0.64	0.13	0.62	0	0.62	0	0.48	0.48	0	0.62	0.31	1	0.62	0.28	-0.1	0.43	0.64	-0.1	0	0.2	0.43	0.76	0	0.62
C21	0.48	0.44	0.7	0.32	-0	-0.1	-0	0.25	0.32	-0.1	-0	0	0.48	0	0.38	0.81	0	0.48	0.23	0.62	1	0.48	-0	0.7	0.32	-0.1	0	-0.1	-0	-0	0	-0
C22	0.48	0.44	0.7	0.69	-0	-0.1	-0	0.43	0.32	-0.1	-0	0	0.48	0	0.81	0.38	0	-0	-0.1	0.28	0.48	1	-0.1	-0	0.32	-0.1	0	-0.1	-0	-0	0	-0
C23	-0.1	0.03	-0.1	-0.1	-0.1	-0.1	-0.1	0.05	-0.1	0.19	-0.1	0	-0.1	0	-0.1	-0.1	0	-0	0.32	-0.1	-0	-0.1	1	0	-0.1	0.31	0	0.08	-0.1	-0.1	0	-0.1
C24	-0	0.31	-0	-0	-0	-0	-0	-0	-0	-0.1	-0	0	-0	0	-0	0.57	0	0.7	0.22	0.43	0.7	-0	0	1	-0	-0.1	0	-0	-0	-0	0	-0
C25	0.69	0.36	0.49	0.46	-0	-0.1	-0	0.13	0.73	0.11	0.32	0	0.32	0	0.55	0.55	0	0.32	0.04	0.64	0.32	0.32	-0.1	-0	1	-0.1	0	0.25	0.49	0.55	0	0.69
C26	-0.1	0.05	-0.1	-0.1	-0.1	-0.1	-0.1	0.09	-0.1	0.53	-0.1	0	-0.1	0	-0.1	-0.1	0	-0.1	0.19	-0.1	-0.1	-0.1	0.31	-0.1	-0.1	1	0	0.53	0	-0.1	0	-0.1
C27	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
C28	-0.1	0.21	-0	-0.1	-0	-0.1	-0	-0.1	0.16	0.45	0.28	0	-0.1	0	0.21	-0.1	0	0.28	0.23	0.2	-0.1	-0.1	0.08	-0	0.25	0.53	0	1	0.43	0.32	0	0.49
C29	-0	0.31	-0	-0	-0	-0	-0	-0	0.49	0.36	0.7	0	-0	0	0.57	-0	0	0.7	0.22	0.43	-0	-0	-0.1	-0	0.49	0	0	0.43	1	0.57	0	0.7
C30	-0	0.12	-0	-0.1	-0	-0.1	-0	-0.1	0.55	0.25	0.81	0	0.38	0	0.3	-0.1	0	0.38	0.21	0.76	-0	-0	-0.1	-0	0.55	-0.1	0	0.32	0.57	1	0	0.81
C31	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0

C32	-0	0.18	-0	-0.1	-0	-0.1	-0	-0.1	0.32	0.22	0.48	0	-0	0	0.38	-0	0	0.48	0.1	0.62	-0	-0	-0.1	-0	0.69	-0.1	0	0.49	0.7	0.81	0	1

Tennessee

TN	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	1	0.94	0.63	0.63	0.63	0.76	-0.1	0.63	0.56	-0	-0.1	0.7	0.35	0.7	0.55	0.25	0.44	0.26	0.22	0.48	0.56	0.88	0.29	0.63	0.39	0.34	0.15	0.38
B2	0.94	1	0.67	0.67	0.67	0.81	-0	0.68	0.59	0.02	-0	0.74	0.38	0.74	0.59	0.3	0.39	0.28	0.19	0.51	0.59	0.81	0.33	0.67	0.44	0.37	0.23	0.33
B3	0.6	0.7	1	0.8	0.8	0.6	0.1	0.5	0.9	0.2	0.1	0.7	0.6	0.7	0.7	0.4	0.4	0.5	0.2	0.8	0.4	0.7	0.3	0.6	0.5	0.5	0.2	0.4
B4	0.6	0.7	0.8	1	1	0.8	0.2	0.7	0.9	0.2	0.2	0.9	0.6	0.9	0.9	0.5	0.4	0.5	0.2	0.8	0.4	0.7	0.3	0.3	0.5	0.5	0.2	0.6
B5	0.6	0.7	0.8	1	1	0.8	0.2	0.7	0.9	0.2	0.2	0.9	0.6	0.9	0.9	0.5	0.4	0.5	0.2	0.8	0.4	0.7	0.3	0.3	0.5	0.5	0.2	0.6
B6	0.8	0.8	0.6	0.8	0.8	1	0.1	0.9	0.7	0.2	0.2	0.9	0.5	0.9	0.7	0.5	0.5	0.4	0.2	0.6	0.5	0.7	0.4	0.4	0.5	0.4	0.3	0.5
B7	-0.1	-0	0.14	0.23	0.23	0.1	1	0.01	0.22	0.81	0.62	0.16	0.38	0.16	0.16	0.62	0.42	0.46	0.51	0.31	0.07	0.01	0.32	0.01	0.39	0.46	0.55	0.52
B8	0.6	0.7	0.5	0.7	0.7	0.9	0	1	0.6	0.1	0.2	0.8	0.5	0.8	0.8	0.3	0.3	0.4	0.2	0.5	0.4	0.6	0.3	0.4	0.4	0.3	0.1	0.4
B9	0.6	0.6	0.9	0.9	0.9	0.7	0.2	0.6	1	0.3	0.2	0.8	0.7	0.8	0.8	0.5	0.4	0.6	0.2	0.9	0.5	0.6	0.4	0.4	0.5	0.6	0.2	0.5
B10	-0	0.02	0.19	0.19	0.19	0.18	0.81	0.07	0.29	1	0.63	0.25	0.42	0.12	0.12	0.61	0.4	0.41	0.57	0.28	0.03	-0	0.25	-0	0.49	0.41	0.62	0.37
B11	-0.1	-0	0.09	0.24	0.24	0.17	0.62	0.24	0.2	0.63	1	0.14	0.28	0.27	0.27	0.5	0.21	0.25	0.73	0.16	0.08	0.03	0.17	-0	0.29	0.27	0.72	0.32
B12	0.7	0.7	0.7	0.9	0.9	0.9	0.2	0.8	0.8	0.3	0.1	1	0.6	0.8	0.8	0.5	0.5	0.4	0.2	0.7	0.4	0.6	0.3	0.3	0.6	0.4	0.2	0.5
B13	0.4	0.4	0.6	0.6	0.6	0.5	0.4	0.5	0.7	0.4	0.3	0.6	1	0.6	0.6	0.5	0.5	0.7	0.2	0.6	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.5
B14	0.7	0.7	0.7	0.9	0.9	0.9	0.2	0.8	0.8	0.1	0.3	0.8	0.6	1	0.8	0.4	0.4	0.4	0.2	0.7	0.6	0.8	0.4	0.5	0.5	0.4	0.2	0.5
B15	0.6	0.6	0.7	0.9	0.9	0.7	0.2	0.8	0.8	0.1	0.3	0.8	0.6	0.8	1	0.4	0.3	0.6	0.1	0.7	0.4	0.6	0.3	0.3	0.5	0.4	0.1	0.5
B16	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.3	0.5	0.6	0.5	0.5	0.5	0.4	0.4	1	0.5	0.3	0.4	0.4	0.1	0.3	0.3	0.1	0.7	0.6	0.4	0.6
B17	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.2	0.5	0.5	0.4	0.3	0.5	1	0.3	0.5	0.3	0.2	0.5	0.6	0.2	0.7	0.5	0.5	0.5
B18	0.3	0.3	0.5	0.5	0.5	0.4	0.5	0.4	0.6	0.4	0.3	0.4	0.7	0.4	0.6	0.3	0.3	1	0.2	0.7	0.4	0.3	0.3	0.3	0.2	0.4	0.2	0.4
B19	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.2	0.2	0.6	0.7	0.2	0.2	0.2	0.1	0.4	0.5	0.2	1	0.1	0.2	0.3	0.3	0.2	0.4	0.2	0.8	0.3
B20	0.5	0.5	0.8	0.8	0.8	0.6	0.3	0.5	0.9	0.3	0.2	0.7	0.6	0.7	0.7	0.4	0.3	0.7	0.1	1	0.6	0.5	0.5	0.5	0.4	0.7	0.2	0.6
B21	0.6	0.6	0.4	0.4	0.4	0.5	0.1	0.4	0.5	0	0.1	0.4	0.3	0.6	0.4	0.1	0.2	0.4	0.2	0.6	1	0.6	0.5	0.9	0.2	0.4	0	0.3
B22	0.88	0.81	0.71	0.71	0.71	0.71	0.01	0.6	0.63	-0	0.03	0.63	0.42	0.79	0.63	0.27	0.45	0.31	0.28	0.54	0.63	1	0.37	0.71	0.37	0.31	0.09	0.46
B23	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.6	0.3	0.3	0.5	0.5	0.4	1	0.4	0.6	0.6	0.3	0.6
B24	0.63	0.67	0.56	0.34	0.34	0.44	0.01	0.37	0.4	-0	-0	0.29	0.25	0.49	0.29	0.08	0.23	0.29	0.19	0.48	0.89	0.71	0.44	1	0.17	0.29	0.06	0.22
B25	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.3	0.6	0.4	0.5	0.5	0.7	0.7	0.2	0.4	0.4	0.2	0.4	0.6	0.2	1	0.6	0.4	0.7
B26	0.3	0.4	0.5	0.5	0.5	0.4	0.5	0.3	0.6	0.4	0.3	0.4	0.4	0.4	0.4	0.6	0.5	0.4	0.2	0.7	0.4	0.3	0.6	0.3	0.6	1	0.2	0.5

B27	0.2	0.2	0.2	0.2	0.2	0.3	0.6	0.1	0.2	0.6	0.7	0.2	0.3	0.2	0.1	0.4	0.5	0.2	0.8	0.2	0	0.1	0.3	0.1	0.4	0.2	1	0.3
B28	0.4	0.3	0.4	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.3	0.5	0.5	0.5	0.5	0.6	0.5	0.4	0.3	0.6	0.3	0.5	0.6	0.2	0.7	0.5	0.3	1

Appendix G State's Homophily Tables

North Carolina

Gender	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
A001	0.556	-0.111	0.556		0		15	12
A002	0.556	-0.111	0.556		0		15	12
A003	0.407	0.185	0.407		0		11	16
A004	0.556	-0.111	0.556		0		15	12
A005	0.556	-0.111	0.556		0		15	12
A006	0.556	-0.111	0.556		0		15	12
A007	0.407	0.185	0.407		0		11	16
A008	0.556	-0.111	0.556		0		15	12
A009	0.407	0.185	0.407		0		11	16
A010	0.407	0.185	0.407		0		11	16
A011							0	0
A012	0.556	-0.111	0.556		0		15	12
A013	0.556	-0.111	0.556		0		15	12
A014	0.556	-0.111	0.556		0		15	12
A015	0.407	0.185	0.407		0		11	16
A016	0.407	0.185	0.407		0		11	16
A017	0.556	-0.111	0.556		0		15	12
A018	0.407	0.185	0.407		0		11	16
A019	0.407	0.185	0.407		0		11	16
A020	0.556	-0.111	0.556		0		15	12
A021	0.407	0.185	0.407		0		11	16
A022	0.556	-0.111	0.556		0		15	12
A023	0.407	0.185	0.407		0		11	16
A024	0.407	0.185	0.407		0		11	16
A025	0.556	-0.111	0.556		0		15	12
A026	0.556	-0.111	0.556		0		15	12
A027	0.44	0.12	0.481	1	0.104	0.235	11	14
A028	0.56	-0.12	0.556	0.12	0.018	0.032	14	11
A029	0.56	-0.12	0.556	0.12	0.018	0.032	14	11

Age	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
A001	0.37	0.259	0.37		0		10	17
A002	0.185	0.63	0.185		0		5	22
A003	0.37	0.259	0.37		0		10	17
A004	0.37	0.259	0.37		0		10	17
A005	0.37	0.259	0.37		0		10	17
A006	0.37	0.259	0.37		0		10	17
A007	0.37	0.259	0.37		0		10	17
A008	0.37	0.259	0.37		0		10	17
A009	0.185	0.63	0.185		0		5	22
A010	0.37	0.259	0.37		0		10	17
A011							0	0
A012	0.37	0.259	0.37		0		10	17
A013	0.185	0.63	0.185		0		5	22
A014	0.37	0.259	0.37		0		10	17
A015	0.185	0.63	0.185		0		5	22
A016	0.185	0.63	0.185		0		5	22
A017	0.37	0.259	0.37		0		10	17
A018	0.37	0.259	0.37		0		10	17
A019	0.37	0.259	0.37		0		10	17
A020	0.37	0.259	0.37		0		10	17
A021	0.37	0.259	0.37		0		10	17
A022	0.37	0.259	0.37		0		10	17
A023	0.37	0.259	0.37		0		10	17
A024	0.37	0.259	0.37		0		10	17
A025	0.185	0.63	0.185		0		5	22
A026	0.37	0.259	0.37		0		10	17
A027	0.36	0.28	0.37	-0.28	-0.031	-0.076	9	16
A028	0.36	0.28	0.37	-0.28	-0.031	-0.076	9	16
A029	0.4	0.2	0.444	1	0.09	0.217	10	15

Ethnicity	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
A001	0.889	-0.778	0.889		0		24	3
A002	0.889	-0.778	0.889		0		24	3
A003	0.889	-0.778	0.889		0		24	3
A004	0.889	-0.778	0.889		0		24	3
A005	0.889	-0.778	0.889		0		24	3
A006	0.889	-0.778	0.889		0		24	3
A007	0.889	-0.778	0.889		0		24	3
A008	0.889	-0.778	0.889		0		24	3
A009	0.889	-0.778	0.889		0		24	3
A010	0.889	-0.778	0.889		0		24	3
A011							0	0
A012	0.889	-0.778	0.889		0		24	3
A013	0.889	-0.778	0.889		0		24	3
A014	0.889	-0.778	0.889		0		24	3
A015	0.889	-0.778	0.889		0		24	3
A016	0.889	-0.778	0.889		0		24	3
A017	0.889	-0.778	0.889		0		24	3
A018	0.074	0.852	0.074		0		2	25
A019	0.889	-0.778	0.889		0		24	3
A020	0.889	-0.778	0.889		0		24	3
A021	0.889	-0.778	0.889		0		24	3
A022	0.074	0.852	0.074		0		2	25
A023	0.889	-0.778	0.889		0		24	3
A024	0.889	-0.778	0.889		0		24	3
A025	0.889	-0.778	0.889		0		24	3
A026	0.889	-0.778	0.889		0		24	3
A027	0.08	0.84	0.148	1	0.013	0.08	2	23
A028	0.92	-0.84	0.889	0.84	0.341	0.35	23	2
A029	0.92	-0.84	0.889	0.84	0.341	0.35	23	2

