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**Attitude consistency theory implication for policy analysis: The
case of sustainable agriculture**

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Iowa State University, 1994

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Attitude consistency theory implication for policy analysis:

The case of sustainable agriculture

by

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TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION	1
CHAPTER 2. THE THEORETICAL FRAMEWORK	9
Theoretical Concepts and Constructs	10
Cognitive Consistency Theories	13
Balanced states	14
Principle of congruity	15
Cognitive dissonance	16
Criticisms of Cognitive Dissonance	21
Attitudes as Arguments	23
Latitudes of attitudes	25
Summary of Theoretical Position	27
CHAPTER 3. SUSTAINABLE AGRICULTURE AS A POLICY ISSUE	32
Sustainable Agriculture	32
CHAPTER 4. THE MEASUREMENT, HYPOTHESES, AND DATA COLLECTION FRAMEWORK	42
Empirical Measures for Dimensions of Sustainable Agriculture	42
Independent Variables	45
Hypotheses	49
Data Collection	50
CHAPTER 5. RESULTS	52
Introduction	52
General Sample Characteristics and Comparisons to U.S. Census	52
Validity and Reliability of the Scale Scores	53
Reliability findings of individual research variables	57

Statistical Procedures	63
Testing Research Hypotheses	66
Findings - hypothesis 1	66
Findings - hypothesis 2	72
Findings - hypothesis 3	78
Hypothesis 2 revisited	79
Summary of Results	83
CHAPTER 6. SUMMARY AND IMPLICATIONS	85
Research Hypotheses and Summary of Results	88
Implications for This and Future Policy Research	92
REFERENCES	97
ACKNOWLEDGEMENTS	108

LIST OF TABLES

Table 2.1.	Definitions of key theoretical concepts as used in this dissertation.	12
Table 4.1.	Attitude statements developed to measure the three dimensions of sustainable agriculture.	43
Table 4.2.	Attitude statements developed to measure social distance.	48
Table 4.3.	Attitude statements developed to measure political ideology.	48
Table 5.1.	Frequency distribution for socio-economic variables.	53
Table 5.2.	Frequency distribution, corrected item-total correlation, alpha if item is deleted, and descriptive summary statistics for Food Sufficiency scale items (overall $\alpha = .62$).	58
Table 5.3.	Frequency distribution, corrected item-total correlation, alpha if item is deleted, and descriptive summary statistics for Environmental Farming scale items (overall $\alpha = .75$).	59
Table 5.4.	Frequency distribution, corrected item-total correlation, alpha if item is deleted, and descriptive summary statistics for Agrarianism scale items (overall $\alpha = .67$).	61
Table 5.5.	Frequency distribution, corrected item-total correlation and alpha if item is deleted for Familiarity scale items (overall $\alpha = .76$).	62
Table 5.6.	Frequency distribution, corrected item-total correlation and alpha if item is deleted for political ideology scale items (overall $\alpha = .43$).	63
Table 5.7.	Univariate statistics testing normality of adherence scores.	67
Table 5.8.	Rotated factor matrix for the twelve items identified for food sufficiency, environmental farming, and agrarianism.	68
Table 5.9.	Pearson correlation coefficients for the twelve sustainable agriculture items.	71

Table 5.10.	Pearson correlation coefficient between familiarity with agriculture and adherence to a particular meaning of sustainable agriculture.	72
Table 5.11.	T-Test procedure testing the influence of presence or absence of adherence (adherence category) on familiarity with a particular sustainable agriculture meaning.	74
Table 5.12.	Probit analysis using familiarity and selected socioeconomic variables as potential explanations for adherence.	75
Table 5.13.	General linear model using familiarity, gender, age, and education to explain variation in adherence.	75
Table 5.14.	T-Test procedure testing the influence of gender on adherence of a particular sustainable agriculture meaning.	77
Table 5.15.	Correlation analysis between adherence and socioeconomic variables age and education.	77
Table 5.16.	Probit analysis using familiarity and selected socioeconomic variables for successful matches between political orientation and adherence to a particular sustainable agriculture dimension.	79
Table 5.17.	Pearson correlation coefficients for the three sustainable agriculture dimensions, familiarity and selected socioeconomic dimensions.	80
Table 5.18.	General linear model using familiarity, gender, age and education to explain variation in food sufficiency scale scores.	81
Table 5.19.	General linear model using familiarity, gender, age and education to explain variation in environmental farming scale scores.	82
Table 5.20.	General linear model using familiarity, gender, age and education to explain variation in agrarianism scale scores.	83

CHAPTER 1. INTRODUCTION

Public policies are developed with the goal of solving social problems through social change (Quade, 1989). The desired social change may be attained through different policy options with varied consequences (Bobrow and Dryzek, 1987). The technical approaches to research the relationship between policy implementation and social change (i.e., the consequences) also are varied and reflect traditional policy research emphases such as economics and political science (Bobrow and Dryzek, 1987). These traditional approaches, however, do not take into consideration that costs and benefits from policies are often not equally distributed among members of the public. It is these inequities and social injustices emanating from public policies (i.e., who are the winners and losers) that should bring sociologists into the policy arena.¹

Notwithstanding a few notable exceptions, sociologists, to date, have not made a significant contribution to public policy through public policy analysis. Sociological analyses that have been conducted typically entail the study of belief systems or ideologies held variously by segments of the public. By demonstrating which beliefs are endorsed by different interest groups political decision makers are helped in understanding reactions to alternative policies and thereby aided in choosing from a range of alternatives (Olsen et al., 1992). The approach has value from two standpoints. One is the forecasting popularity, support or criticism a proposed

¹According to Bobrow and Dryzek (1987), economic models (such as welfare economics) and political science models (such as public choice models) clearly exclude distributional issues. In the case of welfare economics, there is an inherent potential for unequal benefits and costs to be distributed among the public. Public choice models aggregate individual preferences (i.e., choices) with the intent of turning these preferences into government action. Much like welfare economics, public choice models order alternatives based upon aggregate impacts rather than impacts upon sub populations.

action is likely to engender. The second is less politically expedient and assumes that wisdom, understanding and nuances of actions may be understood as well by the citizenry as by policy makers, hence, policies should reflect wishes of citizens. The theoretical approach assumed by those who pursue the documentation of belief systems follows the sociology of knowledge developed by Durkheim and others. This type of policy analysis assumes that the dominantly held beliefs of society guide individual behavior. Policies congruent with a specific belief system, therefore, would encourage desired individual behaviors among members of society. For policy analysis, the reaction to different policy options by various groups can be measured and future behavior estimated. These macrosociologists use public opinion by aggregating individual responses and monitoring trends over time to inform policy makers of current belief systems and potential shifts in belief systems.

Such an approach to policy may be useful, but it is incomplete. For example, assume an issue can be remedied through implementing one of three distinct and competing policies (e.g., Policies A, B, and C). Following the research methodology as previously described, suppose results indicated that Policy A was approved by 50 percent of those sampled, while Policies B and C achieved an approval rating of 30 and 20 percent, respectively. Policy makers using this methodology would, in all likelihood, support Policy A because of its broad support by the citizenry. What is lost in these research results, however, is the intensity in which these beliefs (or policy opinions) were held. That is, of the 50 percent who favored Policy A, how many strongly felt that it was superior to Policies B and C? Or alternatively, did the supporters of Policy A strongly adhere to that policy or was it only slightly favored? If only 10 percent of those favoring Policy A were strong adherents while all 30

percent of those favoring Policy B were strong adherents of that policy, the question arises which policy should be supported by policy makers? If policy is enacted to solve social problems through behavioral (social) change, could it not be argued that policies congruent with strongly-held beliefs and attitudes of individuals are more likely to achieve the desired social behavior?

Therefore, if sociologists are to make a contribution to public policy, analysis must inform decision makers beyond belief systems and general trends. While society does influence an individual's belief system and behavior, individual motivation is necessary and appropriate to change attitudes, given the context in which change is proposed. Therefore, the study of individual beliefs and values toward specific issues and the adherence toward those beliefs are crucial to inform policy makers regarding how individuals may respond to proposed policies.

This dissertation asserts that sociology can make a significant contribution to our understanding of intervention strategies intended to induce social change by identifying strongly-held attitudes attached to policy options. Attitude theory, with its insight toward predispositions to act, will be the mechanism through which policy interventions may achieve the desired social behavior.

The significance of studying attitudes as predispositions to behavior becomes contingent upon whether attitudes are consistently organized (i.e., incur a strong adherence) within individuals. If attitudes reveal these tendencies (i.e., consistent, rationally organized, reasonably stable over time, and predispositions toward behavior), then public policies can be developed and implemented consistent with attitude-behavior predisposition relationships. The behavioral change required to bring about the desired social change then can be reasonably anticipated *a priori*.

From a theoretical perspective, attitude consistency theories postulate that

relationships exist among attitudes and behavior. But consistency theories are not widely used today. Disfavor toward consistency theories has occurred over a number of years. Attitudinal research during the 1960s through early 1980s emphasized the cognitive component of attitudes over the affectual component. That is, individuals were described as rational decision makers and less affected by emotions. These viewpoints have their theoretical grounding in cognitive psychology. More recently, however, the cognitive approach to understanding attitudes has been criticized. For example, Billig (1982, 1987, 1991) and Billig et al. (1988) view attitudes as flexible and fluid. Any particular attitude is dependent upon the context (i.e., situation) in which it exists. Change the situation, and the attitude may change dramatically. Because of an ever-changing context, the individual can consciously hold multiple, conflicting attitudes without experiencing dissonance. If Billig's theoretical viewpoint is correct (i.e., the conclusion "it depends upon the situation"), then study of attitudes lends little empirical guidance toward policy decision making, especially if contexts are multiple and unspecified. If attitude consistency (i.e., adherence) does not result when an issue is salient, but rather is mostly a multitude of individual nuances, then the issue of whether policy decisions can be wisely informed by sociological research arises. If attitudes are transient then their documentation for policy analysis would become little more than an exercise to satisfy the curiosity of the moment.

The validity of attitude consistency theories for policy analysis, therefore, becomes even more critical. Attitude consistency theories (such as Festinger's cognitive dissonance, 1957) postulates that when inconsistent attitudes within individuals become cognizant, dissonance or intrapersonal stress results. The key to experiencing dissonance is both cognition (awareness) and the importance attached

to the issue. Individuals hold numerous conflicting attitudes simultaneously at all times without consciously experiencing dissonance. However, once an issue becomes salient to the individual and he or she becomes aware of the inconsistency, dissonance occurs. According to this theory, the emotional effect of dissonance motivates individuals to change some attitudes to become consonant with other attitudes and/or behavior (i.e., the rational decision making mode). Thus, this move toward consistency brings predictability to behavior and meaningful input to policy analysis.

With this in mind, a policy analytical framework on a specific issue, namely sustainable agriculture, will be examined in this dissertation. Sustainable agriculture will be defined as having three distinct dimensions (Douglass, 1984). Policy approaches to promote each of these will differ. The first dimension, sustainability as food sufficiency, emphasizes production and economic efficiency. A cheap, abundant food supply is the desired end or highest priority for agriculture. Generally, the agricultural policy up to 1985, with its emphasis on the individual farm operator as the decision maker assigns priority to this meaning. Sustainability as stewardship shifts emphasis from economics to ecology. The theme for this meaning is that traditional methods for raising agricultural products adversely impact fragile ecosystems. Environmental costs associated with these current practices in comparison to alternative modes of production generally have not been included in determining economic profitability. Policies integrating environmental provisions into the 1985 and 1990 farm bills, however, do represent concerns for this meaning of sustainable agriculture. The last dimension, sustainability as community, views agriculture as a foundation to a stable society. According to this view, without a strong agriculture, all of society would be detrimentally impacted

both economically (assuming all occupations depend upon agriculture) and socially (assuming a strong agriculture represents a strong community). If a sustainability as community agenda was pursued dramatically different farm legislation would be needed, including shifting the prime locus of decision making from the individual farm operator to a larger geographic or cultural region (i.e., a community).