Ed Level	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
A001	0.667	-0.333	0.667		0		18	9
A002	0.667	-0.333	0.667		0		18	9
A003	0.667	-0.333	0.667		0		18	9
A004	0.667	-0.333	0.667		0		18	9
A005	0.667	-0.333	0.667		0		18	9
A006	0.667	-0.333	0.667		0		18	9
A007	0.222	0.556	0.222		0		6	21
A008	0.667	-0.333	0.667		0		18	9
A009	0.222	0.556	0.222		0		6	21
A010	0.037	0.926	0.037		0		1	26
A011							0	0
A012	0.667	-0.333	0.667		0		18	9
A013	0.667	-0.333	0.667		0		18	9
A014	0.667	-0.333	0.667		0		18	9
A015	0.667	-0.333	0.667		0		18	9
A016	0.222	0.556	0.222		0		6	21
A017	0.222	0.556	0.222		0		6	21
A018	0.667	-0.333	0.667		0		18	9
A019	0.667	-0.333	0.667		0		18	9
A020	0.222	0.556	0.222		0		6	21
A021	0.667	-0.333	0.667		0		18	9
A022	0.222	0.556	0.222		0		6	21
A023	0.667	-0.333	0.667		0		18	9
A024	0.667	-0.333	0.667		0		18	9
A025	0.667	-0.333	0.667		0		18	9
A026	0.222	0.556	0.222		0		6	21
A027	0.68	-0.36	0.667	0.36	0.069	0.1	17	8
A028	0.68	-0.36	0.667	0.36	0.069	0.1	17	8
A029	0.04	0.92	0.111	1	0.006	0.055	1	24

Area of Study	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
A001	0.481	0.037	0.481		0		13	14
A002	0.481	0.037	0.481		0		13	14
A003	0.074	0.852	0.074		0		2	25
A004	0.481	0.037	0.481		0		13	14
A005	0.074	0.852	0.074		0		2	25
A006	0.481	0.037	0.481		0		13	14
A007	0.074	0.852	0.074		0		2	25
A008	0.074	0.852	0.074		0		2	25
A009	0.074	0.852	0.074		0		2	25
A010	0.074	0.852	0.074		0		2	25
A011							0	0
A012	0.481	0.037	0.481		0		13	14
A013	0.481	0.037	0.481		0		13	14
A014	0.481	0.037	0.481		0		13	14
A015	0.481	0.037	0.481		0		13	14
A016	0.259	0.481	0.259		0		7	20
A017	0.259	0.481	0.259		0		7	20
A018	0.259	0.481	0.259		0		7	20
A019	0.481	0.037	0.481		0		13	14
A020	0.259	0.481	0.259		0		7	20
A021	0.481	0.037	0.481		0		13	14
A022	0.259	0.481	0.259		0		7	20
A023	0.481	0.037	0.481		0		13	14
A024	0.481	0.037	0.481		0		13	14
A025	0.481	0.037	0.481		0		13	14
A026	0.259	0.481	0.259		0		7	20
A027	0.24	0.52	0.259	-0.52	-0.051	-0.155	6	19
A028	0.52	-0.04	0.556	1	0.138	0.273	13	12
A029	0.24	0.52	0.259	-0.52	-0.051	-0.155	6	19

Georgia

Gender	Pct Same	EI Index	Matches	Yules Q	CohenKap	Corr/Phi	fInGroup	fOutGroup
C1	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C2	0.161	0.677	0.161		0		5	26
C3	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C4	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C5	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C6	0.161	0.677	0.161		0		5	26
C7	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C8	0.774	-0.548	0.774		0		24	7
C9	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C10	0.167	0.667	0.194	1	0.013	0.08	5	25
C11	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C12	0.2	0.6	0.129	-0.937	-0.27	-0.602	1	4
C13	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C14	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C15	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C16	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C17	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C18	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C19	0.161	0.677	0.161		0		5	26
C20	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C21	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C22	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C23	0.167	0.667	0.194	1	0.013	0.08	5	25
C24	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C25	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C26	0.167	0.667	0.194	1	0.013	0.08	5	25
C27	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C28	0	1	0		0		0	31
C29	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C30	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C31	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C32	0.125	0.75	0.032	-1	-0.53	-0.916	1	7

Age	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
C1	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C2	0	1	0		0		0	31
C3	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C4	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C5	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C6	0.161	0.677	0.161		0		5	26
C7	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C8	0.774	-0.548	0.774		0		24	7
C9	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C10	0.167	0.667	0.194	1	0.013	0.08	5	25
C11	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C12	0.2	0.6	0.129	-0.937	-0.27	-0.602	1	4
C13	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C14	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C15	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C16	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C17	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C18	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C19	0.161	0.677	0.161		0		5	26
C20	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C21	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C22	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C23	0.167	0.667	0.194	1	0.013	0.08	5	25
C24	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C25	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C26	0.167	0.667	0.194	1	0.013	0.08	5	25
C27	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C28	0.161	0.677	0.161		0		5	26
C29	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C30	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C31	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C32	0.125	0.75	0.032	-1	-0.53	-0.916	1	7

Ethnicity	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
C1	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C2	0	1	0		0		0	31
C3	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C4	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C5	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C6	0	1	0		0		0	31
C7	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C8	0.774	-0.548	0.774		0		24	7
C9	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C10	0.133	0.733	0.161	1	0.01	0.07	4	26
C11	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C12	0.2	0.6	0.129	-0.937	-0.27	-0.602	1	4
C13	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C14	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C15	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C16	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C17	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C18	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C19	0.129	0.742	0.129		0		4	27
C20	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C21	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C22	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C23	0.133	0.733	0.161	1	0.01	0.07	4	26
C24	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C25	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C26	0.133	0.733	0.161	1	0.01	0.07	4	26
C27	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C28	0.129	0.742	0.129		0		4	27
C29	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C30	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C31	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C32	0.125	0.75	0.032	-1	-0.53	-0.916	1	7

Ed Level	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
C1	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C2	0.032	0.935	0.032		0		1	30
C3	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C4	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C5	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C6	0.129	0.742	0.129		0		4	27
C7	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C8	0.774	-0.548	0.774		0		24	7
C9	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C10	0.133	0.733	0.161	1	0.01	0.07	4	26
C11	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C12	0.2	0.6	0.129	-0.937	-0.27	-0.602	1	4
C13	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C14	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C15	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C16	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C17	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C18	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C19	0.129	0.742	0.129		0		4	27
C20	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C21	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C22	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C23	0.133	0.733	0.161	1	0.01	0.07	4	26
C24	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C25	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C26	0.133	0.733	0.161	1	0.01	0.07	4	26
C27	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C28	0.032	0.935	0.032		0		1	30
C29	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C30	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C31	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C32	0.125	0.75	0.032	-1	-0.53	-0.916	1	7

Area of Study	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
C1	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C2	0.032	0.935	0.032		0		1	30
C3	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C4	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C5	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C6	0.032	0.935	0.032		0		1	30
C7	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C8	0.774	-0.548	0.774		0		24	7
C9	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C10	0.1	0.8	0.129	1	0.007	0.06	3	27
C11	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C12	0.2	0.6	0.129	-0.937	-0.27	-0.602	1	4
C13	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C14	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C15	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C16	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C17	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C18	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C19	0.097	0.806	0.097		0		3	28
C20	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C21	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C22	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C23	0.1	0.8	0.129	1	0.007	0.06	3	27
C24	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C25	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C26	0.1	0.8	0.129	1	0.007	0.06	3	27
C27	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C28	0	1	0		0		0	31
C29	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C30	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C31	0.125	0.75	0.032	-1	-0.53	-0.916	1	7
C32	0.125	0.75	0.032	-1	-0.53	-0.916	1	7

Tennessee

Gender	Pct Same	EI Index	Matches	Yules Q	CohenKap	Corr/Phi	fInGroup	fOutGroup
B1	0	1	0	-1	-0.997	-1	0	13
B2	0	1	0	-1	-0.997	-1	0	13
B3	0	1	0	-1	-0.997	-1	0	13
B4	0	1	0	-1	-0.997	-1	0	13
B5	0	1	0	-1	-0.997	-1	0	13
B6	0	1	0	-1	-0.997	-1	0	13
B7	0.269	0.462	0.296	1	0.027	0.116	7	19
B8	0	1	0	-1	-0.997	-1	0	13
B9	0	1	0	-1	-0.997	-1	0	13
B10	0.259	0.481	0.259		0		7	20
B11	0.259	0.481	0.259		0		7	20
B12	0	1	0	-1	-0.997	-1	0	13
B13	0.148	0.704	0.148		0		4	23
B14	0	1	0	-1	-0.997	-1	0	13
B15	0	1	0	-1	-0.997	-1	0	13
B16	0.259	0.481	0.259		0		7	20
B17	0.259	0.481	0.259		0		7	20
B18	0.259	0.481	0.259		0		7	20
B19	0.148	0.704	0.148		0		4	23
B20	0	1	0	-1	-0.997	-1	0	13
B21	0	1	0.037	-1	-0.918	-0.928	0	12
B22	0	1	0	-1	-0.997	-1	0	13
B23	0.148	0.704	0.148		0		4	23
B24	0	1	0	-1	-0.997	-1	0	13
B25	0.259	0.481	0.259		0		7	20
B26	0.148	0.704	0.148		0		4	23
B27	0.148	0.704	0.148		0		4	23
B28	0.259	0.481	0.259		0		7	20

Age	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
B1	0	1	0	-1	-0.997	-1	0	13
B2	0	1	0	-1	-0.997	-1	0	13
B3	0	1	0	-1	-0.997	-1	0	13
B4	0	1	0	-1	-0.997	-1	0	13
B5	0	1	0	-1	-0.997	-1	0	13
B6	0	1	0	-1	-0.997	-1	0	13
B7	0.192	0.615	0.222	1	0.017	0.093	5	21
B8	0	1	0	-1	-0.997	-1	0	13
B9	0	1	0	-1	-0.997	-1	0	13
B10	0.185	0.63	0.185		0		5	22
B11	0.185	0.63	0.185		0		5	22
B12	0	1	0	-1	-0.997	-1	0	13
B13	0.185	0.63	0.185		0		5	22
B14	0	1	0	-1	-0.997	-1	0	13
B15	0	1	0	-1	-0.997	-1	0	13
B16	0.185	0.63	0.185		0		5	22
B17	0.148	0.704	0.148		0		4	23
B18	0.185	0.63	0.185		0		5	22
B19	0.148	0.704	0.148		0		4	23
B20	0	1	0	-1	-0.997	-1	0	13
B21	0	1	0.037	-1	-0.918	-0.928	0	12
B22	0	1	0	-1	-0.997	-1	0	13
B23	0.148	0.704	0.148		0		4	23
B24	0	1	0	-1	-0.997	-1	0	13
B25	0.037	0.926	0.037		0		1	26
B26	0.148	0.704	0.148		0		4	23
B27	0.037	0.926	0.037		0		1	26
B28	0.148	0.704	0.148		0		4	23

Ethnicity	Pct Same	EI Index	Matches	Yules Q	CohenKap	Corr/Phi	fInGroup	fOutGroup
B1	0	1	0	-1	-0.997	-1	0	13
B2	0	1	0	-1	-0.997	-1	0	13
B3	0	1	0	-1	-0.997	-1	0	13
B4	0	1	0	-1	-0.997	-1	0	13
B5	0	1	0	-1	-0.997	-1	0	13
B6	0	1	0	-1	-0.997	-1	0	13
B7	0.423	0.154	0.444	1	0.052	0.163	11	15
B8	0	1	0	-1	-0.997	-1	0	13
B9	0	1	0	-1	-0.997	-1	0	13
B10	0.407	0.185	0.407		0		11	16
B11	0.407	0.185	0.407		0		11	16
B12	0	1	0	-1	-0.997	-1	0	13
B13	0	1	0		0		0	27
B14	0	1	0	-1	-0.997	-1	0	13
B15	0	1	0	-1	-0.997	-1	0	13
B16	0.407	0.185	0.407		0		11	16
B17	0.407	0.185	0.407		0		11	16
B18	0.407	0.185	0.407		0		11	16
B19	0.407	0.185	0.407		0		11	16
B20	0	1	0	-1	-0.997	-1	0	13
B21	0	1	0.037	-1	-0.918	-0.928	0	12
B22	0	1	0	-1	-0.997	-1	0	13
B23	0.407	0.185	0.407		0		11	16
B24	0	1	0	-1	-0.997	-1	0	13
B25	0.407	0.185	0.407		0		11	16
B26	0.407	0.185	0.407		0		11	16
B27	0.407	0.185	0.407		0		11	16
B28	0.407	0.185	0.407		0		11	16

Ed Level	Pct Same	EI Index	Matches	Yules Q	CohenKap	Corr/Phi	fInGroup	fOutGroup
B1	0	1	0	-1	-0.997	-1	0	13
B2	0	1	0	-1	-0.997	-1	0	13
B3	0	1	0	-1	-0.997	-1	0	13
B4	0	1	0	-1	-0.997	-1	0	13
B5	0	1	0	-1	-0.997	-1	0	13
B6	0	1	0	-1	-0.997	-1	0	13
B7	0.231	0.538	0.259	1	0.022	0.105	6	20
B8	0	1	0	-1	-0.997	-1	0	13
B9	0	1	0	-1	-0.997	-1	0	13
B10	0.111	0.778	0.111		0		3	24
B11	0.222	0.556	0.222		0		6	21
B12	0	1	0	-1	-0.997	-1	0	13
B13	0.222	0.556	0.222		0		6	21
B14	0	1	0	-1	-0.997	-1	0	13
B15	0	1	0	-1	-0.997	-1	0	13
B16	0.222	0.556	0.222		0		6	21
B17	0.111	0.778	0.111		0		3	24
B18	0.222	0.556	0.222		0		6	21
B19	0.037	0.926	0.037		0		1	26
B20	0	1	0	-1	-0.997	-1	0	13
B21	0	1	0.037	-1	-0.918	-0.928	0	12
B22	0	1	0	-1	-0.997	-1	0	13
B23	0.222	0.556	0.222		0		6	21
B24	0	1	0	-1	-0.997	-1	0	13
B25	0.111	0.778	0.111		0		3	24
B26	0.222	0.556	0.222		0		6	21
B27	0.111	0.778	0.111		0		3	24
B28	0.037	0.926	0.037		0		1	26

Area of Study	Pct Same	EI Index	Matches	Yules Q	Cohen Kap	Corr/Phi	fInGroup	fOutGroup
B1	0	1	0	-1	-0.997	-1	0	13
B2	0	1	0	-1	-0.997	-1	0	13
B3	0	1	0	-1	-0.997	-1	0	13
B4	0	1	0	-1	-0.997	-1	0	13
B5	0	1	0	-1	-0.997	-1	0	13
B6	0	1	0	-1	-0.997	-1	0	13
B7	0.154	0.692	0.185	1	0.013	0.082	4	22
B8	0	1	0	-1	-0.997	-1	0	13
B9	0	1	0	-1	-0.997	-1	0	13
B10	0	1	0		0		0	27
B11	0.148	0.704	0.148		0		4	23
B12	0	1	0	-1	-0.997	-1	0	13
B13	0.148	0.704	0.148		0		4	23
B14	0	1	0	-1	-0.997	-1	0	13
B15	0	1	0	-1	-0.997	-1	0	13
B16	0.111	0.778	0.111		0		3	24
B17	0.111	0.778	0.111		0		3	24
B18	0.148	0.704	0.148		0		4	23
B19	0.037	0.926	0.037		0		1	26
B20	0	1	0	-1	-0.997	-1	0	13
B21	0	1	0.037	-1	-0.918	-0.928	0	12
B22	0	1	0	-1	-0.997	-1	0	13
B23	0.111	0.778	0.111		0		3	24
B24	0	1	0	-1	-0.997	-1	0	13
B25	0.111	0.778	0.111		0		3	24
B26	0	1	0		0		0	27
B27	0.148	0.704	0.148		0		4	23
B28	0.037	0.926	0.037		0		1	26

Appendix H Proportion of Matches Q 14

North Carolina

Col	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011 A	12	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	1	0.92	0.85	0.85	0.62	0.58	0.73	0.62	0.69	0.54	0.44	0.46	0.54	0.46	0.85	0.62	0.69	0.58	0.58	0.62	0.6	0.69	0.76	0.73	0.56	0.54	0.62	0.62	0.54
A002	0.92	1	0.85	0.81	0.54	0.5	0.65	0.54	0.65	0.54	0.44	0.42	0.54	0.46	0.77	0.62	0.62	0.58	0.5	0.54	0.52	0.73	0.68	0.65	0.56	0.46	0.54	0.54	0.46
A003	0.85	0.85	1	0.73	0.54	0.58	0.69	0.54	0.77	0.46	0.37	0.42	0.54	0.39	0.73	0.62	0.62	0.65	0.5	0.54	0.52	0.69	0.64	0.69	0.52	0.46	0.54	0.54	0.58
A004	0.85	0.81	0.73	1	0.54	0.58	0.69	0.54	0.77	0.54	0.48	0.5	0.62	0.5	0.89	0.65	0.54	0.62	0.46	0.5	0.52	0.73	0.64	0.62	0.52	0.5	0.5	0.5	0.5
A005	0.62	0.54	0.54	0.54	1	0.96	0.89	1	0.46	0.81	0.7	0.81	0.58	0.81	0.5	0.69	0.77	0.65	0.85	0.85	0.88	0.39	0.72	0.69	0.72	0.89	0.89	0.89	0.77
A006	0.58	0.5	0.58	0.58	0.96	1	0.89	0.96	0.46	0.73	0.63	0.73	0.58	0.73	0.5	0.69	0.69	0.65	0.77	0.77	0.8	0.42	0.68	0.62	0.64	0.81	0.81	0.81	0.81
A007	0.73	0.65	0.69	0.69	0.89	0.89	1	0.89	0.58	0.73	0.63	0.65	0.69	0.65	0.62	0.77	0.85	0.73	0.77	0.81	0.84	0.54	0.84	0.77	0.68	0.81	0.73	0.73	0.69
A008	0.62	0.54	0.54	0.54	1	0.96	0.89	1	0.42	0.81	0.7	0.81	0.58	0.81	0.46	0.69	0.77	0.65	0.85	0.85	0.88	0.39	0.72	0.65	0.72	0.89	0.85	0.85	0.77
A009	0.69	0.65	0.77	0.77	0.46	0.46	0.58	0.42	1	0.5	0.59	0.5	0.73	0.5	0.85	0.5	0.5	0.54	0.39	0.42	0.44	0.65	0.52	0.62	0.6	0.42	0.42	0.42	0.42
A010	0.54	0.54	0.46	0.54	0.81	0.73	0.73	0.81	0.5	1	0.93	0.92	0.73	0.96	0.5	0.73	0.73	0.69	0.89	0.85	0.92	0.35	0.64	0.65	0.92	0.92	0.77	0.77	0.62
A011	0.44	0.44	0.37	0.48	0.7	0.63	0.63	0.7	0.59	0.93	1	0.85	0.78	0.93	0.52	0.63	0.63	0.59	0.78	0.74	0.81	0.37	0.58	0.56	0.89	0.82	0.67	0.67	0.52
A012	0.46	0.42	0.42	0.5	0.81	0.73	0.65	0.81	0.5	0.92	0.85	1	0.65	0.96	0.46	0.65	0.65	0.69	0.81	0.81	0.84	0.39	0.56	0.65	0.84	0.85	0.77	0.77	0.69
A013	0.54	0.54	0.54	0.62	0.58	0.58	0.69	0.58	0.73	0.73	0.78	0.65	1	0.73	0.65	0.69	0.77	0.65	0.58	0.62	0.64	0.58	0.6	0.58	0.8	0.65	0.46	0.46	0.46
A014	0.46	0.46	0.39	0.5	0.81	0.73	0.65	0.81	0.5	0.96	0.93	0.96	0.73	1	0.46	0.65	0.65	0.62	0.81	0.81	0.84	0.31	0.58	0.58	0.88	0.85	0.77	0.77	0.62
A015	0.85	0.77	0.73	0.89	0.5	0.5	0.62	0.46	0.85	0.5	0.52	0.46	0.65	0.46	1	0.65	0.62	0.62	0.5	0.54	0.52	0.77	0.6	0.65	0.48	0.46	0.54	0.54	0.46
A016	0.62	0.62	0.62	0.65	0.69	0.69	0.77	0.69	0.5	0.73	0.63	0.65	0.69	0.65	0.65	1	0.85	0.96	0.85	0.89	0.88	0.54	0.72	0.81	0.76	0.81	0.73	0.73	0.65
A017	0.69	0.62	0.62	0.54	0.77	0.69	0.85	0.77	0.5	0.73	0.63	0.65	0.77	0.65	0.62	0.85	1	0.81	0.85	0.89	0.88	0.54	0.84	0.81	0.72	0.85	0.73	0.73	0.65
A018	0.58	0.58	0.65	0.62	0.65	0.65	0.73	0.65	0.54	0.69	0.59	0.69	0.65	0.62	0.62	0.96	0.81	1	0.81	0.81	0.81	0.58	0.68	0.85	0.73	0.77	0.69	0.69	0.69
A019	0.58	0.5	0.5	0.46	0.85	0.77	0.77	0.85	0.39	0.89	0.78	0.81	0.58	0.81	0.5	0.85	0.85	0.81	1	0.96	1	0.35	0.76	0.77	0.8	0.96	0.89	0.89	0.73
A020	0.62	0.54	0.54	0.5	0.85	0.77	0.81	0.85	0.42	0.85	0.74	0.81	0.62	0.81	0.54	0.89	0.89	0.81	0.96	1	1	0.39	0.8	0.81	0.8	0.92	0.89	0.89	0.73
A021	0.6	0.52	0.52	0.52	0.88	0.8	0.84	0.88	0.44	0.92	0.81	0.84	0.64	0.84	0.52	0.88	0.88	0.81	1	1	1	0.36	0.79	0.8	0.84	1	0.88	0.88	0.72
A022	0.69	0.73	0.69	0.73	0.39	0.42	0.54	0.39	0.65	0.35	0.37	0.39	0.58	0.31	0.77	0.54	0.54	0.58	0.35	0.39	0.36	1	0.6	0.58	0.36	0.35	0.39	0.42	0.54
A023	0.76	0.68	0.64	0.64	0.72	0.68	0.84	0.72	0.52	0.64	0.58	0.56	0.6	0.58	0.6	0.72	0.84	0.68	0.76	0.8	0.79	0.6	1	0.84	0.63	0.76	0.76	0.76	0.8
A024	0.73	0.65	0.69	0.62	0.69	0.62	0.77	0.65	0.62	0.65	0.56	0.65	0.58	0.58	0.65	0.81	0.81	0.85	0.77	0.81	0.8	0.58	0.84	1	0.72	0.73	0.73	0.73	0.73
A025	0.56	0.56	0.52	0.52	0.72	0.64	0.68	0.72	0.6	0.92	0.89	0.84	0.8	0.88	0.48	0.76	0.72	0.73	0.8	0.8	0.84	0.36	0.63	0.72	1	0.84	0.68	0.68	0.56

A026	0.54	0.46	0.46	0.5	0.89	0.81	0.81	0.89	0.42	0.92	0.82	0.85	0.65	0.85	0.46	0.81	0.85	0.77	0.96	0.92	1	0.35	0.76	0.73	0.84	1	0.85	0.85	0.73
A027	0.62	0.54	0.54	0.5	0.89	0.81	0.73	0.85	0.42	0.77	0.67	0.77	0.46	0.77	0.54	0.73	0.73	0.69	0.89	0.89	0.88	0.39	0.76	0.73	0.68	0.85	1	1	0.77
A028	0.62	0.54	0.54	0.5	0.89	0.81	0.73	0.85	0.42	0.77	0.67	0.77	0.46	0.77	0.54	0.73	0.73	0.69	0.89	0.89	0.88	0.42	0.76	0.73	0.68	0.85	1	1	0.77
A029	0.54	0.46	0.58	0.5	0.77	0.81	0.69	0.77	0.42	0.62	0.52	0.69	0.46	0.62	0.46	0.65	0.65	0.69	0.73	0.73	0.72	0.54	0.8	0.73	0.56	0.73	0.77	0.77	1

Rows	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011	A012	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	1	0.85	0.78	0.7	0.78	0.11	0.67	0.59	0.67	0.67		0.74	0.82	0.73	0.85	0.67	0.7	0.6	0.11	0.41	0.59	0.89	0.82	0.11	0.78	0.78	0.89	0.93	0.11

A002	0.85	1	0.85	0.74	0.7	0.19	0.74	0.67	0.7	0.74		0.7	0.82	0.73	0.78	0.74	0.78	0.68	0.19	0.48	0.52	1	0.89	0.19	0.7	0.63	0.82	0.78	0.19
A003	0.78	0.85	1	0.67	0.78	0.33	0.7	0.82	0.67	0.67		0.56	0.74	0.62	0.74	0.82	0.78	0.76	0.33	0.56	0.67	0.89	0.85	0.3	0.74	0.7	0.67	0.7	0.3
A004	0.7	0.74	0.67	1	0.78	0.41	0.7	0.74	0.59	0.59		0.56	0.67	0.54	0.59	0.78	0.7	0.72	0.44	0.52	0.44	0.78	0.7	0.44	0.52	0.59	0.56	0.59	0.44
A005	0.78	0.7	0.78	0.78	1	0.33	0.67	0.82	0.52	0.48		0.48	0.56	0.5	0.67	0.67	0.56	0.6	0.37	0.41	0.52	0.74	0.7	0.37	0.59	0.67	0.63	0.67	0.33
A006	0.11	0.19	0.33	0.41	0.33	1	0.33	0.52	0.41	0.3		0.3	0.15	0.15	0.19	0.48	0.44	0.56	1	0.74	0.56	0.22	0.33	1	0.26	0.19	0	0.04	1
A007	0.67	0.74	0.7	0.7	0.67	0.33	1	0.63	0.56	0.7		0.56	0.74	0.62	0.78	0.74	0.78	0.68	0.37	0.52	0.52	0.74	0.67	0.37	0.74	0.67	0.63	0.67	0.33
A008	0.59	0.67	0.82	0.74	0.82	0.52	0.63	1	0.44	0.44		0.37	0.52	0.39	0.52	0.7	0.59	0.64	0.56	0.44	0.63	0.7	0.82	0.52	0.56	0.48	0.48	0.52	0.52
A009	0.67	0.7	0.67	0.59	0.52	0.41	0.56	0.44	1	0.89		0.82	0.74	0.73	0.67	0.59	0.7	0.56	0.41	0.56	0.33	0.74	0.67	0.41	0.56	0.56	0.59	0.63	0.41
A010	0.67	0.74	0.67	0.59	0.48	0.3	0.7	0.44	0.89	1		0.78	0.89	0.81	0.7	0.59	0.63	0.52	0.3	0.44	0.3	0.74	0.67	0.3	0.67	0.67	0.7	0.74	0.3
A011																													
A012	0.74	0.7	0.56	0.56	0.48	0.3	0.56	0.37	0.82	0.78		1	0.74	0.89	0.59	0.52	0.63	0.48	0.3	0.48	0.3	0.7	0.59	0.3	0.67	0.59	0.7	0.67	0.3
A013	0.82	0.82	0.74	0.67	0.56	0.15	0.74	0.52	0.74	0.89		0.74	1	0.89	0.78	0.63	0.67	0.56	0.15	0.44	0.44	0.82	0.74	0.15	0.74	0.78	0.85	0.89	0.15
A014	0.73	0.73	0.62	0.54	0.5	0.15	0.62	0.39	0.73	0.81		0.89	0.89	1	0.65	0.54	0.62	0.5	0.15	0.42	0.31	0.69	0.59	0.15	0.69	0.77	0.85	0.81	0.15
A015	0.85	0.78	0.74	0.59	0.67	0.19	0.78	0.52	0.67	0.7		0.59	0.78	0.65	1	0.7	0.78	0.64	0.19	0.48	0.59	0.82	0.74	0.19	0.7	0.7	0.82	0.85	0.19
A016	0.67	0.74	0.82	0.78	0.67	0.48	0.74	0.7	0.59	0.59		0.52	0.63	0.54	0.7	1	0.89	0.96	0.48	0.78	0.67	0.78	0.74	0.44	0.63	0.63	0.52	0.56	0.48
A017	0.7	0.78	0.78	0.7	0.56	0.44	0.78	0.59	0.7	0.63		0.63	0.67	0.62	0.78	0.89	1	0.88	0.44	0.74	0.63	0.82	0.74	0.41	0.7	0.56	0.56	0.59	0.44
A018	0.6	0.68	0.76	0.72	0.6	0.56	0.68	0.64	0.56	0.52		0.48	0.56	0.5	0.64	0.96	0.88	1	0.56	0.84	0.69	0.72	0.68	0.52	0.54	0.56	0.44	0.48	0.56
A019	0.11	0.19	0.33	0.44	0.37	1	0.37	0.56	0.41	0.3		0.3	0.15	0.15	0.19	0.48	0.44	0.56	1	0.7	0.52	0.22	0.33	1	0.26	0.19	0	0.04	1
A020	0.41	0.48	0.56	0.52	0.41	0.74	0.52	0.44	0.56	0.44		0.48	0.44	0.42	0.48	0.78	0.74	0.84	0.7	1	0.59	0.52	0.48	0.7	0.41	0.41	0.26	0.3	0.74
A021	0.59	0.52	0.67	0.44	0.52	0.56	0.52	0.63	0.33	0.3		0.3	0.44	0.31	0.59	0.67	0.63	0.69	0.52	0.59	1	0.56	0.67	0.52	0.56	0.56	0.48	0.52	0.52
A022	0.89	1	0.89	0.78	0.74	0.22	0.74	0.7	0.74	0.74		0.7	0.82	0.69	0.82	0.78	0.82	0.72	0.22	0.52	0.56	1	0.93	0.22	0.7	0.63	0.78	0.78	0.22
A023	0.82	0.89	0.85	0.7	0.7	0.33	0.67	0.82	0.67	0.67		0.59	0.74	0.59	0.74	0.74	0.74	0.68	0.33	0.48	0.67	0.93	1	0.33	0.63	0.59	0.7	0.74	0.33