Knowing which dimension is dominantly held by individuals at any one time, as well as over time, is important to inform decision makers about agricultural policy. An emphasis of one dimension of sustainability over the others would indicate the direction policy makers should pursue to induce desired social change if that dimension was consistently held ala Festinger's postulation. It is important to emphasize that this research application is an adaptation to Festinger's theory (1957) which states that cognitions (i.e., opinions, attitudes, knowledge, and values), as well as behavior, are consistent within individuals. That is, an individual's opinions regarding sustainable agriculture must be consistent with his or her attitudes, knowledge, values, and behavior toward sustainable agriculture to avoid dissonance. This dissertation, however, postulates that attitudes (using Festinger's theory) held toward distinct and competing dimensions of sustainable agriculture must be consistently held to avoid dissonance.

Notwithstanding this adaptation, if a single dominant dimension is not consistently held (i.e., nonsupport of the adaptation of Festinger's theory), then it is my argument, that the study of attitudes is less valuable to policy makers. However, if no pattern predominates, then it is equally important not to assume that Billig's conceptualization of fluidity and flexibility is the correct theoretical position.

An empirical application based upon Festinger's theory of cognitive dissonance will be applied to sustainable agriculture utilizing a national survey of households.

Specifically, selected measures will be used to determine the extent attitudes toward the three competing dimensions of (arguments for) sustainable agriculture are consistently organized and adhered to, namely status quo, ecological alterations to the status quo, and radical changes to the status quo. A measure of familiarity with agriculture will be constructed as a proxy for salience of the issue and used as an independent or explanatory variable. Individuals familiar with agriculture are hypothesized (a la Festinger's theory) to hold more consistent attitudes than those not as familiar or closely linked to agriculture. In addition, adherence is hypothesized to be patterned along contemporary political ideologies measured on a conservative-liberal continuum. Therefore, attitudes (or combinations of attitudes) of individuals toward varying sustainable agriculture meanings could have significant partisan implications.

The theoretical framework of consistency theory will be further elaborated in Chapter 2. Concepts will be defined and relationships among the concepts established. An argument will be offered and defended on why Festinger's theory is important to policy research. Moreover, Festinger's critical concepts such as salience and attitude consistency must be understood to evaluate the usefulness of this perspective for policy analysis. One last point needs to be made regarding the structure of Chapter 2. It is the author's assertion that theoretical model building often includes both theory construction and adaptation as a theory is reviewed and adapted (from criticisms) over time. Therefore, the literature review will be chronologically ordered to attain an understanding (and hopefully an appreciation) of how attitude theory, and in particular cognitive consistency theory, has evolved over time and the potential policy role for Festinger's theory today.

Applying the adaptation of Festinger's model to sustainable agriculture will be

accomplished in Chapter 3. Sustainable agriculture and its three dimensions are further defined along with the policy approach likely to be attached to each dimension. Knowing which sustainable agriculture dimension is favored by individuals would enable policy makers to enact sustainable agriculture policy congruent with individual attitudes (and ultimately behavior). Three etiologies explaining adherence are offered. These involve the key explanatory concepts of familiarity, political ideology, and social demographic experience.

The research methodology including sampling procedures and empirical hypotheses will be presented in Chapter 4. Measurement for the several theoretical concepts will be presented.

The results from the empirical data will be presented in four major sections in Chapter 5. The first section reports findings describing the sample in the context of the population it represents. The second section presents validity and reliability of the research variables on sustainable agriculture attitudes, familiarity, and political ideology scales and adherence as defined in Chapters 2 and 3. The third section presents the statistical procedures and their justification for testing the hypotheses. The fourth and final section reports findings for the specific research hypotheses. A summary of results will conclude the chapter.

The concluding chapter (Chapter 6) will briefly summarize the first five chapters and re-examine the relevance of using attitude consistency theories for policy analysis research. If evidence supports the stated hypotheses, then the relevance of utilizing social psychological and sociological theories in policy analysis should not be minimized. If, on the other hand consistency is not found and attitudes are not patterned, sociologists should call into question this particular pursuit along with its contribution and relevance to policy analysis.

CHAPTER 2. THE THEORETICAL FRAMEWORK

As introduced in Chapter 1, a contribution sociologists and social psychologists can make to public policy analysis is monitoring attitudes held by individual constituents. This is meaningful when attitudes are significant predispositions to behavior. Consistency theory gives us one understanding for the link between attitudes and behavior. The issue of interest here is the attitudes held by American adults toward agriculture, and more specifically sustainable agriculture. As will be discussed in greater detail in Chapter 3, determining which of the competing meanings of sustainable agriculture is predominant (as determined through measurement of attitudes) could significantly affect how elected officials vote on agricultural legislation. Therefore, analyses regarding prevailing attitudes of individuals are helpful in informing decision makers about support for alternative policies.

Applying a theoretical framework is a first step in this enterprise. Concepts must first be defined and relationships among the concepts established. This is the essence of theory. Most relevant in this study is cognitive consistency theory, particularly Festinger's theory of cognitive dissonance (1957). Accordingly, cognitive consistency theories, reviews and criticisms of them, and "attitudes as arguments", are presented chronologically as they evolved in the social psychological literature. To understand attitude consistency today, a review of its history and ensuing debates is essential. Festinger's theory, while viewed as viable by some theorists, is not widely cited today. Rather, Billig's approach of flexible and fluid attitudes is probably the more cited position. If Billig is correct, then attitudinal research will have little bearing on policy analysis. However, if

Festinger is correct, then salience and attitude consistency may have significant policy analysis implications. It is in this context, that Festinger's theory will be examined and interpreted in a policy framework.

Theoretical Concepts and Constructs

At the core of any theoretical framework is a set of concepts. The definitions and the relationships among those concepts describe or define the particular theory. The essence of cognitive consistency theory is that a rational, logical set of relationships exist among individual's values, beliefs, opinions, attitudes and behavior (i.e., the theoretical concepts). Definitions for beliefs, values, and attitudes vary by individual theorists and researchers. As a result, there is ambiguity in the literature. For this study, each of these terms will be attributed a distinct meaning. How these meanings are similar to or different from other uses in the literature will be noted.

For example, attitudes can be defined as "the stands the individual upholds and cherishes about objects, issues, persons, groups, or institutions" (Sherif et al., 1965). Rosenberg and Hovland (1960:1) define attitudes as "predispositions to respond in a particular way toward a specified class of objects." These predispositions are, in turn, produced by the individual's perception of the consequences of the response (act) and the evaluation of the consequences (Sabini, 1992). Because they are predispositions, they cannot be directly observed or measured. The indices used to measure attitudes conventionally fall into three categories; cognitive, affective, and behavioral (Rosenberg and Hovland, 1960) but other authors such as Conner and Becker (1979), stress only the cognitive and affective components of attitudes. Attitudes can also be defined as learned dispositions (Fishbein, 1967) which we accumulate through life experiences.

In contrast, beliefs are statements about phenomenon accepted as true as

elaborated by Rokeach (1972:1).

By the time we have reached adulthood we have tens possibly hundreds of thousands of beliefs concerning what is true or is not true and beautiful and good about the physical and social world in which we live.

It is inconceivable that these countless beliefs would be retained in an unorganized, chaotic state within our minds. Rather, it must be assumed that ... [they] become somehow organized into architectural systems having describable and measurable structural properties which, in turn, have observable behavioral consequences.

Values "may be thought of as global statements about desirable end-states underlying attitudinal and behavioral processes" (Conner and Becker, 1979: 72). They are desirable consequences in themselves rather than necessarily leading to a desirable end (Sabini, 1992). Thus, values are clearly affective in nature. Beliefs are "hypotheses" as to the relationships between objects and the actions that should be taken toward them (Fishbein, 1967) and do not necessarily have a desirable or undesirable consequence associated with them. Therefore, they are more closely aligned with the cognitive notion, as offered by Rosenberg and Hovland (1960).

Cognitions can be defined as "any knowledge, opinion, or belief about the environment, oneself, or about one's behavior" (Festinger, 1957: 3). Fiske (1981:231) defines cognition as "understanding" whereas affect is the "feelings directed toward others."

Thurstone (1967) states that an opinion, is the expression of an attitude through written or oral form. When pollsters measure respondents' attitudinal systems, they ask their opinions, which essentially are assessments or evaluations of beliefs and values. Because this measurement is subject to error, the relationship between the expressed opinion and attitude as well as between the opinion and any resulting

action is not perfect (Thurstone, 1967; Conner and Becker, 1979). Fishbein and Ajzen (1975) interject "intentions toward behavior" between attitudes and action in order to better understand this latter "error."

With these citations in mind, relationships between values, beliefs, attitudes, cognitions, and behavior as listed in Table 2.1 will be used in this dissertation. Briefly, attitudes are an organized set of predispositions to act or behave in a particular way and following the Fishbein and Ajzen (1975) formulation, attitude predispositions are produced by individuals as they project what the consequences of an act are and evaluate the consequences for that particular act. Individuals perceive the consequences of their actions by comparing actions to values (Sabini, 1992).

Table 2.1. Definitions of key theoretical concepts as used in this dissertation.

Attitudes	An organized set of predispositions to act or behave in a particular way.
Values	The goals people have. Goals are sought after because they are good in themselves.
Beliefs	The "hypotheses" between objects and actions. Beliefs describe the relationship between an action and the potential consequences of the action.
Cognitions	Cognitions consist of beliefs, values, opinions, and attitudes.
Opinion	An opinion is a written or oral interpretation of a belief or value.

Values are defined as the goals people possess. These goals are not necessarily sought because they have desirable consequences, but because they are good in themselves. Actions that lead to attainment of values (goals) are likely to be followed.

Beliefs are the "hypotheses" between objects and actions (Fishbein, 1967). Therefore, beliefs describe the relationship individuals hold between an action and the potential consequences of the action. For example, an individual may feel the Earth's ecosystems are fragile (a belief) and should be protected (value). The same individual holds the belief that to attain the goal of a cleaner Earth, food must be grown without chemicals. Therefore, food produced without chemicals (value) can attain the goal of protecting the Earth (value). Taken together, these perceptions form a predisposition (attitude) for action (behavior). Therefore, an observer should not be surprised to notice an individual holding this value and belief purchasing organic produce (i.e., consistent behavior with value-belief orientation).

Cognitions consist of individual's beliefs, values, opinions, and attitudes (Festinger, 1957). An opinion is a written or oral interpretation of a belief or value. In summary, an opinion is an interpretation of a belief. Organized beliefs provide the foundation for attitudes which, in turn, are predispositions for action.

Cognitive Consistency Theories

The significance of studying attitudes as predispositions to behavior, however, becomes contingent upon whether attitudes are consistently organized within individuals. If consistently held (or strongly adhered to), public policies can be developed and implemented assuming the attitude-behavior predisposition relationship. Attitude consistency theories postulate these relationships.

Choices, whether they be policy options or other decisions, are difficult and

second-guessing one's self occurs frequently. The question becomes: What does an individual do when he/she is confronted with multiple, often conflicting choices (or alternative attitudes)? The resolution of conflicting attitudes is addressed by cognitive consistency theories. Three theories will be presented; Heider's balance theory (1958), Osgood and Tannenbaum's principle of congruity (1967), and Festinger's cognitive dissonance (1957).

Balanced states

By a balanced state is meant a situation in which the relations among the entities fit together harmoniously; there is no stress toward change. A basic assumption is that sentiment relations and unit relations tend toward a balanced state. This means that sentiments are not entirely independent of the perception of unit connections between entities and that the latter, in turn, are not entirely independent of sentiments. Sentiments and unit relations are mutually interdependent. It also means that if a balanced state does not exist, then forces toward this state will arise. If a change is not possible, the state of imbalance will produce tension (Heider, 1958: 201).

Heider's balance theory evaluates sentiment relations between two individuals (P and O) and an impersonal (i.e., unit) object (X). The paired relationships between the three components may be either positive or negative. The set of paired relationships may be either "balanced" or "unbalanced." If the set is unbalanced, then tension will produce attitude change toward a balanced state. The change in attitudes may be toward the other individual or the object. A balanced state can exist if all three relations are positive or if two are negative and one positive (Cartwright and Harary, 1967). Heider's theory hypothesizes that the cognitive relationships (i.e., PX and OX) are consistent with affect (i.e., PO sentiment) in a balanced state.