A024	0.11	0.19	0.3	0.44	0.37	1	0.37	0.52	0.41	0.3		0.3	0.15	0.15	0.19	0.44	0.41	0.52	1	0.7	0.52	0.22	0.33	1	0.22	0.19	0	0.04	1
A025	0.78	0.7	0.74	0.52	0.59	0.26	0.74	0.56	0.56	0.67		0.67	0.74	0.69	0.7	0.63	0.7	0.54	0.26	0.41	0.56	0.7	0.63	0.22	1	0.7	0.74	0.78	0.22
A026	0.78	0.63	0.7	0.59	0.67	0.19	0.67	0.48	0.56	0.67		0.59	0.78	0.77	0.7	0.63	0.56	0.56	0.19	0.41	0.56	0.63	0.59	0.19	0.7	1	0.82	0.85	0.15
A027	0.89	0.82	0.67	0.56	0.63	0	0.63	0.48	0.59	0.7		0.7	0.85	0.85	0.82	0.52	0.56	0.44	0	0.26	0.48	0.78	0.7	0	0.74	0.82	1	0.96	0
A028	0.93	0.78	0.7	0.59	0.67	0.04	0.67	0.52	0.63	0.74		0.67	0.89	0.81	0.85	0.56	0.59	0.48	0.04	0.3	0.52	0.78	0.74	0.04	0.78	0.85	0.96	1	0.04
A029	0.11	0.19	0.3	0.44	0.33	1	0.33	0.52	0.41	0.3		0.3	0.15	0.15	0.19	0.48	0.44	0.56	1	0.74	0.52	0.22	0.33	1	0.22	0.15	0	0.04	1

Georgia

Columns	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	1	0.9	0.97	0.93	0.9	0.93	0.9	0.93	0.93	0.9	0.87	0.93	0.93	0.93	0.9	0.97	0.93	0.87	0.87	0.83	0.93	0.93	0.93	0.9	0.93	0.93	0.93	0.9	0.9	0.83	0.93	0.87
C2	0.9	1	0.9	0.9	0.83	0.87	0.83	0.9	0.9	0.9	0.87	0.87	0.87	0.87	0.97	0.93	0.87	0.93	0.93	0.9	0.93	0.93	0.9	0.9	0.9	0.9	0.87	0.9	0.9	0.83	0.87	0.87
C3	0.97	0.9	1	0.9	0.93	0.97	0.93	0.97	0.9	0.93	0.9	0.97	0.97	0.97	0.93	0.93	0.97	0.9	0.9	0.87	0.97	0.97	0.97	0.93	0.9	0.97	0.97	0.93	0.93	0.87	0.97	0.9
C4	0.93	0.9	0.9	1	0.9	0.9	0.9	0.97	0.87	0.83	0.8	0.87	0.87	0.87	0.9	0.9	0.87	0.8	0.8	0.77	0.87	0.93	0.87	0.83	0.87	0.87	0.87	0.83	0.83	0.77	0.87	0.8
C5	0.9	0.83	0.93	0.9	1	1	1	0.97	0.83	0.93	0.9	0.97	0.9	0.97	0.87	0.87	0.97	0.9	0.87	0.8	0.9	0.9	0.97	0.93	0.83	0.97	0.97	0.93	0.93	0.87	0.97	0.9
C6	0.93	0.87	0.97	0.9	1	1	1	0.97	0.87	0.97	0.93	1	0.93	1	0.9	0.9	1	0.93	0.9	0.83	0.93	0.93	1	0.97	0.87	1	1	0.97	0.97	0.9	1	0.93
C7	0.9	0.83	0.93	0.9	1	1	1	0.97	0.83	0.93	0.9	0.97	0.9	0.97	0.87	0.87	0.97	0.9	0.87	0.8	0.9	0.9	0.97	0.93	0.83	0.97	0.97	0.93	0.93	0.87	0.97	0.9
C8	0.93	0.9	0.97	0.97	0.97	0.97	0.97	1	0.87	0.9	0.87	0.93	0.93	0.93	0.93	0.9	0.93	0.87	0.87	0.83	0.93	0.97	0.93	0.9	0.87	0.93	0.93	0.9	0.9	0.83	0.93	0.87
C9	0.93	0.9	0.9	0.87	0.83	0.87	0.83	0.87	1	0.93	0.93	0.87	0.93	0.87	0.9	0.9	0.87	0.87	0.93	0.9	0.87	0.87	0.87	0.83	0.93	0.9	0.87	0.9	0.9	0.9	0.87	0.87
C10	0.9	0.9	0.93	0.83	0.93	0.97	0.93	0.9	0.93	1	1	0.97	0.93	0.97	0.93	0.87	0.97	0.97	0.97	0.9	0.9	0.9	0.97	0.93	0.9	1	0.97	1	1	0.97	0.97	0.97
C11	0.87	0.87	0.9	0.8	0.9	0.93	0.9	0.87	0.93	1	1	0.93	0.93	0.93	0.9	0.83	0.93	0.93	0.97	0.9	0.87	0.87	0.93	0.9	0.87	0.97	0.93	0.97	0.97	0.97	0.93	0.93
C12	0.93	0.87	0.97	0.87	0.97	1	0.97	0.93	0.87	0.97	0.93	1	0.93	1	0.9	0.9	1	0.93	0.9	0.83	0.93	0.93	1	0.97	0.87	1	1	0.97	0.97	0.9	1	0.93
C13	0.93	0.87	0.97	0.87	0.9	0.93	0.9	0.93	0.93	0.93	0.93	0.93	1	0.93	0.9	0.9	0.93	0.87	0.93	0.9	0.93	0.93	0.93	0.9	0.87	0.93	0.93	0.9	0.9	0.9	0.93	0.87
C14	0.93	0.87	0.97	0.87	0.97	1	0.97	0.93	0.87	0.97	0.93	1	0.93	1	0.9	0.9	1	0.93	0.9	0.83	0.93	0.93	1	0.97	0.87	1	1	0.97	0.97	0.9	1	0.93
C15	0.9	0.97	0.93	0.9	0.87	0.9	0.87	0.93	0.9	0.93	0.9	0.9	0.9	0.9	1	0.87	0.9	0.9	0.9	0.87	0.9	0.97	0.9	0.87	0.9	0.93	0.9	0.93	0.93	0.87	0.9	0.9
C16	0.97	0.93	0.93	0.9	0.87	0.9	0.87	0.9	0.9	0.87	0.83	0.9	0.9	0.9	0.87	1	0.9	0.9	0.9	0.87	0.97	0.9	0.93	0.93	0.9	0.9	0.9	0.87	0.87	0.8	0.9	0.83
C17	0.93	0.87	0.97	0.87	0.97	1	0.97	0.93	0.87	0.97	0.93	1	0.93	1	0.9	0.9	1	0.93	0.9	0.83	0.93	0.93	1	0.97	0.87	1	1	0.97	0.97	0.9	1	0.93
C18	0.87	0.93	0.9	0.8	0.9	0.93	0.9	0.87	0.87	0.97	0.93	0.93	0.87	0.93	0.9	0.9	0.93	1	0.97	0.9	0.93	0.87	0.97	0.97	0.87	0.97	0.93	0.97	0.97	0.9	0.93	0.93
C19	0.87	0.93	0.9	0.8	0.87	0.9	0.87	0.87	0.93	0.97	0.97	0.9	0.93	0.9	0.9	0.9	0.9	0.97	1	0.97	0.93	0.87	0.93	0.93	0.87	0.93	0.9	0.93	0.93	0.93	0.9	0.9
C20	0.83	0.9	0.87	0.77	0.8	0.83	0.8	0.83	0.9	0.9	0.9	0.83	0.9	0.83	0.87	0.87	0.83	0.9	0.97	1	0.9	0.83	0.87	0.87	0.9	0.87	0.83	0.9	0.87	0.93	0.83	0.9
C21	0.93	0.93	0.97	0.87	0.9	0.93	0.9	0.93	0.87	0.9	0.87	0.93	0.93	0.93	0.9	0.97	0.93	0.93	0.93	0.9	1	0.93	0.97	0.97	0.87	0.93	0.93	0.9	0.9	0.83	0.93	0.87
C22	0.93	0.93	0.97	0.93	0.9	0.93	0.9	0.97	0.87	0.9	0.87	0.93	0.93	0.93	0.97	0.9	0.93	0.87	0.87	0.83	0.93	1	0.93	0.9	0.87	0.93	0.93	0.9	0.9	0.83	0.93	0.87
C23	0.93	0.9	0.97	0.87	0.97	1	0.97	0.93	0.87	0.97	0.93	1	0.93	1	0.9	0.93	1	0.97	0.93	0.87	0.97	0.93	1	1	0.87	1	1	0.97	0.97	0.9	1	0.93
C24	0.9	0.9	0.93	0.83	0.93	0.97	0.93	0.9	0.83	0.93	0.9	0.97	0.9	0.97	0.87	0.93	0.97	0.97	0.93	0.87	0.97	0.9	1	1	0.83	0.97	0.97	0.93	0.93	0.87	0.97	0.9
C25	0.93	0.9	0.9	0.87	0.83	0.87	0.83	0.87	0.93	0.9	0.87	0.87	0.87	0.87	0.9	0.9	0.87	0.87	0.87	0.9	0.87	0.87	0.87	0.83	1	0.9	0.87	0.93	0.9	0.9	0.87	0.93
C26	0.93	0.9	0.97	0.87	0.97	1	0.97	0.93	0.9	1	0.97	1	0.93	1	0.93	0.9	1	0.97	0.93	0.87	0.93	0.93	1	0.97	0.9	1	1	1	1	0.93	1	0.97
C27	0.93	0.87	0.97	0.87	0.97	1	0.97	0.93	0.87	0.97	0.93	1	0.93	1	0.9	0.9	1	0.93	0.9	0.83	0.93	0.93	1	0.97	0.87	1	1	0.97	0.97	0.9	1	0.93
C28	0.9	0.9	0.93	0.83	0.93	0.97	0.93	0.9	0.9	1	0.97	0.97	0.9	0.97	0.93	0.87	0.97	0.97	0.93	0.9	0.9	0.9	0.97	0.93	0.93	1	0.97	1	1	0.97	0.97	1
C29	0.9	0.9	0.93	0.83	0.93	0.97	0.93	0.9	0.9	1	0.97	0.97	0.9	0.97	0.93	0.87	0.97	0.97	0.93	0.87	0.9	0.9	0.97	0.93	0.9	1	0.97	1	1	0.93	0.97	0.97
C30	0.83	0.83	0.87	0.77	0.87	0.9	0.87	0.83	0.9	0.97	0.97	0.9	0.9	0.9	0.87	0.8	0.9	0.9	0.93	0.93	0.83	0.83	0.9	0.87	0.9	0.93	0.9	0.97	0.93	1	0.9	0.97
C31	0.93	0.87	0.97	0.87	0.97	1	0.97	0.93	0.87	0.97	0.93	1	0.93	1	0.9	0.9	1	0.93	0.9	0.83	0.93	0.93	1	0.97	0.87	1	1	0.97	0.97	0.9	1	0.93

C32	0.87	0.87	0.9	0.8	0.9	0.93	0.9	0.87	0.87	0.97	0.93	0.93	0.87	0.93	0.9	0.83	0.93	0.93	0.9	0.9	0.87	0.87	0.93	0.9	0.93	0.97	0.93	1	0.97	0.97	0.93	1