A balanced state would represent a "black and white" attitude (Abelson and

Rosenberg, 1958). That is, there is consistency between cognitive elements deemed good (positive relationships) and bad (negative relationships). An example would be you and a friend both hold the belief that the Earth's ecosystems are fragile (i.e., both P and O have positive relationships toward an impersonal object X). A balanced state would exist if you also hold positive feelings toward your friend (i.e., positive PO sentiment) resulting in all three relations being positive. A balanced state would also exist if both you and your friend held the belief that the Earth's ecosystems were not fragile and held positive feelings toward your friend (i.e., two negative relationships, OX and PX, and one positive relation PO).

Principle of congruity

The principle of congruity in human thinking can be stated quite succinctly: changes in evaluation are always in the direction of increased congruity with the existing frame of reference (Osgood and Tannenbaum, 1967: 301).

Osgood and Tannenbaum (1967) state that it is possible, according to this principle, to have incongruent attitudes without feeling the pressure toward attitude change as long as the individual is not aware of the association between the incongruent attitudes. Incongruity often occurs as new information is received relating to an already established attitude. The new information is evaluated and categorized as either positive or negative. If the current evaluation is in the same direction as previous statements then the attitude is reinforced. If the evaluation runs counter to those previously held, pressure to change attitudes is felt. The changes in attitudes occur inversely to the original attitude positions. For example, a political candidate whom you dislike is backing a sustainable agricultural policy (one of the three dimensions) you favor. The congruity principle would suggest that you would dislike the candidate less as well as being less favorable toward the

sustainable agricultural policy. That is, the inconsistent attitudes are becoming more congruent. The amount of attitude change would depend on the strength of the original attitude and the judgment of the importance of the new information. This differs from the "balanced states" idea in that new information effects an existing attitudinal set within an individual rather than the relationships between two individual's sets of attitudes. A second difference is that the principle of congruity allows for small movements toward congruity rather than a "black and white" determination.

Cognitive dissonance

Unlike Heider (1958) and Osgood and Tannenbaum (1967), Festinger's Theory of Cognitive Dissonance (1957) contains no assignment of positive or negative values (Cohen, 1964). The theory focuses on individual behavior because behavior may serve to create dissonance among the individual's cognitions. For example, farmers are confronted with information regarding reducing applications of synthetic chemicals. Most farmers agree that farming with fewer chemicals may enhance local water quality and personal health (Lasley et al., 1990; Padgitt, 1986, 1989; Padgitt and Hoyer, 1987). Yet, use of agrichemicals remains very pervasive (Duffy and Thompson, 1991). In this situation, the farmer who applies chemicals but expresses a contrary attitudinal position finds him or herself in a dissonant condition. That is, the behavior of chemical usage is inconsistent with cognitions on health hazards. The consequence is a drive toward dissonance reduction.

It has frequently been implied, and sometimes even pointed out, that the individual strives toward consistency within himself. His opinions and attitudes, for example, tend to exist in clusters that are internally consistent... It is still overwhelmingly true that related opinions are consistent with one another. Study after study reports such consistency among one person's political attitudes, social attitudes, and

many others... There is the same kind of consistency between what a person knows or believes and what he does (Festinger, 1957: 1).

Festinger (1957) emphasizes that there are times when individuals are not successful in either explaining away or rationalizing their inconsistencies. In these cases, the presence of the inconsistency (i.e., dissonance) causes psychological discomfort. Festinger defines dissonance as simply the existence of inconsistent cognitions and may occur within or among sets of attitudes, beliefs, and behaviors. Nonetheless, the psychological discomfort that occurs from dissonance motivates the individual to reduce the attitude or attitude/behavior inconsistencies (i.e., move toward consonance). The individual under dissonance may also attempt to avoid situations and information that increase the likelihood of dissonance. Festinger assumes that the motivation to reduce dissonance is a basic human process. Therefore dissonance-reducing behavior should be observable.

Dissonance may occur in primarily one of two ways. First, new information is received which is contrary to existing cognitions. Second, already-existing information is ambiguous resulting in the presence of contradictions. Whether the existence of dissonance motivates the individual to act depends upon the magnitude of the inconsistency. The magnitude, in turn, is a function of the relative importance of the cognitive elements, the proportion of elements that are dissonant with the one in question, and the cost of changing the cognition or behavior in question. If the dissonance in question cannot be eliminated, the total magnitude of dissonance may be reduced through the addition of new cognitive elements thereby reducing the importance of the total dissonance.

Festinger also included the effects of forced compliance on dissonance within his theory. This is important when applied to public policy. For example, the 1985 and 1990 farm bills include several provisions with which farmers must comply in order

to be eligible for federal farm program benefits. In this example, compliance may be changes in operations conducted to stay within soil erosion standards. The changes in practices (i.e., behavior) to meet compliance, without an accompanying change in opinion, results in dissonance. Dissonance may be reduced by either changing attitudes toward favoring the coerced behavioral changes or justify the changed behavior through the reward (i.e., the subsidies justified the changes).

As outlined previously, involuntary exposure to new information, dissonance-reducing cognitions are sought while dissonance-increasing cognitions are avoided. The effect of involuntary exposure to information depends upon the persuasiveness of the communication. Often the persuasiveness is not enough to bring about a dramatic change in attitudes. Rather, involuntary exposure to information only creates doubt in an already established belief system. If doubt occurs and the individual communicates these doubts to significant others (i.e., someone whose opinion is sought after and respected), then it is likely the dissonance can be erased.

In summary, the theory of cognitive dissonance states that when individuals express their opinions, they are revealing their attitudinal system, and by revealing their cognitive dispositions a drive toward consistency is engaged. Therefore, an individual tries to

establish internal harmony, consistency, or congruity among his opinions, attitudes, knowledge, and values. That is, there is a drive toward consensus among cognitions (Festinger, 1957: 260).

The presence of dissonance motivates the individual to reduce it through one of three ways: changing one or more attitudes and/or behaviors; adding new cognitions that are consistent with the one in question; or by decreasing the importance of the elements in question. Festinger asserted that his theory covered a wide scope of cognitions (i.e., subject matter) and was likely to be applicable in most

contexts.

Heider, Osgood and Tannenbaum, and Festinger all proposed a motivation for reducing attitude imbalance. That is, there is a pressure toward attainment of cognitive balance. As was stated previously, each individual may have hundreds of thousands of beliefs expressing thousands of attitudes. Therefore, there exists at any one time, innumerable attitude inconsistencies (Abelson, 1967). It is plausible then to assume that pressure toward cognitive consistency occurs only when the inconsistency becomes salient. That is, only when the individual becomes "familiar" with a particular issue is cognitive dissonance likely to occur (Abelson, 1967). Therefore, familiarity (or salience) with an issue is critical in determining what effect a particular policy will have upon attitude consistency (or adherence), and ultimately individual behavior.

Taylor (1981), summarizing research in cognition, identified three research thrusts that occurred during the 1960s and 1970s. The first identified people as "consistency seekers." This research, while enormously popular in the 1960s, fell into disfavor. The major criticism that occurred was "that people are able to maintain high degrees of inconsistency among their attitudes and between their attitudes and behavior" (1981: 190-91). Individuals tended (according to critics) to be able to compartmentalize attitudes well enough to avoid apparent inconsistencies.

The second thrust viewed the individual as an information processor. Attribution theory came out of this research trend (see Kelly and Thibaut, 1978; Jones and Davis, 1965). The premise here (with the individual as information processor) is that behavior is a

product of rational, though not infallible, information processing strategies, which direct the coding, storage and retrieval of

information, as well as the analysis of it and actions taken as a result of it (Taylor, 1981: 192).

This premise also defines individuals as rational decision makers. Rather than motivational and emotional factors entering into the decision making process (as was the case with the consistency seekers), cognitive processes would determine the "best" answer. While attribution theory became somewhat popular, growing evidence revealed that "individuals do not go through the kinds of formal scientific-like processes that are hypothesized to underlie the attribution process" (1981: 194). Individuals appear, rather, to make decisions much quicker (without full information) leaning more heavily on internal biases.

The third thrust perceives individuals as cognitive misers. Individuals are seen as taking short-cuts in information gathering and "satisficing" rather than "maximizing." Because information is never complete (because of time and cost), uncertainty enters into the decision making process (Kahneman and Tversky, 1973; Tversky and Kahneman, 1974) making individuals rely more heavily on less information (Taylor and Fiske, 1978). Taylor (1981) summarizes her review by stating that, while the cognitive miser is the predominant research thrust, all three are still currently conducted.

While the cognitive miser view may be prevalent, there are critics. Fiske (1981) stresses that the cognitive miser approach omits the affectual component of attitudes. Social information, which is the type processed by individuals, is laden with affect.

Social cognition intrinsically involves the perceiver's self concept and uniquely concerns stimuli with needs, wishes, and opinions of their own... consequently, it pulls in affective reactions (Fisk, 1981: 228).

Wicklund and Brehm (1976) stated that there has been abundant support for

Festinger's dissonance theory. They added (to the theory) the notion that cognitions have differing resistances to change. Cognitions that are easiest to change (i.e., least resistant or lowest commitment) will be utilized first to reduce dissonance. These authors stressed that the theory, because of easy applicability to social issues, can be utilized in a variety of complex social environments.

More recently, Baron (1988), for example, agreed that individuals attempt to eliminate conflict among their beliefs. Moreover, he asserts to do so is "completely rational." When confronted with conflicting information, individuals attempt to either reduce the importance of the incoming information, the established beliefs, or both. While most of the experiments Baron reviewed were related to post-decision dissonance, he made the following generalization: "[individuals] manipulate their own beliefs so as to convince themselves that they are not [seen as inconsistent]" (Baron, 1988: 274).

Criticisms of Cognitive Dissonance

Although cognitive consistency still has its proponents, there exist critics as well. The criticism began in the mid-1960s. For example, Shelly and Bryan (1964) believed that individuals "try out" various beliefs and opinions until one set is felt to have an advantage over the others. This counters Festinger's notion that attitudinal change follows an actual decision. Festinger hypothesized that attitudes change in order to realign themselves with already-existing attitudes or behavior. Under this scenario, however, attitude changes occur prior to the actual decision and allow the decision to be made. Shelly and Bryan unfortunately did not illustrate any experimental (or other) data that could be used to substantiate or refute their hypothesis.

McGuire (1960) stressed that attitude consistency cannot be studied on the cognitive level alone. Specifically, McGuire felt that

We have to recognize that cognitive consistency is not just a matter of logical thinking - of consistency between belief and belief on related issues - but also a matter of wishful thinking, that is, consistency between belief and desire on the same issue (McGuire, 1960: 96).

In this criticism, McGuire was not arguing that individuals do not strive toward cognitive consistency. Rather, like Brehm (1960), Rosenberg (1960), and Rosenberg and Abelson (1960), he was stating that the affective component of attitudes should not be forgotten. That is, individuals not only seek out consistency among cognitive elements but also between cognitive and affective components. Individuals may incorporate the affective component by attempting to balance cognitive consistency within a maximization framework (i.e., maximizing potential gains or minimizing potential losses). McGuire concluded that the evidence toward cognitive consistency was neither "nonexistent nor absolute."

Aronson (1988), in his review of studies relating to Festinger's theory, stated that "we do not process information in an unbiased manner. Rather, we distort it in a way that fits our preconceived notions" (Aronson, 1988: 125). Aronson hypothesized that dissonance may be limited to only those situations in which the self-concept of the individual is violated (rather than for any two cognitions). That is, the individuals in most of the dissonance experiments were either "knowingly committing themselves to stupid acts" or "doing something immoral" (Aronson, 1988: 171). Under these conditions, dissonance occurs. When subjects were committed to an experiment including an unknown task, the opposite results occurred. Various theorists have attempted to clarify dissonance theory so that it can be used to help us better understand current social events (e.g., the Jonestown massacre; Aronson, 1988).

Because social phenomenon includes affective concerns, social psychological

theories cannot afford to neglect them (Fiske, 1981). Festinger's dissonance theory (1957), for example, focuses on the motivation to reduce dissonance (i.e., emotional tension) thereby including the affective component of attitudes. Although Fiske (1981), in this context, does not take into consideration McGuire's earlier criticism of cognitive-affective consistency, she does conclude by stressing that "more consideration of affective reactions would take us beyond the affectively barren cognitive-miser model" (1981: 258). In essence, the theoretical criticisms (from the early 1960s through the early 1980s) have come full circle. In the end, attitude theories are proposed to have both a cognitive and affectual component. Festinger's theory does include both.

Attitudes as Arguments

Beginning in the early 1980s, however, a different theoretical perspective began to emerge. Theoreticians following this framework, stress the process in which decisions are made rather than attitude formation and consistency. While similarities (e.g., rational decision making) can be found, the key concept of argumentation and debate puts this framework apart from those that preceded it.

For example, Quade (1989) and others propose a rational decision making process where public policies, for example those related to sustainable agriculture, are developed based on clear goals, sufficient information, and statistical availability. The policy alternatives generated, as described by the three dimensions of sustainable agriculture, are nonpartisan and objective. The policy analyst's job is to determine the best means to achieve the designated goals. Majone (1989), on the other hand, state that the democratic political process, by nature, involves debate (i.e., argument). Therefore, "argumentation is the key process through which citizens and policy makers arrive at moral judgments and policy choices" (Majone,

1989: 2).

For example, a political disagreement between a left- and right-winger does not arise because one side has correctly applied the laws of logic and the other has not. Both sides can argue their case with equal logical consistency, for the difference between them has not arisen from errors of reasoning. Their disagreement will be more basic than that. It will have emerged from genuine social problems or dilemmas, for which opposing solutions can be proposed (Billig, 1991: 39).

Through this argumentation process, different attitudes and perspectives emerge. At this point, it is important to step back and think about what is being suggested. Billig stresses that policy analysis does not begin with axioms and laws, but with opinions, beliefs, or viewpoints. Billig states that policy development is an outward mediation of the conflicting attitudes. If policy makers were informed of the level of support for the conflicting positions (or attitudes) argued by policy makers, policy could be adopted that is consistent with attitudes held by the citizenry. While Billig stresses the importance of understanding attitudes as arguments as the basis for critique of traditional theories of attitudes and attitude change, the same argument can be used to stress the importance of measuring attitudes.

Whereas Billig (1987) defines attitudes similar to other social psychologists, he differs on how attitudes are developed and held. As in the left/right winger quote above (Billig, 1991), Billig views the individual "existing within a social context, in which all dilemmas and oppositions cannot possibly have worked out" (Billig et al., 1988: 19). This emphasis on context is contrary to theorists which view thinking as a way to reach consistency or process information.

Billig's viewpoint stresses that attitudes are developed and held within larger social contexts, or in essence, attitudes are contextual or situational. Different individual contexts lead to controversy because not all stances are congruent.

Therefore, an expression of an attitude

indicates something personal about the individual attitude holder. In addition to its individual significance an attitude has social meaning for it locates the individual in a wider controversy (Billig, 1991: 43).

Billig (1987) argues that consistency theories have not provided the key to understanding attitude change. The emphasis should not be placed on how motivation operates, but rather on how people cope with consistency. Thus, the study of attitudes is more of a reactive study and have little proactive benefit.

According to Billig (1982:224):

... if ... "dissonance" or "inconsistency" is a social phenomenon, dependent upon norms about what constitutes contradiction, then one might hypothesize that the processes by which an individual might resolve dissonance in private will not be so qualitatively different from those used to defend a position in public.

This explanation of how people cope is located in the wider social context.

Cognitive psychologists, on the other hand, place an emphasis on categorization of cognitions. Billig (1991) argues that each categorization involves a stance and, by default, involves a contestable cognitive counter move. Thinking, therefore, is not a coldly rational activity.

Latitudes of attitudes

Billig states that people interested in an issue will likely pay attention to information relating to that issue. This is similar to Festinger's contention that familiarity will likely lead to attention and consistency of attitudes. Where they begin to diverge is Billig's assumption that individuals sometimes agree and other times ignore any given message (the same message) dependent upon the situation (Billig, 1987).

Billig's argument for variability of attitudes by context is similar to the concept of

latitudes of attitudes proposed by Sherif, Hovland, and others in the 1960s. That is, given a change in context, the expression of the attitude may change as well.

Experimental evidence demonstrates that attitude-relevant items are ordered, or ranked, within the bounds of what is acceptable and what is objectionable in terms of the individual's own stand. In other words, the most acceptable items serves as a standard (anchor) to which other items in that universe of discourse are compared for their proximity or divergence from it. Reaction to the items is a comparison process, whether conscious or not. And comparison between two or more items is a judgment (Sherif et al., 1965: 7).

Sherif et al. (1965) state that acceptable and objectionable positions form a reference scale enabling the individual to judge specific statements, objects, and events. Moreover, these scales form three latitudes of attitudes; latitudes of acceptance, rejection, and non commitment (Sherif and Hovland, 1961). The individual positions his/her attitudes within the three ranges.

These researchers hypothesized several relationships among the latitudes. Three of these hypotheses follow. First, the size of latitudes of non commitment decreases as involvement in the issue increases. As individuals becomes more familiar with an issue, they take a favorable (acceptance) or unfavorable (rejection) position toward the issue. Second, individuals with strongly-held attitudes are likely to have larger latitudes of rejection. As information is being evaluated, less information is likely to support the extreme position leading to a higher rejection rate. Festinger (1957) has long held the viewpoint that strongly-held opinions represent a fixed and internally-consistent response. That is, individuals with strong beliefs will deny the validity of other responses. A third hypothesis, related to the first, states that less-involved individuals are more likely to incur attitude changes. This occurs because these individuals are more open to a wide variety of stimuli which, in turn, may lead to attitude change. These hypotheses assume that the latitudes of acceptance and

rejection are related to the individual's involvement with the issue (Sherif and Hovland, 1961). Whereas Festinger (1957) uses these assumptions within his theoretical framework, Billig (1991) does not differentiate among intensity of attitudes. That is, individuals with strongly-held attitudes also display attitude variability.

Summary of Theoretical Position

Quade's (1989) highly rationalistic decision making process, like that of the information processor, assumes that individuals have perfect information and can objectively match means and goals. The cognitive miser, like that of the information processor, excludes an affective attitudinal component. Notwithstanding McGuire's criticism of cognitive-affective consistency, the emotional motivation of Festinger's cognitive dissonance takes into consideration the affective component missing from the information processor and cognitive-miser depictions. Billig's conceptualization of attitudes as arguments describes a much less rationalistic, highly emotional picture of attitude development. For these reasons, Festinger's cognitive dissonance theory and Billig's conceptualization of attitudes as arguments will be used in developing the research hypotheses tested in this dissertation.

If Billig's theoretical viewpoint is correct, then study of attitudes lends little empirical guidance toward policy decision making. If Festinger is correct, however, the validity of attitude consistency theories for policy analysis becomes critical. In sum, Festinger's Theory of Cognitive Dissonance postulates that when inconsistent attitudes within individuals become salient (or familiar), dissonance results. The key to experiencing dissonance is the familiarity to the issue. Only when an individual becomes "familiar" with a particular issue is cognitive dissonance likely to occur. Therefore an individual unfamiliar with agriculture is more likely to have

inconsistent attitudes toward agriculture (than an individual familiar with agriculture). The emotional effect of dissonance motivates individuals to change some attitudes to become consonant with other attitudes and/or behavior. The move toward consistency brings predictability to behavior and meaningful input to policy analysis. Thus, Festinger's theory would postulate that the higher the familiarity with an issue, the higher the consistency of attitudes (or the more strongly attitudes are adhered to as) related to that issue.

Familiarity will be informed by the sociological concept of social distance. Social distance is a concept that was developed by Bogardus in the 1920s. According to Bogardus:

Social Distance, it may be repeated, refers to the degrees and grades of understanding and feeling that persons experience regarding each other. It explains the nature of a great deal of their interaction. It charts the character of social relations.

The measurement of social distances is to be viewed simply as a means for securing adequate interpretations of the varying degrees and grades of understanding and feeling that exist in social situations. The measurement exercise and its results indicate the main points for intensive inquiry into human experiences (Bogardus, 1967: 71).

While social distance is often viewed narrowly as the willingness of people to accept other people who differ from themselves (for example, see Triandis and Triandis, 1967), the previous quote suggests a broader view. That is, social distance is a measure of familiarity existing within social situations whether they are with other people or occupations such as agriculture.

A second explanatory concept for determining cognitive consistency is the political ideology of the individual. It has been assumed that the more politically aware and knowledgeable an individual is, the more consistent the relationship

between overall ideology and specific policy opinions (Sniderman and Tetlock, 1986). In reviewing previous research, Sniderman and Tetlock felt that consistency models do a better job of explaining opinions on policy issues. Political ideology, unfortunately, has shown little empirical support in explaining such social concerns as environmentalism (Milbrath, 1984, 1989; Dunlap and Van Liere 1978, 1984).

Sniderman and Tetlock (1986) explain this is because people pay little attention to politics and policy preferences. Therefore, "efforts to influence political attitudes are not likely to succeed if people are unmotivated to attend to or think about political communications" (Sniderman and Tetlock, 1986: 73). This problem leads back to the importance of familiarity and cognitive consistency.

Sniderman and Tetlock (1986) reviewed models of political ideology based on two broadly defined groups of issues; consensual and contested. Consensual issues, which are those related to democratic values, are better explained through the use of a social learning model. Contested issues (e.g., environmentalism), on the other hand, are better explained through consistency models.

On contested issues, the greater the political sophistication and awareness, the stronger the strain to maximize consistency between ideological outlook and issue preferences (Sniderman and Tetlock, 1986: 74).

That is, the differences between liberals and conservatives should be more pronounced for contested issues.

Political ideology may be viewed as consisting of two elements; one cognitive, one affective. The cognitive element allows the individual to identify themselves as either liberal or conservative and to determine how conservative or liberal they perceive themselves to be. The affective element relates to how an individual feels (or identifies with) various conservatives and liberals. The two elements combined

causally-determine political behavior (Sniderman and Tetlock, 1986; Seliktar, 1986).

Conservatives have been defined as supporting the following general themes (Lane, 1969: 52): individual rights, faith in the status quo, and pro-capitalism. These dimensions, with their economic premise, describe the concept sustainability as food sufficiency. Liberals, with their beliefs in social equality, social justice, and the downplaying of importance of economic considerations define sustainability as community. The middle-of-the-road position typically would require a minor adjustment to the status quo. Sustainability as stewardship, with its minor adjustments in agricultural legislation, would be defined as the middle position. It is expected that individuals holding a middle-of-the-road political ideology would predominantly hold this definition.

A third set of concepts is socio-economic statuses, which provide some sense of context as asserted to be important by Billig. Stage of life course (such as age), gender, and education will comprise socio-economic statuses and have been tested (within paradigm shift studies) in regards to environmentalism with varying degrees of success (see Milbrath, 1984, 1989; Olsen et al., 1992, as examples). While admittedly inconsistent results have occurred, environmental advocates are still described as young, urban, well-educated, and politically liberal (Olsen et al., 1992).

Sustainable agriculture can be defined as a component within the larger environmental issue. However, no research information is available to determine if the descriptors of the "environmentalist" carry over to (the subtopic of) sustainable agriculture. To further cloud the issue of utilization of demographic variables, Coleman (1972) states that the problem with demographic variables, from a policy perspective, is that they are not manipulative. Notwithstanding Coleman's criticism

and lack of "environmentalist" carryover, socioeconomic variables will be tested as explanatory variables.

CHAPTER 3. SUSTAINABLE AGRICULTURE AS A POLICY ISSUE

The Chapter 2 Introduction discussion of cognitive consistency theories and public policy concluded with the hypotheses that public policies often have multiple dimensions, competing visions, or alternatives and, if cognitive consistency theory is viable, one of these will be consistently patterned and dominate over the others. In this chapter dimensions of sustainable agriculture and the policy implications of the various dimensions are presented.

Sustainable Agriculture

As outlined in Chapter 1, three distinct meanings of sustainable agriculture form the basis of this analysis: sustainability as food sufficiency, sustainability as stewardship, and sustainability as community. Each meaning supports a different agricultural policy; namely status quo, environmental provisions to the status quo, and dramatic shift in focus from the individual to larger geographic region. The conceptual framework from Chapter 2 suggests that individuals familiar with agriculture would consistently hold or adhere to sets of attitudes toward one of these meanings in lieu of the two alternative meanings. If empirically supported, these findings are both supportive of the notion of consistency and also meaningful to inform policy makers about preferred sustainable agriculture policy. If adherence to a single dimension of sustainable agriculture is not found, the viability of consistency theory and no clear direction on policy intervention can be proposed to policy makers. The likely scenario given the latter situation is the status quo will continue to prevail.