Rows	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	1	0.87	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C2	0.87	1	0.83	0.87	0.83	0.77	0.83	0.8	0.87	0.7	0.83	0.83	0.83	0.83	0.83	0.87	0.83	0.83	0.77	0.83	0.83	0.83	0.7	0.83	0.87	0.57	0.83	0.77	0.83	0.83	0.83	0.83
C3	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C4	1	0.87	1	1	1	0.9	1	0.9	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C5	1	0.83	1	1	1	0.9	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C6	0.87	0.77	0.87	0.9	0.9	1	0.9	0.83	0.87	0.67	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.57	0.87	0.87	0.87	0.63	0.87	0.87	0.43	0.87	0.73	0.87	0.87	0.87	0.87
C7	1	0.83	1	1	1	0.9	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C8	0.87	0.8	0.87	0.9	0.87	0.83	0.87	1	0.87	0.67	0.87	0.87	0.87	0.87	0.9	0.87	0.87	0.87	0.73	0.87	0.87	0.9	0.7	0.87	0.87	0.57	0.87	0.73	0.87	0.87	0.87	0.87
C9	1	0.87	1	1	1	0.87	1	0.87	1	0.83	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.6	1	0.87	1	1	1	1
C10	0.8	0.7	0.8	0.8	0.8	0.67	0.8	0.67	0.83	1	0.83	0.8	0.83	0.8	0.8	0.8	0.8	0.8	0.6	0.83	0.8	0.8	0.7	0.8	0.8	0.73	0.8	0.8	0.8	0.83	0.8	0.8
C11	1	0.83	1	1	1	0.87	1	0.87	1	0.83	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.6	1	0.87	1	1	1	1
C12	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C13	1	0.83	1	1	1	0.87	1	0.87	1	0.83	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C14	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C15	1	0.83	1	1	1	0.87	1	0.9	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.6	1	0.87	1	1	1	1
C16	1	0.87	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.8	1	1	0.57	1	0.87	1	1	1	1
C17	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C18	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.8	1	1	0.6	1	0.87	1	1	1	1
C19	0.6	0.77	0.6	0.6	0.57	0.57	0.57	0.73	0.6	0.6	0.57	0.57	0.6	0.57	0.6	0.6	0.57	0.57	1	0.6	0.6	0.6	0.63	0.57	0.6	0.5	0.57	0.57	0.57	0.57	0.57	0.57
C20	1	0.83	1	1	1	0.87	1	0.87	1	0.83	1	1	1	1	1	1	1	1	0.6	1	1	1	0.8	1	1	0.6	1	0.9	1	1	1	1
C21	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.8	1	1	0.57	1	0.87	1	1	1	1
C22	1	0.83	1	1	1	0.87	1	0.9	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C23	0.77	0.7	0.77	0.77	0.77	0.63	0.77	0.7	0.77	0.7	0.77	0.77	0.77	0.77	0.77	0.8	0.77	0.8	0.63	0.8	0.8	0.77	1	0.8	0.77	0.6	0.77	0.7	0.77	0.77	0.77	0.77
C24	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.8	1	1	0.57	1	0.87	1	1	1	1
C25	1	0.87	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.6	1	1	1	0.77	1	1	0.6	1	0.9	1	1	1	1
C26	0.57	0.57	0.57	0.57	0.57	0.43	0.57	0.57	0.6	0.73	0.6	0.57	0.57	0.57	0.6	0.57	0.57	0.6	0.5	0.6	0.57	0.57	0.6	0.57	0.6	1	0.57	0.73	0.6	0.6	0.57	0.6
C27	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C28	0.87	0.77	0.87	0.87	0.87	0.73	0.87	0.73	0.87	0.8	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.57	0.9	0.87	0.87	0.7	0.87	0.9	0.73	0.87	1	0.87	0.9	0.87	0.9
C29	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.6	1	0.87	1	1	1	1
C30	1	0.83	1	1	1	0.87	1	0.87	1	0.83	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.6	1	0.9	1	1	1	1
C31	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.57	1	0.87	1	1	1	1
C32	1	0.83	1	1	1	0.87	1	0.87	1	0.8	1	1	1	1	1	1	1	1	0.57	1	1	1	0.77	1	1	0.6	1	0.9	1	1	1	1

Tennessee

Columns	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	1	0.96	0.77	0.77	0.77	0.85	0.73	0.77	0.73	0.77	0.73	0.81	0.73	0.81	0.73	0.81	0.92	0.69	0.92	0.69	0.73	0.92	0.77	0.77	0.85	0.73	0.92	0.77
B2	0.96	1	0.81	0.81	0.81	0.89	0.77	0.81	0.77	0.81	0.77	0.85	0.77	0.85	0.77	0.85	0.89	0.73	0.89	0.73	0.77	0.89	0.81	0.81	0.89	0.77	0.96	0.77
B3	0.77	0.81	1	0.92	0.92	0.85	0.92	0.77	0.96	0.92	0.81	0.89	0.96	0.89	0.89	0.92	0.89	0.92	0.77	0.92	0.81	0.85	0.89	0.85	0.92	0.92	0.85	0.89
B4	0.77	0.81	0.92	1	1	0.92	0.96	0.85	0.96	0.92	0.89	0.96	0.96	0.96	0.96	1	0.89	0.92	0.77	0.92	0.81	0.85	0.89	0.77	0.96	0.92	0.85	0.96
B5	0.77	0.81	0.92	1	1	0.92	0.96	0.85	0.96	0.92	0.89	0.96	0.96	0.96	0.96	1	0.89	0.92	0.77	0.92	0.81	0.85	0.89	0.77	0.96	0.92	0.85	0.96
B6	0.85	0.89	0.85	0.92	0.92	1	0.89	0.92	0.89	0.92	0.89	0.96	0.89	0.96	0.89	0.96	0.92	0.85	0.85	0.85	0.81	0.85	0.89	0.77	0.96	0.85	0.92	0.89
B7	0.73	0.77	0.92	0.96	0.96	0.89	1	0.81	0.96	0.96	0.85	0.92	0.96	0.92	0.92	0.96	0.85	1	0.73	1	0.89	0.81	0.96	0.85	0.92	1	0.81	1
B8	0.77	0.81	0.77	0.85	0.85	0.92	0.81	1	0.81	0.85	0.96	0.89	0.85	0.89	0.89	0.89	0.85	0.81	0.85	0.77	0.73	0.77	0.81	0.69	0.89	0.77	0.85	0.81
B9	0.73	0.77	0.96	0.96	0.96	0.89	0.96	0.81	1	0.96	0.85	0.92	1	0.92	0.92	0.96	0.85	0.96	0.73	0.96	0.85	0.81	0.92	0.81	0.92	0.96	0.81	0.92
B10	0.77	0.81	0.92	0.92	0.92	0.92	0.96	0.85	0.96	1	0.81	0.96	0.96	0.89	0.89	0.96	0.89	0.96	0.77	0.96	0.85	0.77	0.92	0.81	0.96	0.96	0.85	0.92
B11	0.73	0.77	0.81	0.89	0.89	0.89	0.85	0.96	0.85	0.81	1	0.85	0.89	0.92	0.92	0.89	0.81	0.85	0.81	0.81	0.81	0.81	0.85	0.77	0.85	0.81	0.81	0.85
B12	0.81	0.85	0.89	0.96	0.96	0.96	0.92	0.89	0.92	0.96	0.85	1	0.92	0.92	0.92	1	0.92	0.89	0.81	0.89	0.77	0.81	0.85	0.73	1	0.89	0.89	0.92
B13	0.73	0.77	0.96	0.96	0.96	0.89	0.96	0.85	1	0.96	0.89	0.92	1	0.92	0.92	0.96	0.85	0.96	0.77	0.96	0.85	0.81	0.92	0.81	0.92	0.96	0.81	0.92
B14	0.81	0.85	0.89	0.96	0.96	0.96	0.92	0.89	0.92	0.89	0.92	0.92	0.92	1	0.92	0.96	0.89	0.89	0.81	0.89	0.85	0.89	0.92	0.81	0.92	0.89	0.89	0.92
B15	0.73	0.77	0.89	0.96	0.96	0.89	0.92	0.89	0.92	0.89	0.92	0.92	0.92	0.92	1	0.96	0.85	0.92	0.73	0.89	0.77	0.81	0.85	0.73	0.92	0.89	0.81	0.92
B16	0.81	0.85	0.92	1	1	0.96	0.96	0.89	0.96	0.96	0.89	1	0.96	0.96	0.96	1	0.92	0.92	0.81	0.92	0.81	0.85	0.89	0.77	1	0.92	0.89	0.96
B17	0.92	0.89	0.89	0.89	0.89	0.92	0.85	0.85	0.85	0.89	0.81	0.92	0.85	0.89	0.85	0.92	1	0.81	0.92	0.81	0.73	0.92	0.81	0.77	0.96	0.81	0.92	0.89
B18	0.69	0.73	0.92	0.92	0.92	0.85	1	0.81	0.96	0.96	0.85	0.89	0.96	0.89	0.92	0.92	0.81	1	0.69	1	0.89	0.77	0.96	0.85	0.89	1	0.77	0.96
B19	0.92	0.89	0.77	0.77	0.77	0.85	0.73	0.85	0.73	0.77	0.81	0.81	0.77	0.81	0.73	0.81	0.92	0.69	1	0.69	0.73	0.92	0.77	0.77	0.85	0.69	0.85	0.77
B20	0.69	0.73	0.92	0.92	0.92	0.85	1	0.77	0.96	0.96	0.81	0.89	0.96	0.89	0.89	0.92	0.81	1	0.69	1	0.89	0.77	0.96	0.85	0.89	1	0.77	0.96
B21	0.73	0.77	0.81	0.81	0.81	0.81	0.89	0.73	0.85	0.85	0.81	0.77	0.85	0.85	0.77	0.81	0.73	0.89	0.73	0.89	1	0.81	0.96	0.96	0.77	0.89	0.73	0.85
B22	0.92	0.89	0.85	0.85	0.85	0.85	0.81	0.77	0.81	0.77	0.81	0.81	0.81	0.89	0.81	0.85	0.92	0.77	0.92	0.77	0.81	1	0.85	0.85	0.85	0.77	0.85	0.85
B23	0.77	0.81	0.89	0.89	0.89	0.89	0.96	0.81	0.92	0.92	0.85	0.85	0.92	0.92	0.85	0.89	0.81	0.96	0.77	0.96	0.96	0.85	1	0.92	0.85	0.96	0.81	0.92
B24	0.77	0.81	0.85	0.77	0.77	0.77	0.85	0.69	0.81	0.81	0.77	0.73	0.81	0.81	0.73	0.77	0.77	0.85	0.77	0.85	0.96	0.85	0.92	1	0.77	0.85	0.77	0.81
B25	0.85	0.89	0.92	0.96	0.96	0.96	0.92	0.89	0.92	0.96	0.85	1	0.92	0.92	0.92	1	0.96	0.89	0.85	0.89	0.77	0.85	0.85	0.77	1	0.89	0.92	0.92
B26	0.73	0.77	0.92	0.92	0.92	0.85	1	0.77	0.96	0.96	0.81	0.89	0.96	0.89	0.89	0.92	0.81	1	0.69	1	0.89	0.77	0.96	0.85	0.89	1	0.81	0.96
B27	0.92	0.96	0.85	0.85	0.85	0.92	0.81	0.85	0.81	0.85	0.81	0.89	0.81	0.89	0.81	0.89	0.92	0.77	0.85	0.77	0.73	0.85	0.81	0.77	0.92	0.81	1	0.81
B28	0.77	0.77	0.89	0.96	0.96	0.89	1	0.81	0.92	0.92	0.85	0.92	0.92	0.92	0.92	0.96	0.89	0.96	0.77	0.96	0.85	0.85	0.92	0.81	0.92	0.96	0.81	1

Rows	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.65	0.58	0.89	0	1	1	1	0.81	1	0.73	0.92	0	0.89
B2	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.65	0.58	0.89	0	1	1	1	0.81	1	0.73	0.92	0	0.85
B3	1	1	1	1	1	1	0.35	1	1	0.31	0.08	1	0.89	1	1	0.62	0.54	0.89	0	1	1	1	0.77	1	0.73	0.89	0	0.85
B4	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.62	0.54	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B5	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.62	0.54	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B6	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.65	0.58	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B7	0.39	0.39	0.35	0.39	0.39	0.39	1	0.39	0.35	0.85	0.69	0.39	0.46	0.39	0.39	0.69	0.62	0.46	0.62	0.35	0.35	0.39	0.42	0.35	0.54	0.46	0.62	0.54
B8	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.92	1	1	0.65	0.58	0.92	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B9	1	1	1	1	1	1	0.35	1	1	0.31	0.08	1	0.89	1	1	0.62	0.54	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B10	0.31	0.31	0.31	0.31	0.31	0.31	0.85	0.31	0.31	1	0.77	0.31	0.42	0.31	0.31	0.65	0.54	0.39	0.69	0.27	0.27	0.31	0.35	0.27	0.54	0.39	0.69	0.42
B11	0.08	0.08	0.08	0.08	0.08	0.08	0.69	0.08	0.08	0.77	1	0.08	0.15	0.08	0.08	0.46	0.35	0.15	0.92	0.08	0.04	0.08	0.15	0.04	0.31	0.19	0.92	0.23
B12	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.65	0.54	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B13	0.89	0.89	0.89	0.89	0.89	0.89	0.46	0.92	0.89	0.42	0.15	0.89	1	0.89	0.89	0.65	0.65	0.92	0.08	0.89	0.89	0.89	0.73	0.89	0.65	0.77	0.12	0.81
B14	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.62	0.58	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B15	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.62	0.54	0.92	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B16	0.65	0.65	0.62	0.62	0.62	0.65	0.69	0.65	0.62	0.65	0.46	0.65	0.65	0.62	0.62	1	0.65	0.58	0.35	0.62	0.62	0.62	0.62	0.62	0.73	0.73	0.35	0.69
B17	0.58	0.58	0.54	0.54	0.54	0.58	0.62	0.58	0.54	0.54	0.35	0.54	0.65	0.58	0.54	0.65	1	0.58	0.42	0.54	0.58	0.58	0.81	0.58	0.73	0.65	0.42	0.65
B18	0.89	0.89	0.89	0.89	0.89	0.89	0.46	0.92	0.89	0.39	0.15	0.89	0.92	0.89	0.92	0.58	0.58	1	0.12	0.89	0.89	0.89	0.65	0.89	0.58	0.77	0.12	0.73
B19	0	0	0	0	0	0	0.62	0	0	0.69	0.92	0	0.08	0	0	0.35	0.42	0.12	1	0	0	0	0.19	0	0.27	0.12	1	0.12
B20	1	1	1	1	1	1	0.35	1	1	0.27	0.08	1	0.89	1	1	0.62	0.54	0.89	0	1	1	1	0.77	1	0.69	0.89	0	0.85
B21	1	1	1	1	1	1	0.35	1	1	0.27	0.04	1	0.89	1	1	0.62	0.58	0.89	0	1	1	1	0.81	1	0.69	0.89	0	0.85
B22	1	1	1	1	1	1	0.39	1	1	0.31	0.08	1	0.89	1	1	0.62	0.58	0.89	0	1	1	1	0.81	1	0.73	0.89	0	0.89
B23	0.81	0.81	0.77	0.77	0.77	0.77	0.42	0.77	0.77	0.35	0.15	0.77	0.73	0.77	0.77	0.62	0.81	0.65	0.19	0.77	0.81	0.81	1	0.81	0.85	0.81	0.23	0.85
B24	1	1	1	1	1	1	0.35	1	1	0.27	0.04	1	0.89	1	1	0.62	0.58	0.89	0	1	1	1	0.81	1	0.73	0.89	0	0.85
B25	0.73	0.73	0.73	0.69	0.69	0.69	0.54	0.69	0.69	0.54	0.31	0.69	0.65	0.69	0.69	0.73	0.73	0.58	0.27	0.69	0.69	0.73	0.85	0.73	1	0.81	0.27	0.85
B26	0.92	0.92	0.89	0.89	0.89	0.89	0.46	0.89	0.89	0.39	0.19	0.89	0.77	0.89	0.89	0.73	0.65	0.77	0.12	0.89	0.89	0.89	0.81	0.89	0.81	1	0.08	0.81
B27	0	0	0	0	0	0	0.62	0	0	0.69	0.92	0	0.12	0	0	0.35	0.42	0.12	1	0	0	0	0.23	0	0.27	0.08	1	0.15
B28	0.89	0.85	0.85	0.85	0.85	0.85	0.54	0.85	0.85	0.42	0.23	0.85	0.81	0.85	0.85	0.69	0.65	0.73	0.12	0.85	0.85	0.89	0.85	0.85	0.85	0.81	0.15	1