Conventional agriculture over the past few decades has gone through a tremendous transition. Technological advances such as power equipment, inorganic

fertilizers, and synthetic pesticides have allowed farmers to substantially increase productivity. Most farmers no longer rely very extensively on family labor, rather reliance often rests on the availability of technologies. Commercial agriculture has become the epitome of growth and technology and substitution of capital for labor.

Critics of conventional agriculture stress that changes must be made in agriculture to avoid an ecological crisis; that agriculture must somehow become more "sustainable." In addition to these strictly environmental concerns, sustainable agriculture has related dimensions, including economic, agronomic, social, political and cultural components (Ehrenfeld, 1987; Lockeretz, 1988; Stenholm and Waggoner, 1990).

The problem of defining sustainable agriculture is that even adherents often disagree on whether sustainable agriculture is a philosophy, a long-term goal, or a set of agricultural practices. Two predominant perspectives, or philosophies exist according to Allen et al. (1991). The first views sustainability as primarily relating to resource conservation and profitability. The second defines sustainability in terms of social problems. While both technical and social issues are important, the technical (i.e., farm-level productivity and profitability) is more often emphasized. That is, most discussion and research on sustainable agriculture concentrates on the means toward sustainability (Schaller, 1990). Examples of the narrowness of sustainable research, according to Allen et al. (1991) are Francis (1988); the National Research Council (1989), Rutton (1988), and Lockeretz (1988). In each of these works, the agronomic considerations outweigh the potential socioeconomic impacts. For this reason, Allen et al. define and promote sustainable agriculture as "one that equitably balances concerns of environmental soundness, economic viability, and social justice among all sectors of society" (1991: 37). Social welfare and equitable

distribution, therefore, are not only for future generations as many propose (e.g., d'Arge, 1990) but for all people and species now living. Berry (1991) confirms this relationship within his concept of "community".

Douglass (1984) agrees that sustainable agriculture can be defined in multiple ways. With this in mind, he categorizes sustainable agriculture into three types or groups. These groups are: sustainability as food sufficiency; sustainability as stewardship; and sustainability as community.

Sustainability as food sufficiency focuses primarily on the need to increase agricultural production to meet population growth. The tools used are generally those of the economist. The researcher first estimates future demand of food influenced by future population, income per capita, and other economic variables. Once demand projections are completed, supply capacities are estimated taking into consideration the economic tradeoffs of various agricultural resources and available technology. Rarely does either supply or demand estimates explicitly integrate environmental or sociological variables. It is assumed that as long as society is willing to utilize available resources, society is willing to incur environmental costs. That is, the means toward sustainability is to maintain a positive food balance even at the expense of depleting the resource base. Future generations will have to make the necessary technological or social adjustments to sustain production (i.e., the positive food balance).

It is in this context that past U.S. agricultural legislation has been enacted. Prior to the 1930s, agricultural legislation such as the Morrill, Hatch and Smith-Lever Acts were geared toward research and the outreach of agricultural production information. This emphasis changed during the depression years of the 1930s as a reaction to low farm incomes and farm product prices. During this time, when the

farm sector accounted for over one-fourth of the nation's total workforce, society considered it important to have a strong farm sector to sustain a healthy national economy (Benedict, 1955; Batie and Marshall, 1989). Thus, the goal of 1930s agricultural legislation was turned toward anti-depression, emergency-type aid.

The Agricultural Adjustment Act of 1933 was an attempt to support agricultural prices through price supports and loans, and lower agricultural production through acreage reduction and other incentives (Barkley and May, 1989). These tools were implemented to adjust for the imbalance of the supply and demand of agricultural commodities. The primary mechanism of support was through income redistribution based on a farmer's volume of output (Knutson, et al. 1983). Thus, the greater the production output, the greater the income support received.

Since The Agricultural Adjustment Act, agricultural policies have included mechanisms such as set-asides, reserves, and payment-in-kind (PIK) to alleviate crop surpluses through supply controls (Barkley and May, 1989). In addition to income support, farm legislation has addressed other goals such as a safe, nutritious, abundant, and reasonably-priced food supply; preservation of the environment for future production and generations; promotion of economic growth and international competitiveness; and contributing to the welfare of other nations (Galston, 1985).

Regardless of stated goals, agricultural policies have relied on the decision of individual farmers whether to act according to policy. Economic incentives have been the major impetus to behavior change based on the assumption farmers act to maximize income (Nowak and Korsching, 1983). That is, farmers participate in agricultural programs because it is in their own best interest (Brubaker and Castle, 1982). In general, farmers have been highly responsive to the incentives and/or

disincentives inherent to these programs.

In summary, sustainability as food sufficiency emphasizes an abundant, economical food supply. Like the technological paradigm from Olsen et al. (1992), technology and science has and will continue to provide the tools necessary to achieve increasing food demands at a relatively low cost. Because of faith in science and technology, there is little need to worry about environmental degradation; any environmental hazards will be fixed with future scientific break-throughs. Governmental policies aligned with this meaning have included incentives based on economic profitability to the individual farmer (decision-maker). Sustainability as food sufficiency has a relatively long policy history indicating the importance of (or assumed importance of) this goal to a majority of constituents.

The second meaning (sustainability as stewardship) focuses on the ecology rather than economics. The ecological influence asserts that there are limits to the ability to provide food for an ever increasing population (i.e., carrying capacity). The limits are physical in that resources and the ability of the environment to absorb wastes is finite.

In agriculture, water quality problems can be traced to farmer behavior (Moody, 1990). Over the past few decades, U.S. agriculture has replaced long-term crop rotations by monocultures or limited rotations. Technological advances in hybrids and mechanization, and introduction of synthetic fertilizers and pesticides, were the main forces behind this movement (Papendick, 1987). Other factors, such as herbicide carryover problems and government policies (Duffy and Chase, 1989; Libby, 1990; and Young, 1989), favored limited use of rotations. In addition, farmers with only one or two crops in the rotation found management easier (Papendick, 1987).

Farming in monocultures or limited rotations increases reliance on chemicals to suppress pest populations. The reduction in use of nitrogen-fixing legumes in long-term rotations has resulted in increased fertilizer rates (Papendick et al., 1986). The emphasis on monoculture or limited rotation row crops has led to increased soil erosion and reduced soil productivity. Further increases in fertilization are needed to compensate for the loss in productivity (Papendick, 1987).

Best management practices (i.e., farming practices labeled as environmentally friendly) can reduce the need for pesticides and fertilizers, thus reducing potential ground and surface water quality problems (Voss et al., 1989). The main techniques for accomplishing this goal are cover crops, green manure crops, crop rotations, reduced tillage, manure management, and cultivation (Papendick et al., 1986). Crediting nitrogen from legumes and animal manure as well as using realistic yield goals based on soil productivity reduces potential nitrate contamination (Hallberg, 1987).

Farming is a complex, environmentally-interactive activity. The movement from an established system to a sustainable system may require changing farmers' attitudes, as well as changing the farmers' economic, political, and social situation (Lockeretz, 1988).

Farmers' attitudes toward sustainable farming systems will be affected by various factors to varying degrees dependent on farmers' situations. Policies and educational programs can be targeted to increase awareness, persuade, aid in the decision and implementation, or reinforce the change in farming practices (Rogers, 1983). These targeting strategies are designed to influence farmers toward accepting and continuing farming systems that are in agreement with society's environmental goals. The objective is that, through this influence, the length of time to integrate

BMPs (and decrease environmental degradation and nonrenewable resource usage) in farmers' systems will be shortened and maintained. The sustainability of any agricultural system depends greatly upon the ability to maximize internal resource use thereby maintaining a renewable resource base.

Historically, farm policy has followed economic events more than it has led them (Knutson et al., 1983; National Research Council, 1989); it has become a reactionary tool to short-term problems rather than providing long-term solutions. Reactions to a crises have often led to unforeseen and unwanted long run consequences (National Research Council, 1989). The 1985 farm bill continued this pattern; by focusing on the inadequacies of the 1981 bill, the goals of the 1985 farm bill included international competitiveness, governmental costs, farm income protection, and the environment (Edelman and Wisner, 1989). Although the 1985 Act included more environmental provisions than previous farm legislation, the bill continued the historical emphasis on income support through production of specific crops. This, in turn, encouraged environmentally damaging practices through crop specialization (Fleming, 1987; Duffy and Chase, 1989).

In 1990, only minor modifications were made in the 1985 farm bill. Modifications included the addition of water quality provisions to comply with society's demands for a more sustainable environment (Benbrook, 1988). However, as was the case with the 1985 farm bill debate, concerns with the disadvantages of regulation overpowered concerns with the economic incentive approach. Because of the strong reluctance for using regulations, the primary tools continued to be target and loan prices, and deficiency payments based on economic productivity. Both the 1985 and 1990 farm bills continued the use of an economic incentive base while discouraging certain agricultural activities in the interests of the environment.

In summary, sustainability as stewardship has occurred as an outgrowth of environmentalism. Understanding the earth has limited capacity and consists of fragile ecosystems is at the core of this meaning. Technology and science cannot "fix" continued destruction. Governmental policies have occurred as a result of the environmental movement in general and agricultural policies have incorporated environmental considerations since 1985.

The third type of sustainability is sustainability as community. This perspective stresses the values of community. A community consists of a group of individual living things which interact and depend upon one another. It is the impact of alternative agriculture upon the quality of community relationships that is of interest to this group.

To attain sustainability, members of the community must not dominate the usage of resources at their disposal. Rather, resources are to be used equitably among community members. Each member has both access to and a vote on the usage of available resources. That is, social justice becomes a reality through a democratic process. It is with this assumption in mind that Thomas Jefferson defined agrarianism. Jefferson thought that to maintain a political democracy, a population must be stable, virtuous, and economically independent. He found those qualities in farmers (Berry, 1977). These visions of agrarianism are still deeply-rooted in society today. The sympathy for the family farmer fighting against the system is still prevalent (Strange, 1988). Agrarianism, however, goes beyond political ramifications as outlined by Jefferson. Berry (1977) states the culture that emanates from family farms becomes the culture of the surrounding communities. Therefore, with the disappearance of family farms goes the vitality of the rural communities. It is in these social, political, and cultural characteristics that agrarianism and its

relationship to sustainable agriculture can be defined.

Policy choices from this group, therefore, often emphasize support for and sustainability of the family farm. Specific policies would provide the opportunity for farmers to start over (in the case of bankruptcy) and for new farm operators to become established (Strange, 1988). The policy outlined by Strange (1988) specifically would omit financial support to larger than typical sized farms. The premise is that family farms sustain rural communities and enhance human-environmental interactions, as well as provide ample food supply.

In summary, sustainability as community views agriculture as consisting of more than farmers and farm families. Agriculture is the occupation that most other occupations rely upon. That is, a depression in agriculture goes much beyond the farm gate; it spreads to surrounding rural communities as well as urban centers. Policies should therefore emphasize not only the profitability of farmers, but profitability of the agricultural sector as a whole. Moreover, agriculture has characteristics beyond profitability that make it vital to society.

The three competing sustainable agriculture meanings have conflicting goals and inherently support different agricultural policies. Sustainability as food sufficiency emphasizes economic determinism of individual farmers with disregard to environmental consequences or other components of the agricultural sector. Policy thrust would be the current farm programs, especially prior to 1985. Sustainability as stewardship stresses that economic determinism of individual farmers does not take into account social costs of environmental degradation. Policies would include environmental provisions aimed at regulating farming activities within the general framework of the Farm Bill. Sustainability as community, while supporting family farms, emphasizes rural communities and rural infrastructure. Policy emphasis

would need to de-emphasize individual farmers by stressing the well being of all inhabitants in larger communities. This latter meaning of sustainability has a social justice component. Because of the divergent targets (individuals versus communities) and basis for determination of goals (individual economic determinism, eco-system determinism, and community social justice), the policies created by strong adherents of each will likely conflict. Therefore, it is imperative for policy decision making that the following two questions be answered : (1) do or can individuals strongly adhere to more than one of the competing dimensions of sustainable agriculture (with their inherent inconsistent policies); and (2) which of the three dimensions of sustainability is prominently held by society. The latter question can be answered through paradigmatic research. The former (which I believe to be the more interesting research question), will be tested in this dissertation. As previously stated, if individuals strongly adhere to one and only one dimension of sustainable agriculture, policy can be aligned to that dimension. Assuming a relationship exists between attitudes and ultimate behavior (as was outlined in Chapter 2), policies aligned with a strong adherence of attitudes should achieve the desirable social consequence of that particular policy. Further, as the theory chapter suggests, adherence to a single policy is expected to be patterned with social distance from agriculture, political ideology, and social/economic experiences and statuses. The methodology for testing the hypothesized theoretical relationships and how it applies to sustainable agriculture will be presented in Chapter 4.

CHAPTER 4. THE MEASUREMENT, HYPOTHESES, AND DATA COLLECTION FRAMEWORK

Empirical Measures for Dimensions of Sustainable Agriculture

Measures for each of the three dimensions or meanings of sustainable agriculture (i.e., sustainability as food sufficiency, sustainability as stewardship, and sustainability as community) were developed by selecting a series of attitude statements. Four statements were selected for each of the sustainable agriculture dimensions (Table 4.1). Multiple items were used to increase the reliability of the attitude measurements (Fishbein, 1967). That is, multiple responses give a better indication of an underlying attitude than does a one or two item index. The five-point Likert-type response was utilized, with answers ranging from strongly agree to strongly disagree and including a neutral position. The Likert scale technique was used because, as evaluations, attitudes have direction and intensity and can be determined by the strength of favorableness or unfavorableness (Fishbein, 1967). As reflected in its popularity, the Likert-type format is compatible with the concept of attitude. Each item was assumed to measure an equally relevant belief, therefore no differential weighting on the statements was conducted.

A total score was obtained for each respondent by summing the scores of the individual items. The higher the summated score the higher the favorableness toward the particular sustainable agriculture meaning. In some instances this involved recoding numerical answers from the original questionnaire.

The variable developed to measure sustainability as food sufficiency is food sufficiency. Food sufficiency was measured by four attitude statements (Table 4.1). As operationalized, all four items were positively-worded toward sustainability as food sufficiency. These items represent, as outlined in Chapter 3, a conventional

Table 4.1. Attitude statements developed to measure the three dimensions of sustainable agriculture.^a

Sustainability as food sufficiency:

1. The use of fertilizers, pesticides and other agricultural chemicals is a major reason that food costs in the United States are the lowest in the world.
2. Science and technology are making our lives healthier, easier and more comfortable.
3. The benefits of science are greater than any harmful effects.
4. Farm chemicals help keep our food supply cheap and abundant.

Sustainability as stewardship:

1. Farming is a major source of pollution in our nation today.
2. To protect the environment, we must change the way we produce our nation's food.
3. Most farmers use pesticides and other chemicals on food crops safely.
4. If used as directed, fertilizers, pesticides and other agricultural chemicals are not a threat to the environment.

Sustainability as community:

1. Agriculture is the most basic occupation in our society, and almost all other occupations depend on it.
 2. A depression in agriculture is likely to cause a depression in the entire country.
 3. Farming involves understanding and working with nature; therefore, it is a much more satisfying occupation than others.
 4. We hear so much about crime and corruption today because our nation is becoming so urbanized.
-

^a All attitude statements, with the exception of items 3 and 4 for sustainability for stewardship, involved reverse coding from the original questionnaire .

agriculture emphasizing the importance of technological advances (or science) to increase society's standard of living. More specifically, this meaning of sustainability stresses the use of technology to increase agricultural production regardless of environmental costs in order to sustain an adequate, cheap supply of food. Moreover, because of faith in science, there is little to worry about environmental degradation because any environmental hazards will be fixed with future scientific break-throughs. The four items used to measure the concept sustainability as food sufficiency take into account these properties of faith in science, standard of living, and cheap, abundant food supply.

The variable developed to measure sustainability as stewardship is environmental farming. Similar to food sufficiency, environmental farming was measured by four attitude statements (Table 4.1). The items are balanced in that two items reflect a sustainable perspective and two represent a more conventional agriculture position. The four indicators of environmental farming, in aggregate, constitute a sound representation of sustainable agriculture as stewardship. As indicated in Chapter 3, sustainability as stewardship calls into question the ability for conventional agriculture to produce food in an environmental benign manner, as well as the ability of future scientific break-throughs to be a quick fix for environmental problems.

The variable constructed to measure the concept sustainability as community was agrarianism. Again, four statements were used for the composite scale. The specific items for agrarianism come from ones commonly used in past research. Specifically, Dalecki and Coughenour (1992) developed a twelve-item scale consisting of eight items used by Flinn and Johnson (1974) and four from the 1986 survey entitled *Farming in American Life*. Each of the items used were included in Dalecki and

Coughenour's twelve-item scale. Agrarianism is measured here as consisting of two of the four dimensions outlined by Dalecki and Coughenour (1992:52), namely agricultural fundamentalism and agricultural naturalism.

Agricultural fundamentalism and agricultural naturalism are good proxy measures for sustainability as community because they relate to two vital relationships between agriculture and community. Agricultural fundamentalism emphasizes economic relationships of jobs and occupations between town and country. As has been experienced in Iowa in recent years, what happens to agriculture in rural areas impacts main street businesses and future job creation. Agricultural naturalism, on the other hand, stresses the importance of agriculture as a way of life. This vision of agrarianism is still prevalent according to Strange (1988). As such, the emotion and support this vision may have have consequences as policy makers look to the citizenry for policy option guidance. For each of the three scales, items were rescored where necessary so that high values represent a more positive response toward sustainable agriculture meanings.

Independent variables

As suggested in Chapter 3, individuals will hold to, or adhere to, one and only one sustainable agriculture meaning (assuming familiarity with sustainable agriculture) to avoid cognitive dissonance. Adherence for this research will be the index of dispersion (Loether and McTavish, 1980) as constructed from scores on the sustainability scales. The index of dispersion (the D statistic) is a ratio that can be used to measure adherence to a dimension within a concept. The range in ratio values is from 0.0 (indicating maximum adherence) to 1.0 (indicating minimum adherence).

The index of dispersion has been used in other applied research settings.

Rushing and Davies (1970), for example, used the index of dispersion to measure occupational differences among individuals (i.e., division of labor) That is, these authors were interested in how individuals were distributed among the occupational structure. A similar 0,1 ratio defined as the index of qualitative variation (see Mueller et al., 1970) also has been used to measure variation among qualitative variables. Regardless of which index was used for this research, the purpose was to measure adherence to a particular sustainable agriculture meaning. That is, the higher the adherence score, the more differentiation the individual made between the three meanings of sustainable agriculture.

The computational formula for D is:

$$D = k(N^2 - \sum f_i^2) / N^2(k-1)$$

where:

N = number of scores

k = number of categories

f_i = frequency of cases in the i^{th} category

These variable definitions do not correspond with the proposed hypotheses outlined later in this chapter. Therefore, variable definitions will be altered such that N is the total summated score for the three dimensions of sustainable agriculture and f_i is the individual sustainable agriculture scale scores.

For example, an individual with scale scores of 12, 12, and 12 for sustainability as food sufficiency, sustainability as stewardship, and sustainability as community would have a D-statistic score of 1.0.

$$\begin{aligned} D &= 3((12 + 12 + 12)^2 - \Sigma(12^2 + 12^2 + 12^2)) / (12 + 12 + 12)^2 \times (3 - 1) \\ &= 3(1296 - 432) / 1296 \times 2 \\ &= 2592 / 2592 \end{aligned}$$

$$= 1.0$$

This result should be expected because equal scale scores for all three dimensions would indicate minimum adherence to any one dimension over the others.

Alternatively, an individual with scale scores of 12, 0, and 0 for the three sustainability dimensions would result in a D statistic score of 0.0.

$$\begin{aligned} D &= 3((12 + 0 + 0)^2 - \Sigma(12^2 + 0^2 + 0^2)) / (12 + 0 + 0)^2 \times (3-1) \\ &= 3(144 - 144) / 144 \times 2 \\ &= 0.0 \end{aligned}$$

As expected, scale scores indicating a maximum adherence (e.g., 12, 0, 0) would incur a 0.0 D statistic.

While consistency of attitudes (or adherence) held toward sustainable agriculture is central in this research, the mere documentation that consistency exists is not enough. For example, in Chapter 2 familiarity was a central tenet of this theoretical framework and, as such, must be supported by this research. Further, another critical component of the political process is knowing the etiology of support for each meaning. As established in Chapter 2, the relationships of socio-demographic contexts and the partisanship identities are important to policy makers. Thus, these concepts were operationalized and used as independent variables in this research.

The variable constructed for the concept social distance is familiarity. It is measured by a summated scale of six items depicting the respondents' familiarity with agriculture and more specifically, farming and/or ranching (Table 4.2). The social distance score could range from 0 to 6. A score of 6 would indicate that the individual respondent is very familiar with agriculture. Conceptually this method of scoring is contradictory to the common usage of social distance. That is, in conventional approaches, as social distance increases the individual is less familiar

Table 4.2. Attitude statements developed to measure social distance.

-
1. Do you currently own or run a farm or ranch?
 2. Did your parents ever own or run a farm or ranch?
 3. Do any of your close relatives own or run a farm or ranch?
 4. Do any of your close friends own or run a farm or ranch?
 5. Have you visited a farm or ranch in the past five years?
 6. Have you ever had a job on a farm or ranch?
-

with the subject at hand. However, it is more directly interpretable with the label familiarity. As suggested by Festinger's theoretical framework, the higher the familiarity (or salience) with agriculture, the higher the endorsement or adherence to a particular dimension of sustainable agriculture.

Political orientation will be constructed through the use of two explanatory measures (Table 4.3) depicting the conservativeness or liberalism of the individual. These items have face validity for the defined meaning of political orientation as outlined in Chapter 2.

Age, gender, and education will be included in the analyses as socioeconomic variables. Age is measured in years (respondents fill in), gender from a choice of male/female, and education from a selection of six categories (less than high school,

Table 4.3. Attitude statements developed to measure political ideology.

-
1. Which do you consider yourself to be (republican, democrat, other)?
 2. Which of these best describes your usual stand on political issues (conservative, middle-of-the-road, liberal).
-

some high school, high school graduate, some college, college graduate, completed post-graduate degree).

It is hypothesized that these independent variables (familiarity, political ideology, and social-demographics) will help explain the single or multiple attitudes held toward sustainable agriculture.

Hypotheses

The research hypotheses to be tested were derived from the theoretical framework outlined in Chapter 2. With that framework in mind, the first research hypothesis is

Hypothesis #1: Respondents will perceive the three dimensions of sustainable agriculture (as measured by the variables food sufficiency, environmental farming, and agrarianism) as separate and distinct.

According to the theoretical framework, dissonance results when inconsistent attitudes within individuals becomes salient. To determine whether inconsistency exists within individuals, we must first determine if the proposed sustainable agriculture dimensions are separate and distinct. If they are not separate and distinct within the mindset of respondents, inconsistent attitudes can be held without dissonance. However, if the three meanings are separate and distinct, we would expect (following the theoretical framework in Chapter 2) individuals holding inconsistent attitudes to experience dissonance.

Hypothesis #2: The higher respondent's familiarity (with agriculture), the higher his or her adherence with a particular dimension of sustainable agriculture.

Applying Festinger's theory, individuals with a high familiarity would not hold

inconsistent attitudes. That is, the more familiar an individual is with agriculture, the more strongly-held is his/her definition of sustainable agriculture.

Hypothesis # 3: The higher the respondent's familiarity (with agriculture), the greater the relationship between declared political orientation and adherence (to a specified dimension of sustainable agriculture).

As previously argued, as individuals become more familiar with an issue, the more consistent will be the relationship between political ideology and a specific policy position on sustainable agriculture. Therefore, the hypothesis as familiarity increases, self-perception as liberal, conservative, or middle-of-the-road becomes more consistent with their attitudes toward one sustainable agriculture meaning. That is, individuals labeling themselves as either strongly conservative or strongly liberal would have a higher adherence score, although the endorsement of a specific dimension of sustainable agriculture could be different. More specifically, the following three subhypotheses would be derived.

Hypothesis # 3a: Individuals familiar with agriculture and self-designated as conservative will adhere to sustainability as food sufficiency.

Hypothesis # 3b: Individuals familiar with agriculture and self-designated as middle-of- the-road will adhere to sustainability as stewardship.