Apendix I Proportion of Matches Q 19

North Carolina

Column 1	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011 A	12	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	1	0.92	0.85	0.69	0.77	0.73	0.62	0.73	0.58	0.54	0.48	0.5	0.54	0.54	0.58	0.62	0.5	0.5	0.54	0.5	0.46	0.58	0.5	0.58	0.58	0.54	0.69	0.62	0.62
A002	0.92	1	0.85	0.77	0.69	0.81	0.65	0.69	0.62	0.54	0.52	0.54	0.62	0.58	0.65	0.62	0.5	0.54	0.54	0.58	0.39	0.65	0.46	0.58	0.65	0.54	0.69	0.62	0.62
A003	0.85	0.85	1	0.62	0.73	0.62	0.62	0.77	0.58	0.46	0.44	0.42	0.54	0.46	0.5	0.54	0.5	0.5	0.54	0.5	0.46	0.58	0.54	0.54	0.5	0.5	0.62	0.54	0.54
A004	0.69	0.77	0.62	1	0.65	0.65	0.65	0.69	0.62	0.62	0.44	0.54	0.62	0.54	0.73	0.62	0.5	0.5	0.5	0.58	0.46	0.81	0.62	0.65	0.65	0.54	0.65	0.65	0.58
A005	0.77	0.69	0.73	0.65	1	0.73	0.77	0.89	0.69	0.65	0.56	0.62	0.65	0.65	0.65	0.69	0.73	0.54	0.65	0.58	0.62	0.62	0.65	0.5	0.65	0.58	0.73	0.73	0.69
A006	0.73	0.81	0.62	0.65	0.73	1	0.77	0.73	0.65	0.62	0.56	0.58	0.65	0.69	0.65	0.62	0.54	0.54	0.54	0.62	0.39	0.62	0.5	0.5	0.65	0.58	0.81	0.65	0.65
A007	0.62	0.65	0.62	0.65	0.77	0.77	1	0.85	0.69	0.58	0.56	0.5	0.58	0.62	0.65	0.62	0.65	0.54	0.5	0.65	0.58	0.65	0.5	0.5	0.62	0.54	0.65	0.62	0.54
A008	0.73	0.69	0.77	0.69	0.89	0.73	0.85	1	0.65	0.62	0.52	0.54	0.58	0.58	0.58	0.62	0.62	0.5	0.54	0.54	0.58	0.62	0.62	0.5	0.62	0.62	0.69	0.69	0.62
A009	0.58	0.62	0.58	0.62	0.69	0.65	0.69	0.65	1	0.73	0.63	0.62	0.85	0.65	0.58	0.54	0.5	0.46	0.46	0.54	0.42	0.69	0.5	0.54	0.5	0.42	0.65	0.54	0.54
A010	0.54	0.54	0.46	0.62	0.65	0.62	0.58	0.62	0.73	1	0.78	0.81	0.77	0.77	0.65	0.62	0.58	0.65	0.62	0.62	0.5	0.58	0.5	0.58	0.65	0.62	0.69	0.62	0.69
A011	0.48	0.52	0.44	0.44	0.56	0.56	0.56	0.52	0.63	0.78	1	0.82	0.74	0.74	0.52	0.52	0.52	0.52	0.48	0.56	0.44	0.41	0.41	0.37	0.7	0.67	0.63	0.63	0.7
A012	0.5	0.54	0.42	0.54	0.62	0.58	0.5	0.54	0.62	0.81	0.82	1	0.73	0.81	0.58	0.62	0.62	0.62	0.58	0.62	0.5	0.46	0.46	0.46	0.73	0.73	0.65	0.69	0.77
A013	0.54	0.62	0.54	0.62	0.65	0.65	0.58	0.58	0.85	0.77	0.74	0.73	1	0.77	0.62	0.58	0.54	0.54	0.5	0.5	0.35	0.62	0.58	0.58	0.65	0.58	0.73	0.62	0.69
A014	0.54	0.58	0.46	0.54	0.65	0.69	0.62	0.58	0.65	0.77	0.74	0.81	0.77	1	0.62	0.69	0.69	0.54	0.58	0.58	0.42	0.5	0.5	0.46	0.65	0.65	0.65	0.62	0.73
A015	0.58	0.65	0.5	0.73	0.65	0.65	0.65	0.58	0.58	0.65	0.52	0.58	0.62	0.62	1	0.73	0.65	0.65	0.62	0.73	0.62	0.73	0.58	0.65	0.69	0.58	0.73	0.69	0.69
A016	0.62	0.62	0.54	0.62	0.69	0.62	0.62	0.62	0.54	0.62	0.52	0.62	0.58	0.69	0.73	1	0.89	0.73	0.81	0.69	0.69	0.58	0.62	0.69	0.58	0.54	0.62	0.58	0.62
A017	0.5	0.5	0.5	0.5	0.73	0.54	0.65	0.62	0.5	0.58	0.52	0.62	0.54	0.69	0.65	0.89	1	0.73	0.85	0.77	0.73	0.5	0.58	0.62	0.58	0.54	0.54	0.58	0.62

A018	0.5	0.54	0.5	0.5	0.54	0.54	0.54	0.5	0.46	0.65	0.52	0.62	0.54	0.54	0.65	0.73	0.73	1	0.89	0.81	0.73	0.58	0.42	0.77	0.62	0.58	0.62	0.54	0.58
A019	0.54	0.54	0.54	0.5	0.65	0.54	0.5	0.54	0.46	0.62	0.48	0.58	0.5	0.58	0.62	0.81	0.85	0.89	1	0.73	0.73	0.54	0.54	0.69	0.58	0.58	0.62	0.54	0.62
A020	0.5	0.58	0.5	0.58	0.58	0.62	0.65	0.54	0.54	0.62	0.56	0.62	0.5	0.58	0.73	0.69	0.77	0.81	0.73	1	0.77	0.62	0.42	0.58	0.62	0.54	0.62	0.62	0.58
A021	0.46	0.39	0.46	0.46	0.62	0.39	0.58	0.58	0.42	0.5	0.44	0.5	0.35	0.42	0.62	0.69	0.73	0.73	0.73	0.77	1	0.54	0.54	0.58	0.54	0.58	0.5	0.58	0.5
A022	0.58	0.65	0.58	0.81	0.62	0.62	0.65	0.62	0.69	0.58	0.41	0.46	0.62	0.5	0.73	0.58	0.5	0.58	0.54	0.62	0.54	1	0.62	0.65	0.62	0.5	0.65	0.65	0.5
A023	0.5	0.46	0.54	0.62	0.65	0.5	0.5	0.62	0.5	0.5	0.41	0.46	0.58	0.5	0.58	0.62	0.58	0.42	0.54	0.42	0.54	0.62	1	0.54	0.5	0.54	0.62	0.54	0.54
A024	0.58	0.58	0.54	0.65	0.5	0.5	0.5	0.5	0.54	0.58	0.37	0.46	0.58	0.46	0.65	0.69	0.62	0.77	0.69	0.58	0.58	0.65	0.54	1	0.58	0.58	0.62	0.54	0.58
A025	0.58	0.65	0.5	0.65	0.65	0.65	0.62	0.62	0.5	0.65	0.7	0.73	0.65	0.65	0.69	0.58	0.58	0.62	0.58	0.62	0.54	0.62	0.5	0.58	1	0.81	0.77	0.89	0.85
A026	0.54	0.54	0.5	0.54	0.58	0.58	0.54	0.62	0.42	0.62	0.67	0.73	0.58	0.65	0.58	0.54	0.54	0.58	0.58	0.54	0.58	0.5	0.54	0.58	0.81	1	0.77	0.81	0.85
A027	0.69	0.69	0.62	0.65	0.73	0.81	0.65	0.69	0.65	0.69	0.63	0.65	0.73	0.65	0.73	0.62	0.54	0.62	0.62	0.62	0.5	0.65	0.62	0.62	0.77	0.77	1	0.85	0.85
A028	0.62	0.62	0.54	0.65	0.73	0.65	0.62	0.69	0.54	0.62	0.63	0.69	0.62	0.62	0.69	0.58	0.58	0.54	0.54	0.62	0.58	0.65	0.54	0.54	0.89	0.81	0.85	1	0.85
A029	0.62	0.62	0.54	0.58	0.69	0.65	0.54	0.62	0.54	0.69	0.7	0.77	0.69	0.73	0.69	0.62	0.62	0.58	0.62	0.58	0.5	0.5	0.54	0.58	0.85	0.85	0.85	0.85	1

Rows	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011	A012	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	1	0.22	0.7	0.63	0.52	0.3	0.67	0.26	0.48	0.11		0.33	0.44	0.67	0.48	0.41	0.67	0.74	0.48	0.33	0.56	0.67	0.59	0.52	0.22	0.56	0	0	0
A002	0.22	1	0.3	0.37	0.15	0.93	0.56	0.82	0.26	0.11		0.44	0.56	0.19	0.37	0.3	0.33	0.04	0.3	0.89	0	0.37	0.44	0.26	0.89	0.07	0	0	0
A003	0.7	0.3	1	0.56	0.52	0.26	0.56	0.26	0.37	0.07		0.41	0.26	0.56	0.41	0.37	0.48	0.63	0.48	0.3	0.59	0.44	0.59	0.41	0.3	0.48	0	0	0
A004	0.63	0.37	0.56	1	0.59	0.44	0.67	0.44	0.33	0.07		0.37	0.41	0.41	0.3	0.41	0.48	0.44	0.44	0.44	0.37	0.33	0.59	0.33	0.37	0.22	0	0	0
A005	0.52	0.15	0.52	0.59	1	0.19	0.48	0.22	0.37	0		0.3	0.26	0.41	0.3	0.26	0.48	0.52	0.41	0.19	0.48	0.3	0.56	0.41	0.15	0.33	0	0	0
A006	0.3	0.93	0.26	0.44	0.19	1	0.63	0.89	0.26	0.07		0.44	0.59	0.19	0.37	0.26	0.44	0.04	0.3	1	0	0.37	0.52	0.26	0.85	0.07	0	0	0
A007	0.67	0.56	0.56	0.67	0.48	0.63	1	0.59	0.37	0.07		0.33	0.48	0.37	0.41	0.41	0.63	0.41	0.41	0.63	0.26	0.44	0.67	0.37	0.56	0.26	0	0	0
A008	0.26	0.82	0.26	0.44	0.22	0.89	0.59	1	0.3	0.04		0.33	0.56	0.19	0.3	0.3	0.41	0.04	0.26	0.85	0	0.3	0.48	0.19	0.74	0.07	0	0	0
A009	0.48	0.26	0.37	0.33	0.37	0.26	0.37	0.3	1	0.26		0.59	0.41	0.52	0.37	0.44	0.44	0.48	0.44	0.22	0.33	0.41	0.48	0.33	0.3	0.37	0	0	0
A010	0.11	0.11	0.07	0.07	0	0.07	0.07	0.04	0.26	1		0.22	0.19	0.15	0.11	0.04	0.15	0.15	0.15	0.07	0.11	0.11	0.11	0.11	0.07	0.11	0	0	0
A011																													
A012	0.33	0.44	0.41	0.37	0.3	0.44	0.33	0.33	0.59	0.22		1	0.37	0.37	0.44	0.37	0.33	0.3	0.44	0.48	0.3	0.41	0.48	0.41	0.52	0.3	0	0	0
A013	0.44	0.56	0.26	0.41	0.26	0.59	0.48	0.56	0.41	0.19		0.37	1	0.44	0.3	0.26	0.33	0.33	0.22	0.59	0.19	0.67	0.37	0.22	0.52	0.26	0	0	0
A014	0.67	0.19	0.56	0.41	0.41	0.19	0.37	0.19	0.52	0.15		0.37	0.44	1	0.41	0.41	0.37	0.74	0.48	0.22	0.59	0.52	0.33	0.52	0.26	0.52	0	0	0
A015	0.48	0.37	0.41	0.3	0.3	0.37	0.41	0.3	0.37	0.11		0.44	0.3	0.41	1	0.37	0.7	0.56	0.67	0.37	0.41	0.44	0.3	0.82	0.48	0.48	0	0	0
A016	0.41	0.3	0.37	0.41	0.26	0.26	0.41	0.3	0.44	0.04		0.37	0.26	0.41	0.37	1	0.3	0.41	0.44	0.26	0.3	0.33	0.33	0.41	0.44	0.33	0	0	0
A017	0.67	0.33	0.48	0.48	0.48	0.44	0.63	0.41	0.44	0.15		0.33	0.33	0.37	0.7	0.3	1	0.63	0.74	0.44	0.41	0.44	0.59	0.7	0.33	0.52	0	0	0
A018	0.74	0.04	0.63	0.44	0.52	0.04	0.41	0.04	0.48	0.15		0.3	0.33	0.74	0.56	0.41	0.63	1	0.74	0.07	0.74	0.67	0.41	0.74	0.15	0.78	0	0	0
A019	0.48	0.3	0.48	0.44	0.41	0.3	0.41	0.26	0.44	0.15		0.44	0.22	0.48	0.67	0.44	0.74	0.74	1	0.3	0.52	0.44	0.44	0.82	0.41	0.56	0	0	0
A020	0.33	0.89	0.3	0.44	0.19	1	0.63	0.85	0.22	0.07		0.48	0.59	0.22	0.37	0.26	0.44	0.07	0.3	1	0.04	0.41	0.48	0.26	0.82	0.11	0	0	0
A021	0.56	0	0.59	0.37	0.48	0	0.26	0	0.33	0.11		0.3	0.19	0.59	0.41	0.3	0.41	0.74	0.52	0.04	1	0.48	0.41	0.56	0.07	0.59	0	0	0
A022	0.67	0.37	0.44	0.33	0.3	0.37	0.44	0.3	0.41	0.11		0.41	0.67	0.52	0.44	0.33	0.44	0.67	0.44	0.41	0.48	1	0.44	0.44	0.44	0.59	0	0	0
A023	0.59	0.44	0.59	0.59	0.56	0.52	0.67	0.48	0.48	0.11		0.48	0.37	0.33	0.3	0.33	0.59	0.41	0.44	0.48	0.41	0.44	1	0.33	0.44	0.37	0	0	0
A024	0.52	0.26	0.41	0.33	0.41	0.26	0.37	0.19	0.33	0.11		0.41	0.22	0.52	0.82	0.41	0.7	0.74	0.82	0.26	0.56	0.44	0.33	1	0.37	0.59	0	0	0
A025	0.22	0.89	0.3	0.37	0.15	0.85	0.56	0.74	0.3	0.07		0.52	0.52	0.26	0.48	0.44	0.33	0.15	0.41	0.82	0.07	0.44	0.44	0.37	1	0.19	0	0	0
A026	0.56	0.07	0.48	0.22	0.33	0.07	0.26	0.07	0.37	0.11		0.3	0.26	0.52	0.48	0.33	0.52	0.78	0.56	0.11	0.59	0.59	0.37	0.59	0.19	1	0	0	0
A027	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	1
A028	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	1
A029	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	1