Hypothesis # 3c: Individuals familiar with agriculture and self-designated as liberal will adhere to sustainability as community.

Data Collection

Data for this study were obtained from a nationwide sample of American households conducted by Auburn University in a Spring 1992 mail survey. The 10-page mail questionnaire entitled *Food, Farming, and the Environment: What do you*

think? (Auburn University Department of Agricultural Economics and Rural Sociology, 1992) was sent to a sample of 10,000 names and addresses purchased from Survey Sampling Inc. The Dillman (1976) mail survey technique was conducted consisting of the following sequence: 1) initial mailing in early February followed by a postcard; 2) a second questionnaire sent to nonrespondents approximately ten days following the initial mailing; 3) a third mailing with replacement questionnaires to nonrespondents conducted one month following the initial mailing; and 4) a postcard sent on June 15 as a final reminder.

The return rate, using Dillman's method of calculation, was 36.1 percent which was below expectations. A similar survey conducted Spring 1986 achieved a 46 percent completion rate. Although the current response rate is lower than most studies using the Dillman method, the data set includes 2,856 completed observations.

The data were weighted to compensate for oversampling in selected states and to ensure that sample statistics more closely represent population parameters. The weighting procedure used here, as described in Molnar and Wu (1989), allows for a more representative national analysis to be conducted while retaining the original sample size.

The statistical procedures used to test the hypotheses outlined in this chapter will be discussed in Chapter 5. Prior to testing, however, a comparison of socio-demographics of the sample to the U.S. population and scale reliability results will be presented.

CHAPTER 5. RESULTS

Introduction

The results are presented in four sections. The first section reports findings describing the sample in the context of the population it represents. The second section presents validity and reliability of the research variables on sustainable agriculture attitudes, familiarity, and political ideology scales and adherence as defined in Chapters 2 and 3. The third section presents the statistical procedures and their justification for testing the hypotheses. The fourth and final section reports findings for the specific research hypotheses.

General Sample Characteristics and Comparisons to U.S. Census

The socioeconomic distribution of the 2,856 survey respondents reveal that some characteristics were inconsistent with that of the general population (Table 5.1). For example, a little over two-thirds of the respondents were male and 37 percent have graduated from college. This compares to U.S. general population characteristics of 49 and 20 percent, respectively (U.S. Department of Commerce Bureau of the Census, 1992a; U.S. Department of Commerce Bureau of the Census, 1992b). The sample also reveals that 86.7 percent of respondents reside in cities under 500,000 or in the country. This is in contrast to U.S. Census figures (U.S. Department of Commerce Bureau of the Census, 1992a) that show 77 percent of U.S. population residing in metropolitan areas. The sample includes responses from each of the 50 states but is heavily represented by eight (Alabama, Georgia, Iowa, Kentucky, Louisiana, Michigan, North Carolina, and New York) comprising 55 percent of the total. Therefore, the respondents of the survey are heavily weighted toward male rural residents (from selected states) with at least some college education.

Table 5.1. Percentage distribution for socioeconomic variables.

Gender					
Male			Female		
67.8			32.2		
Education					
Less than high school	Some high school	High school graduate	Some college	College graduate	Post- graduate degree
4.5	7.0	26.4	25.1	24.4	12.6
Age					
Under 30	30-39	40-49	50-59	60-69	Over 69
9.2	21.7	20.8	15.6	17.5	15.2

Validity and Reliability of the Scale Scores

A highly reliable measure is one that leads to consistent results because it incurs relatively low random error (Carmines and Zeller, 1979). Random errors include coding, interviewer inconsistencies (e.g., word order, word emphasis, etc.), unclear instructions, etc. Reliability is primarily an empirical issue emphasizing the performance of the measures. Nonrandom errors (i.e., systematic bias), on the other hand, affect the validity of the measure because it no longer measures (through bias)

what it was intended to. Validity, therefore, is primarily theoretical connecting the theoretical concept to the manifest variables (Carmines and Zeller, 1979).

Validity is concerned not so much the measurement itself, but the measurement in relation to its intended purpose (Carmines and Zeller, 1979). There are several forms of validity; criterion, content, construct, convergent, and discriminant (Bohrnstedt, 1983).

The statistical testing for variable measurement consisted of a two step process. Step I emphasized evaluating the reliability of the multiple item scales familiarity, political ideology, food sufficiency, environmental farming, and agrarianism. Multiple item scales have several advantages over single item scales (McGiver and Carmines, 1981; Spector, 1992). First, it is unlikely that any single item could tap the complexities of the theoretical concepts under study. Second, multiple item scales can differentiate and discriminate among degrees of commitment (or adherence). Third, the reliability of multiple item scales are higher than their single item counterparts.

With this last advantage in mind, overall reliability of each scale (as well as the individual items) was determined by calculating and reviewing Cronbach's alpha (1951). Cronbach's alpha is an internal-consistency approach designed to test whether items within a scale measure the same concept (Spector, 1992). That is, alpha is defined as the portion of a scale's total variance attributed to a common source (DeVellis, 1991). A highly reliable measure will correspond to a high alpha value (i.e., an alpha minimum of .7; Spector, 1992). The value of alpha will be affected by both the number of items included in the scale and the average inter-item correlation (Carmines and Zeller, 1979). The addition of items that do not reduce the average inter-item correlation will increase the scale's reliability (i.e.,

increase alpha). If the addition of items reduce the average inter-item correlation, however, the reliability of a the scale will be reduced (Carmines and Zeller, 1979). Item contribution, therefore, will be assessed by evaluating the corrected item-total correlation and comparing alpha prior to and following removal of individual items. An alpha that declines following removal indicates the particular item should be kept within the scale. That is, these items contribute to an internally consistent scale.

Content and construct validity will be assessed through a confirmatory factor analysis using all items for the three sustainability scales. A confirmatory factor analysis will determine if the individual items derived from the exploratory analysis of step I significantly load on more than one factor. This step is necessary to ensure that the three sustainability ideas are indeed perceived differently by individual respondents or subparts of a larger dimension. That is, it is critical to determine if sustainability consists of three unidimensional scales (e.g., food sufficiency, environmental farming, agrarianism) or three subscales of a multidimensional sustainable agriculture scale (Spector, 1992). Some items may significantly load on more than one sustainability factor. Festinger's theory assumes only one could be maximized. Therefore, items significantly loading on more than one factor will be removed from each sustainability scale.

As a prior step to analyzing validity using confirmatory factor analysis, a measurement model using exploratory factor analysis was conducted. Exploratory factor analysis is a process that identifies hypothetical variables that account for patterns of covariation among variables (DeVillis, 1991). The exploratory factor analysis used for this study was principle components. Judgments of factor loadings greater than or equal to .4 and minimum eigen values greater than 1.0 were utilized. Factor loadings (given all variables were standardized to have unit variance) are

equivalent to standardized regression coefficients. That is, factor loadings are the correlations between standardized regression coefficients of variables sharing the same common factor (Kim and Mueller, 1978a) thereby representing path coefficients between variables (items) and factors (DeVilles. 1991). Communalities reflect the reliability of an item for a particular scale. Communality of an item can also be defined as that portion of its variance explained by the common factors represented in the scale items (Gorsuch, 1983).

The factor rotation conducted was orthogonal indicating that correlations between factors had not been arbitrarily imposed (Kim and Mueller, 1978b). Items with low factor loadings and/or communalities will be dropped from the corresponding scale.

The agrarian scale, which has been widely-used in research (Flinn and Johnson, 1974; Buttel, 1976; Molnar and Wu, 1989; Dalecki and Coughenour, 1992), remains relatively stable regarding item wording. Therefore, only under unusual circumstances will the results of this study justify altering the common usage (inclusion of specified items) of the agrarian items.

The Chi-square goodness-of-fit test (χ^2) is typically used to assess the overall fit (i.e., the validity) of a proposed model under confirmatory factor analysis (Long, 1983). The logic behind this type of significance testing is different than that utilized by regression and other similar analytical tools. In regression analysis, the null hypothesis established in opposition to the theoretical position (e.g., $\beta=0$) and it is hoped that the null hypotheses can be rejected (Bollen, 1989). With Chi-square testing, the null hypothesis implies that the difference between the covariance structure in the proposed model and the population is zero. If χ^2 is significant, then statistically significant differences exist between the model and population

covariance structures. In this study, the test would be used to access the hypothesized relationships between individual items and the three sustainability meanings. A non-significant χ^2 would indicate that independence (of items) did occur (i.e., a "good" model). Another interpretation is that a non-significant χ^2 would indicate that the number of common factors extracted is adequate in explaining the variance within the model (Gorsuch, 1983). The problem with using χ^2 to assess model fit is that it is sensitive to sample size. Chi-square can indicate "significance" even under trivial relationships with large samples (i.e., over 1,000). With 2,856 observations in the study data set, it may be difficult to obtain a nonsignificant χ^2 under any circumstance. Additional analyses will be examined if a significant χ^2 occurs.

Reliability findings of individual research variables

The percentage distribution, corrected item-total correlation and alpha if item is deleted for food sufficiency scale items are presented in Table 5.2. The frequency distributions reveal that the responses to each item have adequate variability. That is, 80-90 percent of all respondents did not respond similarly to any one question. Rather, responses were distributed among the Likert alternatives. The corrected item-total correlation measures the degree to which responses for one item are correlated with responses for the other items combined. These measures ranged from .34 to .48 indicating a moderate to strong degree of association among scale items. With this level of correlation, a moderate to strong coefficient alpha would be expected. In fact, alpha for the scale was .62. Along with reviewing corrected item-total correlations, the change in alpha due to deletion of any one scale item was conducted and revealed that deleting any of the four scale items lowered alpha. Overall, the food sufficiency scale had moderate reliability.

Table 5.2. Percentage distribution, corrected item-total correlation, alpha if item is deleted, and descriptive summary statistics for Food Sufficiency scale items (overall $\alpha = .62$).

Item	Percent Response ^a					Corrected item-total correlation	Alpha if item is deleted
	SA	A	U	D	SD		
The use of fertilizers, pesticides and other agricultural chemicals is a major reason that food costs in the United States are the lowest in the world.	8.6	37.8	35.3	15.5	2.8	.41	.55
Science and technology are making our lives healthier, easier and more comfortable.	16.1	60.9	15.3	7.1	0.7	.39	.56
The benefits of science are greater than any harmful effects.	5.7	33.9	34.9	21.3	4.2	.34	.60
Farm chemicals help keep our food supply cheap and abundant.	4.5	47.8	27.6	17.2	2.9	.48	.49
Scale Total Score	Theoretical		Actual		Mean		Std Dev
Summary Statistics	Range		Range		13.7		2.45
	4 - 20		4 - 20				

^a SA=strongly agree; A=agree; U=undecided; D=disagree; SD=strongly disagree.

Table 5.3. Percentage distribution, corrected item-total correlation, alpha if item is deleted, and descriptive summary statistics for Environmental Farming scale items (overall $\alpha = .75$).

Item	Percent Response ^a					Corrected item-total correlation	Alpha if item is deleted
	SA	A	U	D	SD		
Farming is a major source of pollution in our nation today.	4.6	23.5	20.6	41.2	10.0	.51	.72
To protect the environment, we must change the way we produce our nation's food.	8.8	36.9	29.7	21.1	3.5	.60	.67
Most farmers use pesticides and other chemicals on food safely.	3.0	17.5	35.2	40.5	3.9	.52	.71
If used as directed, fertilizers, pesticides and other agricultural chemicals are not a threat to the environment.	7.0	26.9	27.4	33.7	5.1	.57	.68
Scale Total Score	Theoretical		Actual		Mean		Std Dev
Summary Statistics	Range		Range		11.7		3.04
	4 - 20		4 - 20				

^a SA=strongly agree; A=agree; U=undecided; D=disagree; SD=strongly disagree.

These same procedures were followed and the environmental farming scale items revealed the following results (Table 5.3). First, the percentage of responses fell more evenly among the response set. Second, the corrected item-total correlations ranged from .51 to .60. These correlations were higher than those associated with the food sufficiency scale items indicating that coefficient alpha should also be higher. For this scale, alpha equaled .75. Deleting any of the scale items would lower alpha to .67 to .72. Overall, the results indicated the scale was sufficiently reliable for further statistical analysis.