Georgia

Col	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C2	0	1	0	0	0	0.7	0	0.4	0	0.5	0	0	0	0	0	0	0	0	0.5	0	0	0	0.47	0	0	0.33	0	0.43	0	0	0	0
C3	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C4	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C5	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C6	0	0.7	0	0	0	1	0	0.63	0	0.47	0	0	0	0	0	0	0	0	0.4	0	0	0	0.4	0	0	0.47	0	0.43	0	0	0	0
C7	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C8	0.03	0.4	0.03	0.03	0.03	0.63	0.03	1	0.03	0.27	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.23	0.03	0.03	0.03	0.2	0.03	0.03	0.3	0.03	0.4	0.03	0.03	0.03	0.03
C9	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C10	0.03	0.5	0.03	0.03	0.03	0.47	0.03	0.27	0.03	1	0.03	0	0.03	0.03	0.03	0.03	0.03	0.03	0.4	0.03	0.03	0.03	0.5	0.03	0.03	0.43	0.03	0.3	0.03	0.03	0.03	0.03
C11	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C12	1	0	1	1	1	0	1	0.03	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	0	1	1	1	1
C13	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C14	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C15	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C16	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C17	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C18	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C19	0	0.5	0	0	0	0.4	0	0.23	0	0.4	0	0	0	0	0	0	0	0	1	0	0	0	0.63	0	0	0.27	0	0.3	0	0	0	0

C20	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C21	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C22	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C23	0.03	0.47	0.03	0.03	0.03	0.4	0.03	0.2	0.03	0.5	0.03	0	0.03	0.03	0.03	0.03	0.03	0.03	0.63	0.03	0.03	0.03	1	0.03	0.03	0.23	0.03	0.33	0.03	0.03	0.03	0.03
C24	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C25	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C26	0.03	0.33	0.03	0.03	0.03	0.47	0.03	0.3	0.03	0.43	0.03	0	0.03	0.03	0.03	0.03	0.03	0.03	0.27	0.03	0.03	0.03	0.23	0.03	0.03	1	0.03	0.5	0.03	0.03	0.03	0.03
C27	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C28	0	0.43	0	0	0	0.43	0	0.4	0	0.3	0	0	0	0	0	0	0	0	0.3	0	0	0	0.33	0	0	0.5	0	1	0	0	0	0
C29	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C30	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C31	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1
C32	1	0	1	1	1	0	1	0.03	1	0.03	1	1	1	1	1	1	1	1	0	1	1	1	0.03	1	1	0.03	1	0	1	1	1	1

Rows	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
C1	1	0.97	0.83	0.9	0.87	0.9	0.83	0.87	0.87	0.9	0.87	0.77	0.87	0.8	0.9	0.93
C2	0.97	1	0.8	0.93	0.9	0.93	0.87	0.9	0.87	0.9	0.9	0.8	0.87	0.83	0.9	0.9
C3	0.83	0.8	1	0.83	0.8	0.83	0.83	0.83	0.83	0.8	0.8	0.73	0.8	0.8	0.83	0.8
C4	0.9	0.93	0.83	1	0.87	0.87	0.9	0.93	0.77	0.8	0.8	0.77	0.77	0.77	0.83	0.83
C5	0.87	0.9	0.8	0.87	1	1	0.97	0.93	0.83	0.87	0.83	0.87	0.8	0.8	0.83	0.8
C6	0.9	0.93	0.83	0.87	1	1	0.97	0.93	0.87	0.9	0.87	0.87	0.83	0.83	0.87	0.83
C7	0.83	0.87	0.83	0.9	0.97	0.97	1	0.97	0.8	0.83	0.8	0.83	0.77	0.77	0.83	0.77
C8	0.87	0.9	0.83	0.93	0.93	0.93	0.97	1	0.87	0.9	0.83	0.83	0.8	0.8	0.87	0.8
C9	0.87	0.87	0.83	0.77	0.83	0.87	0.8	0.87	1	0.93	0.9	0.8	0.93	0.87	0.9	0.83
C10	0.9	0.9	0.8	0.8	0.87	0.9	0.83	0.9	0.93	1	0.87	0.83	0.9	0.83	0.87	0.9
C11	0.87	0.9	0.8	0.8	0.83	0.87	0.8	0.83	0.9	0.87	1	0.8	0.9	0.9	0.9	0.83
C12	0.77	0.8	0.73	0.77	0.87	0.87	0.83	0.83	0.8	0.83	0.8	1	0.83	0.83	0.77	0.77
C13	0.87	0.87	0.8	0.77	0.8	0.83	0.77	0.8	0.93	0.9	0.9	0.83	1	0.93	0.9	0.87
C14	0.8	0.83	0.8	0.77	0.8	0.83	0.77	0.8	0.87	0.83	0.9	0.83	0.93	1	0.83	0.8
C15	0.9	0.9	0.83	0.83	0.83	0.87	0.83	0.87	0.9	0.87	0.9	0.77	0.9	0.83	1	0.87
C16	0.93	0.9	0.8	0.83	0.8	0.83	0.77	0.8	0.83	0.9	0.83	0.77	0.87	0.8	0.87	1
C17	0.83	0.83	0.83	0.8	0.83	0.87	0.87	0.87	0.83	0.9	0.8	0.77	0.83	0.77	0.87	0.9

Rows	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	0.83	0.87	0.87	0.87	0.9	0.87	0.93	0.87	0.87	0.83	0.9	0.9	0.87	0.83	0.8	0.83
C2	0.83	0.87	0.87	0.87	0.9	0.87	0.93	0.87	0.9	0.87	0.93	0.93	0.9	0.87	0.83	0.87
C3	0.83	0.77	0.8	0.77	0.77	0.8	0.8	0.77	0.77	0.77	0.73	0.8	0.77	0.77	0.83	0.8
C4	0.8	0.77	0.77	0.8	0.8	0.8	0.83	0.8	0.83	0.8	0.83	0.87	0.83	0.8	0.8	0.83
C5	0.83	0.8	0.83	0.83	0.83	0.8	0.87	0.8	0.9	0.83	0.87	0.9	0.9	0.83	0.8	0.87
C6	0.87	0.83	0.87	0.87	0.87	0.83	0.9	0.83	0.93	0.87	0.9	0.93	0.93	0.87	0.83	0.9
C7	0.87	0.77	0.8	0.83	0.8	0.8	0.83	0.8	0.9	0.83	0.83	0.9	0.9	0.83	0.83	0.87
C8	0.87	0.8	0.87	0.9	0.83	0.83	0.87	0.83	0.9	0.87	0.87	0.97	0.9	0.9	0.9	0.9
C9	0.83	0.87	0.93	0.87	0.87	0.87	0.9	0.83	0.83	0.83	0.83	0.9	0.83	0.87	0.93	0.8
C10	0.9	0.93	0.97	0.97	0.93	0.87	0.97	0.9	0.87	0.93	0.9	0.93	0.87	0.9	0.87	0.83
C11	0.8	0.87	0.87	0.8	0.87	0.87	0.9	0.83	0.83	0.87	0.9	0.87	0.83	0.87	0.9	0.83
C12	0.77	0.8	0.83	0.77	0.8	0.77	0.83	0.77	0.8	0.8	0.83	0.8	0.8	0.77	0.77	0.77
C13	0.83	0.9	0.9	0.83	0.9	0.87	0.93	0.87	0.8	0.83	0.9	0.83	0.8	0.8	0.87	0.77
C14	0.77	0.83	0.83	0.77	0.83	0.8	0.87	0.8	0.77	0.83	0.9	0.8	0.77	0.8	0.87	0.83
C15	0.87	0.87	0.87	0.9	0.9	0.9	0.93	0.93	0.9	0.87	0.87	0.9	0.9	0.87	0.87	0.87
C16	0.9	0.93	0.9	0.87	0.97	0.83	0.97	0.93	0.8	0.83	0.87	0.83	0.8	0.77	0.77	0.77
C17	1	0.9	0.9	0.9	0.93	0.83	0.93	0.93	0.83	0.87	0.83	0.87	0.83	0.8	0.83	0.8

C18	0.87	0.87	0.77	0.77	0.8	0.83	0.77	0.8	0.87	0.93	0.87	0.8	0.9	0.83	0.87	0.93	0.9	1	0.97	0.87	0.97	0.9	0.97	0.93	0.8	0.9	0.87	0.83	0.8	0.83	0.8	0.77
C19	0.87	0.87	0.8	0.77	0.83	0.87	0.8	0.87	0.93	0.97	0.87	0.83	0.9	0.83	0.87	0.9	0.9	0.97	1	0.9	0.93	0.9	0.93	0.9	0.83	0.9	0.87	0.9	0.83	0.9	0.87	0.8
C20	0.87	0.87	0.77	0.8	0.83	0.87	0.83	0.9	0.87	0.97	0.8	0.77	0.83	0.77	0.9	0.87	0.9	0.87	0.9	1	0.9	0.83	0.93	0.93	0.9	0.93	0.87	0.93	0.9	0.9	0.83	0.87
C21	0.9	0.9	0.77	0.8	0.83	0.87	0.8	0.83	0.87	0.93	0.87	0.8	0.9	0.83	0.9	0.97	0.93	0.97	0.93	0.9	1	0.87	1	0.97	0.83	0.87	0.9	0.87	0.83	0.8	0.8	0.8
C22	0.87	0.87	0.8	0.8	0.8	0.83	0.8	0.83	0.87	0.87	0.87	0.77	0.87	0.8	0.9	0.83	0.83	0.9	0.9	0.83	0.87	1	0.9	0.87	0.83	0.87	0.83	0.87	0.83	0.87	0.83	0.8
C23	0.93	0.93	0.8	0.83	0.87	0.9	0.83	0.87	0.9	0.97	0.9	0.83	0.93	0.87	0.93	0.97	0.93	0.97	0.93	0.93	1	0.9	1	0.97	0.87	0.9	0.93	0.9	0.87	0.83	0.83	0.83
C24	0.87	0.87	0.77	0.8	0.8	0.83	0.8	0.83	0.83	0.9	0.83	0.77	0.87	0.8	0.93	0.93	0.93	0.93	0.9	0.93	0.97	0.87	0.97	1	0.87	0.9	0.87	0.87	0.87	0.83	0.8	0.83
C25	0.87	0.9	0.77	0.83	0.9	0.93	0.9	0.9	0.83	0.87	0.83	0.8	0.8	0.77	0.9	0.8	0.83	0.8	0.83	0.9	0.83	0.83	0.87	0.87	1	0.9	0.87	0.93	1	0.9	0.83	0.9
C26	0.83	0.87	0.77	0.8	0.83	0.87	0.83	0.87	0.83	0.93	0.87	0.8	0.83	0.83	0.87	0.83	0.87	0.9	0.9	0.93	0.87	0.87	0.9	0.9	0.9	1	0.9	0.9	0.9	0.97	0.87	0.9
C27	0.9	0.93	0.73	0.83	0.87	0.9	0.83	0.87	0.83	0.9	0.9	0.83	0.9	0.9	0.87	0.87	0.83	0.87	0.87	0.87	0.9	0.83	0.93	0.87	0.87	0.9	1	0.9	0.87	0.87	0.83	0.87
C28	0.9	0.93	0.8	0.87	0.9	0.93	0.9	0.97	0.9	0.93	0.87	0.8	0.83	0.8	0.9	0.83	0.87	0.83	0.9	0.93	0.87	0.87	0.9	0.87	0.93	0.9	0.9	1	0.93	0.93	0.9	0.9
C29	0.87	0.9	0.77	0.83	0.9	0.93	0.9	0.9	0.83	0.87	0.83	0.8	0.8	0.77	0.9	0.8	0.83	0.8	0.83	0.9	0.83	0.83	0.87	0.87	1	0.9	0.87	0.93	1	0.9	0.83	0.9
C30	0.83	0.87	0.77	0.8	0.83	0.87	0.83	0.9	0.87	0.9	0.87	0.77	0.8	0.8	0.87	0.77	0.8	0.83	0.9	0.9	0.8	0.87	0.83	0.83	0.9	0.97	0.87	0.93	0.9	1	0.9	0.9
C31	0.8	0.83	0.83	0.8	0.8	0.83	0.83	0.9	0.93	0.87	0.9	0.77	0.87	0.87	0.87	0.77	0.83	0.8	0.87	0.83	0.8	0.83	0.83	0.8	0.83	0.87	0.83	0.9	0.83	0.9	1	0.83
C32	0.83	0.87	0.8	0.83	0.87	0.9	0.87	0.9	0.8	0.83	0.83	0.77	0.77	0.83	0.87	0.77	0.8	0.77	0.8	0.87	0.8	0.8	0.83	0.83	0.9	0.9	0.87	0.9	0.9	0.9	0.83	1

Tennessee

Columns	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	1	0.89	0.77	0.69	0.69	0.89	0.85	0.73	0.89	0.73	0.73	0.77	0.73	0.69	0.77	0.73	0.89	0.81	0.77	0.77	0.65	0.89	0.92	0.81	0.92	0.62	0.85	0.89
B2	0.89	1	0.73	0.73	0.73	0.92	0.81	0.77	0.85	0.81	0.77	0.73	0.77	0.81	0.73	0.77	0.85	0.69	0.77	0.73	0.65	0.85	0.89	0.69	0.81	0.65	0.89	0.89
B3	0.77	0.73	1	0.65	0.65	0.69	0.73	0.62	0.73	0.73	0.69	0.65	0.69	0.65	0.69	0.69	0.77	0.69	0.65	0.81	0.62	0.85	0.85	0.62	0.85	0.69	0.77	0.81
B4	0.69	0.73	0.65	1	0.96	0.81	0.89	0.96	0.81	0.92	0.96	0.81	1	0.92	0.89	0.96	0.73	0.81	0.96	0.73	0.65	0.77	0.77	0.65	0.73	0.62	0.81	0.81
B5	0.69	0.73	0.65	0.96	1	0.81	0.89	0.92	0.81	0.92	1	0.85	0.96	0.89	0.85	1	0.73	0.85	0.92	0.73	0.65	0.77	0.77	0.65	0.73	0.62	0.81	0.77
B6	0.89	0.92	0.69	0.81	0.81	1	0.89	0.85	0.92	0.81	0.81	0.81	0.85	0.81	0.81	0.85	0.85	0.77	0.85	0.73	0.62	0.85	0.89	0.73	0.81	0.62	0.89	0.85
B7	0.85	0.81	0.73	0.89	0.89	0.89	1	0.85	0.89	0.89	0.89	0.81	0.92	0.89	0.96	0.92	0.89	0.89	0.85	0.77	0.69	0.89	0.89	0.77	0.85	0.69	0.85	0.92
B8	0.73	0.77	0.62	0.96	0.92	0.85	0.85	1	0.77	0.89	0.92	0.77	0.96	0.89	0.85	0.92	0.69	0.77	1	0.69	0.62	0.73	0.77	0.69	0.69	0.58	0.77	0.77
B9	0.89	0.85	0.73	0.81	0.81	0.92	0.89	0.77	1	0.81	0.81	0.89	0.85	0.81	0.81	0.85	0.85	0.85	0.81	0.77	0.69	0.85	0.85	0.73	0.89	0.65	0.89	0.85
B10	0.73	0.81	0.73	0.92	0.92	0.81	0.89	0.89	0.81	1	0.92	0.77	0.92	0.92	0.85	0.92	0.77	0.81	0.89	0.73	0.73	0.81	0.81	0.65	0.77	0.69	0.81	0.81
B11	0.73	0.77	0.69	0.96	1	0.81	0.89	0.92	0.81	0.92	1	0.85	0.96	0.89	0.85	1	0.77	0.85	0.92	0.77	0.69	0.81	0.81	0.69	0.77	0.65	0.85	0.81
B12	0.77	0.73	0.65	0.81	0.85	0.81	0.81	0.77	0.89	0.77	0.85	1	0.81	0.73	0.77	0.89	0.73	0.92	0.81	0.73	0.69	0.73	0.73	0.69	0.81	0.62	0.81	0.77
B13	0.73	0.77	0.69	1	0.96	0.85	0.92	0.96	0.85	0.92	0.96	0.81	1	0.96	0.92	0.96	0.77	0.81	0.96	0.77	0.69	0.81	0.81	0.69	0.77	0.65	0.85	0.85
B14	0.69	0.81	0.65	0.92	0.89	0.81	0.89	0.89	0.81	0.92	0.89	0.73	0.96	1	0.85	0.89	0.73	0.73	0.89	0.69	0.69	0.77	0.77	0.65	0.73	0.69	0.77	0.85
B15	0.77	0.73	0.69	0.89	0.85	0.81	0.96	0.85	0.81	0.85	0.85	0.77	0.92	0.85	1	0.89	0.81	0.85	0.85	0.73	0.65	0.81	0.81	0.69	0.77	0.62	0.81	0.89
B16	0.73	0.77	0.69	0.96	1	0.85	0.92	0.92	0.85	0.92	1	0.89	0.96	0.89	0.89	1	0.77	0.89	0.92	0.77	0.69	0.81	0.81	0.69	0.77	0.65	0.85	0.81
B17	0.89	0.85	0.77	0.73	0.73	0.85	0.89	0.69	0.85	0.77	0.77	0.73	0.77	0.73	0.81	0.77	1	0.77	0.69	0.77	0.62	0.92	0.92	0.69	0.89	0.69	0.92	0.92
B18	0.81	0.69	0.69	0.81	0.85	0.77	0.89	0.77	0.85	0.81	0.85	0.92	0.81	0.73	0.85	0.89	0.77	1	0.81	0.73	0.77	0.77	0.77	0.81	0.85	0.69	0.77	0.81
B19	0.77	0.77	0.65	0.96	0.92	0.85	0.85	1	0.81	0.89	0.92	0.81	0.96	0.89	0.85	0.92	0.69	0.81	1	0.73	0.65	0.73	0.77	0.73	0.73	0.62	0.77	0.77
B20	0.77	0.73	0.81	0.73	0.73	0.73	0.77	0.69	0.77	0.73	0.77	0.73	0.77	0.69	0.73	0.77	0.77	0.73	0.73	1	0.69	0.85	0.85	0.69	0.85	0.77	0.85	0.81
B21	0.65	0.65	0.62	0.65	0.65	0.62	0.69	0.62	0.69	0.73	0.69	0.69	0.69	0.69	0.65	0.69	0.62	0.77	0.65	0.69	1	0.65	0.65	0.81	0.73	0.81	0.65	0.69
B22	0.89	0.85	0.85	0.77	0.77	0.85	0.89	0.73	0.85	0.81	0.81	0.73	0.81	0.77	0.81	0.81	0.92	0.77	0.73	0.85	0.65	1	1	0.73	0.96	0.69	0.89	0.92
B23	0.92	0.89	0.85	0.77	0.77	0.89	0.89	0.77	0.85	0.81	0.81	0.73	0.81	0.77	0.81	0.81	0.92	0.77	0.77	0.85	0.65	1	1	0.77	0.96	0.69	0.89	0.92
B24	0.81	0.69	0.62	0.65	0.65	0.73	0.77	0.69	0.73	0.65	0.69	0.69	0.69	0.65	0.69	0.69	0.69	0.81	0.73	0.69	0.81	0.73	0.77	1	0.81	0.77	0.65	0.73
B25	0.92	0.81	0.85	0.73	0.73	0.81	0.85	0.69	0.89	0.77	0.77	0.81	0.77	0.73	0.77	0.77	0.89	0.85	0.73	0.85	0.73	0.96	0.96	0.81	1	0.73	0.85	0.89
B26	0.62	0.65	0.69	0.62	0.62	0.62	0.69	0.58	0.65	0.69	0.65	0.62	0.65	0.69	0.62	0.65	0.69	0.69	0.62	0.77	0.81	0.69	0.69	0.77	0.73	1	0.65	0.69
B27	0.85	0.89	0.77	0.81	0.81	0.89	0.85	0.77	0.89	0.81	0.85	0.81	0.85	0.77	0.81	0.85	0.92	0.77	0.77	0.85	0.65	0.89	0.89	0.65	0.85	0.65	1	0.89

B28	0.89	0.89	0.81	0.81	0.77	0.85	0.92	0.77	0.85	0.81	0.81	0.77	0.85	0.85	0.89	0.81	0.92	0.81	0.77	0.81	0.69	0.92	0.92	0.73	0.89	0.69	0.89	1

Rows	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B2	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B3	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B4	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B5	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B6	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B7	0.04	0.04	0.04	0.04	0.04	0.04	1	0.04	0.04	0.23	0.19	0.04	0.31	0.04	0.04	0.35	0.27	0.69	0.15	0.04	0	0.04	0.35	0.04	0.27	0.39	0.31	0.27
B8	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B9	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B10	0	0	0	0	0	0	0.23	0	0	1	0.73	0	0.62	0	0	0.58	0.39	0.12	0.62	0	0	0	0.19	0	0.39	0.08	0.42	0.42
B11	0	0	0	0	0	0	0.19	0	0	0.73	1	0	0.58	0	0	0.5	0.35	0	0.5	0	0	0	0.15	0	0.46	0.08	0.35	0.35
B12	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B13	0	0	0	0	0	0	0.31	0	0	0.62	0.58	0	1	0	0	0.58	0.46	0.19	0.42	0	0	0	0.23	0	0.39	0.08	0.42	0.39
B14	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B15	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B16	0	0	0	0	0	0	0.35	0	0	0.58	0.5	0	0.58	0	0	1	0.39	0.35	0.54	0	0	0	0.31	0	0.39	0.15	0.39	0.39
B17	0	0	0	0	0	0	0.27	0	0	0.39	0.35	0	0.46	0	0	0.39	1	0.42	0.27	0	0	0	0.23	0	0.81	0	0.96	0.77
B18	0	0	0	0	0	0	0.69	0	0	0.12	0	0	0.19	0	0	0.35	0.42	1	0.08	0	0	0	0.42	0	0.42	0.46	0.46	0.39
B19	0	0	0	0	0	0	0.15	0	0	0.62	0.5	0	0.42	0	0	0.54	0.27	0.08	1	0	0	0	0.19	0	0.12	0.04	0.31	0.27
B20	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B21	1	1	1	1	1	1	0	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B22	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B23	0	0	0	0	0	0	0.35	0	0	0.19	0.15	0	0.23	0	0	0.31	0.23	0.42	0.19	0	0	0	1	0	0.31	0.73	0.31	0.35
B24	1	1	1	1	1	1	0.04	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0
B25	0	0	0	0	0	0	0.27	0	0	0.39	0.46	0	0.39	0	0	0.39	0.81	0.42	0.12	0	0	0	0.31	0	1	0.12	0.81	0.73
B26	0	0	0	0	0	0	0.39	0	0	0.08	0.08	0	0.08	0	0	0.15	0	0.46	0.04	0	0	0	0.73	0	0.12	1	0.04	0.15
B27	0	0	0	0	0	0	0.31	0	0	0.42	0.35	0	0.42	0	0	0.39	0.96	0.46	0.31	0	0	0	0.31	0	0.81	0.04	1	0.77
B28	0	0	0	0	0	0	0.27	0	0	0.42	0.35	0	0.39	0	0	0.39	0.77	0.39	0.27	0	0	0	0.35	0	0.73	0.15	0.77	1

Appendix J Question 14 Reachability

North Carolina

NC	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011	A012	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A002	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A003	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A004	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A005	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A006	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A007	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A008	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A009	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A010	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A011	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A012	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A013	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A014	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A015	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A016	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
A017	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
A018	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
A019	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
A020	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
A021	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
A022	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
A023	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
A024	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
A025	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
A026	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
A027	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
A028	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
A029	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Georgia

GA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	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
C2	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
C3	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
C4	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
C5	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
C6	1	1	0	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
C7	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
C8	1	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
C9	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
C10	1	1	1	1	0	0	0	1	1	0	1	0	1	0	1	1	0	0	1	1	1	1	0	0	1	0	0	0	0	1	0	0
C11	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
C12	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
C13	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
C14	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
C15	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
C16	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
C17	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
C18	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
C19	1	1	1	1	0	0	0	1	1	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0
C20	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
C21	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
C22	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
C23	1	1	1	1	0	0	0	1	1	0	0	0	1	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0
C24	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

C25	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
C26	1	1	1	1	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	0	0	1	0	0	1	1	1	0	1
C27	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
C28	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	1	0	1
C29	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
C30	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
C31	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
C32	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

Tennessee

TN	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	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
B2	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
B3	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
B4	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
B5	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
B6	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
B7	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B8	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
B9	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
B10	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B11	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B12	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
B13	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B14	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
B15	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
B16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
B17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
B18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
B19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
B20	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
B21	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
B22	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
B23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
B24	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
B25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
B27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
B28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Appendix K Q 19 Reachability

North Carolina

NC	A001	A002	A003	A004	A005	A006	A007	A008	A009	A010	A011	A012	A013	A014	A015	A016	A017	A018	A019	A020	A021	A022	A023	A024	A025	A026	A027	A028	A029
A001	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A002	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A003	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A004	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A005	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A006	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A007	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A008	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A009	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A010	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A011	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A012	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A013	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A014	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A015	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A016	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1
A017	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1

A018	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
A019	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
A020	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
A021	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
A022	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
A023	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
A024	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
A025	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
A026	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
A027	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
A028	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
A029	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

Georgia

GA	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32
C1	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
C2	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C3	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
C4	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
C5	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
C6	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C7	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
C8	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C9	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
C10	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C11	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
C12	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
C13	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
C14	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
C15	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
C16	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
C17	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
C18	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
C19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1
C20	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
C21	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
C22	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
C23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1
C24	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

C25	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
C26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1
C27	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
C28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1
C29	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
C30	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
C31	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
C32	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

Tennessee

TN	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B1	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
B2	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
B3	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
B4	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
B5	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
B6	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
B7	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B8	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
B9	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
B10	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B11	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B12	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
B13	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B14	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
B15	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
B16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1
B17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1
B18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1	1
B19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	1	1
B20	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
B21	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
B22	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
B23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1
B24	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
B25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1
B26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1
B27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1
B28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10