The reliability analysis for agrarianism items is presented in Table 5.4. The response distribution appears to be uneven but tends to congregate more toward support for sustainability as community (i.e., the agree to strongly agree categories). The corrected item-total correlations ranged from a low of .34 to a high of .51. At .67, coefficient alpha was lower than for the environmental farming scale. This was expected given the lower corrected item-total correlations. Again, alpha would decrease if any of the items were deleted.

The fourth agrarian item achieved the lowest corrected item-total correlation and very little impact upon alpha if the item was deleted. Under normal research circumstances, marginal items may be deleted from the scale. However, the agrarian items used in this dissertation have been used in previous sociological research. For this reason, the item was kept within the agrarian scale.

The familiarity scale consisted of six dichotomous response items (Table 5.5). The corrected item-total correlations ranged from .39 to .59. Coefficient alpha equaled .76. Deleting any of the six items lowered alpha.

The lowest correlation item asked whether the respondent currently owned a farm or ranch. This item is statistically marginal but important conceptually to the

Table 5.4. Percentage distribution, corrected item-total correlation, alpha if item is deleted, and descriptive summary statistics for Agrarianism scale items (overall $\alpha = .67$).

Item	Percent Response ^a					Corrected item-total correlation	Alpha if item is deleted
	SA	A	U	D	SD		
Agriculture is the most basic occupation in our society, and almost all other occupations depend upon it.	25.1	55.8	10.9	7.9	0.3	.48	.58
A depression in agriculture is likely to cause a depression in the entire country.	18.7	48.2	18.1	14.4	0.7	.51	.55
Farming involves understanding and working with nature; therefore, it is a much more satisfying occupation than others.	13.3	43.0	24.7	17.7	1.2	.46	.58
We hear so much about crime and corruption today because our nation is becoming so urbanized.	15.4	46.4	18.2	18.5	1.5	.34	.66
Scale Total Score	Theoretical Range		Actual Range		Mean		Std Dev
Summary Statistics	4 - 20		4 - 20		14.7		2.65

^a SA=strongly agree; A=agree; U=undecided; D=disagree; SD=strongly disagree.

Table 5.5. Frequency distribution, corrected item-total correlation and alpha if item is deleted for Familiarity scale items (overall $\alpha = .76$).

Item	Yes	No	Corrected item-total correlation	Alpha if item is deleted
Do you currently own or run a farm or ranch?	11.7	88.3	.39	.75
Did your parents ever own a farm or ranch?	43.0	57.0	.51	.73
Do any of your close relatives own or run a farm or ranch?	46.2	53.8	.55	.71
Do any of your close friends own or run a farm or ranch?	50.7	49.3	.59	.70
Have you visited a farm or ranch in the past five years?	73.4	26.6	.46	.74
Have you ever had a job on a farm or ranch?	47.1	52.9	.53	.72
Scale Total Score	Theoretical Range		Mean	Std Dev
Summary Statistics	0 - 6		2.7	1.87

scale. That is, an item relating to existing farming ties must be included in a scale that measures familiarity with agriculture. For that reason, item 1 was left in the scale.

Political ideology was proposed to conceptually consist of two items. The first was a self-identification item while the second was a political orientation item.

Reviewing the results in Table 5.6 clearly indicate that the reliability of a scale using

Table 5.6. Frequency distribution, corrected item-total correlation and alpha if item is deleted for Political Ideology scale items (overall $\alpha = .43$).

Item	(1)	(2)	(3)	Corrected item-total correlation	Alpha if item is deleted
		(%)			
Which do you consider yourself to be (republican, democrat, other)?	37.8	39.7	22.6	.28	N.A.
Which of these best describes your usual stand on political issues (conservative, middle-of-the-road, liberal).	40.3	48.6	11.1	.28	N.A.

these two items was suspect. The corrected item-total correlation was weak at .28 and alpha equaled .43. For these reasons, political ideology was measured by the political orientation item only.

Statistical Procedures

The statistical procedures used to test Hypothesis 1 were factor analysis and correlation analysis. As outlined in Chapter 4, Hypothesis 1 stated that respondents will perceive the three dimensions of sustainable agriculture (as measured by the variables food sufficiency, environmental farming, and agrarianism) as separate and distinct. The factor analysis conducted was principal components with an orthogonal rotation. The criterion used to determine the number of factors retained was minimum eigen values greater than 1.0. A factor loading of .4 also was used to signify a sufficient relationship. A correlation analysis for the twelve sustainable

agriculture items was conducted. If the correlation coefficients within a scale are substantially greater than those for items between scales, then the factor loadings are confirmed.

The statistical analyses used to test Hypothesis 2 was correlation analysis and a t-test procedure. Hypothesis 2 stated that the higher respondent's familiarity (with agriculture), the higher their adherence with a particular dimension of sustainable agriculture. These analyses tested whether a direct relationship exists between familiarity in agriculture and adherence with a particular dimension of sustainable agriculture. The correlation analysis indicated whether a general relationship exists between familiarity and adherence. The t-test procedure tested whether there is a statistical difference in group means associated with familiarity scores between people exhibiting some tendency to adhere to a particular meaning and those that do not.

The socioeconomic variables age, gender, and familiarity were used as control variables to help explain variability in adherence scores. A probit analysis and general linear regression models using familiarity and selected socioeconomic variables as explanatory variables were conducted to test for these covariance differences. Although both the probit and general linear regression models used a measure of familiarity in their respective models, the characteristics of the familiarity measure differed. The probit procedure used adherence as a categorical variable (i.e., 0,1 scores), while a continuous measure of familiarity (i.e., scale score) was used for the regression analysis.

The general linear regression and probit procedures were quite similar. The primary difference between the two relates to the analysis of residuals (Freeman, 1987). Probit analysis was chosen over regression analysis because the latter

procedure would result in unreliable estimates when a dichotomous dependent variable is used (Aldrich and Nelson, 1984). Unreliability would be due to violating the regression assumption that all error terms have a constant variance. Therefore the regression coefficients, while remaining unbiased (expected value of error terms is still zero), are no longer best (i.e., not having the least variance). The probit model, on the other hand, assumes that the dependent variable has but two values, 0 and 1. The goodness of fit measure in a probit analysis is the likelihood ratio statistic (Aldrich and Nelson, 1984). This statistic approximates a Chi-square distribution when the null hypothesis is true (i.e., that all coefficients except the intercept are zero) and is valid for large sample sizes (Freeman, 1987). The general linear model used tested for significant relationships between the independent variables defined previously and the continuous measure of familiarity. The regression procedure utilized the typical "overall" F statistic as a goodness of fit measure.

Additional procedures conducted included a t-test on the influence of gender on adherence of a particular sustainable agriculture meaning and a correlation analysis between adherence and the socioeconomic variables age and education. The t-test procedure was used to test whether there is a statistical difference in group means (of adherence scores) by gender. The correlation analysis was conducted to better illustrate the relationships between the continuous variables age and education and adherence scores.

Testing Hypotheses 3a, b, and c was accomplished through a probit analysis using familiarity and the socioeconomic characteristics as explanatory variables between political orientation and adherence. Hypothesis 3 stated the higher the respondent's familiarity (with agriculture), the greater the relationship between

declared political orientation and adherence (to a specified dimension of sustainable agriculture). Hypotheses 3a, b, and c stated that individuals designated as conservative will adhere to sustainability as food sufficiency, whereas individuals designated as middle-of-the-road and liberal will adhere to sustainability as stewardship and sustainability as community, respectively. To test these hypotheses, a success rate (a bivariate variable with 0,1 values) between political ideology and highest sustainable agriculture dimension was developed. Individuals were grouped according to their highest sustainable agriculture scale score (i.e., food sufficiency, environmental farming, agrarianism). The grouping was compared to the political orientation indicated by each individual (i.e., liberal, middle-of-the-road, conservative). If the political orientation indicated matched the proposed sustainable agriculture dimension (based on the hypotheses stated in Chapter 4), then a success score of 1 results. Incorrect relationships between political orientation and sustainable agriculture scores will result in a success score of 0.

The last analyses conducted were exploratory by nature and looked at the relationship between the individual sustainable agriculture scale scores and potential explanatory variables familiarity, gender, age, and education. More specifically, a correlation analysis and general linear regression models for each sustainable agriculture dimension was conducted.

Testing Research Hypotheses

Findings - hypothesis 1

As cited previously, adherence is at the center of Festinger's theory. An individual will strive to hold attitudes, or adhere to attitudes, that are consistent with each other to avoid cognitive dissonance. Using sustainable agriculture as an example, an individual will hold to, or adhere to, one and only one sustainable

agriculture meaning (assuming familiarity with sustainable agriculture) to avoid cognitive dissonance.

The distribution for adherence scores was tested for normality using a univariate procedure and is presented in Table 5.7². The null hypothesis tested was that adherence scores were non-normally distributed. Rejecting this hypothesis would indicate a normal distribution and allow the reader to visualize the distribution. The statistical significance of the D test (i.e., the probability of the calculated score to be greater than the table score was less than .01) indicating the null hypotheses was rejected and adherence scores assumed to be normally distributed.

Table 5.7. Univariate statistics testing the normality of adherence scores.

Mean	Std Dev	Skewness	D:Normal	Prob>D
0.021	0.024	2.738	0.190	<.01

The first approach to testing adherence to a single measure of sustainable agriculture was a factor analysis (Table 5.8). The criterion used to determine the number of factors was minimum eigen values greater than 1.0. The calculated eigen values were as follows: 2.76, 2.00, 1.62, .94, .91, .70, .67, .60, .52, .44, .43, and .41. Therefore, three factors incurred eigen values greater than 1.0 and were retained. Using a factor loading of .4 to signify a sufficient relationship between the

²A common statistic used for determining normality is the W test. The drawback for the W test is that it is awkward for sample sizes greater than 50 (Shapiro and Wilk, 1965). Therefore, the Kolomogorov D statistic will be used as a replacement. This statistic tests the data against a normal distribution with mean and variance equal to the sample mean and variance (SAS Institute Inc., 1985).

Table 5.8. Rotated factor matrix for the twelve items identified for food sufficiency, environmental farming, and agrarianism.

	Factor 1	Factor 2	Factor 3
The use of fertilizers, pesticides and other agricultural chemicals is a major reason that food costs in the United States are the lowest in the world.	-0.069	0.693	0.147
Science and technology are making our lives healthier, easier and more comfortable.	-0.014	.660	-0.089
The benefits of science are greater than any harmful effects.	-0.147	0.567	-0.071
Farm chemicals help keep our food supply cheap and abundant.	-0.033	0.758	0.030
Farming is a major source of pollution in our nation today.	0.785	0.192	-0.075
To protect the environment, we must change the way we produce our nation's food.	0.818	-0.036	0.041
Most farmers use pesticides and other chemicals on food safely.	0.662	-0.328	-0.113
If used as directed, fertilizers, pesticides and other agricultural chemicals are not a threat to the environment .	0.727	-0.282	-0.110
Agriculture is the most basic occupation in our society, and almost all other occupations depend upon it.	-0.049	0.035	0.749
A depression in agriculture is likely to cause a depression in the entire country.	-0.064	-0.129	0.775
Farming involves understanding and working with nature; therefore, it is a much more satisfying occupation than others.	-0.058	-0.007	0.692
We hear so much about crime and corruption today because our nation is becoming so urbanized.	-0.021	0.071	0.570

individual item and the calculated factor, three distinct factors were derived. The first four items loaded on factor 2 (food sufficiency factor). The factor loadings ranged from .57 to .76. None of these items had a factor loading of more than .15 on either

factor 1 or 3. The second four items incurred loadings from .66 to .82 on factor 1 (environmental farming factor). None of these items had a factor loading of more than .2 on factor 2 or 3. The last four items had a strong relationship with factor 3 (agrarianism factor). Each item incurred a factor loading of at least .57 while limiting cross factor loadings to under .08. This analysis, with its definite loading patterns for each of the three factors, supports the first hypothesis that the sustainable agriculture scales are distinct.

A confirmatory factor analysis was conducted to evaluate content validity for only the three sustainable agriculture meanings. A significant Chi-square value occurred (as expected) due to the large sample size. For large sample sizes, the goodness-of-fit index (GFI) is a more appropriate measure of overall model fit. The GFI, like the Chi-square, compares the variance and covariance structure of the predicted model to that generated by the data set. The major difference between the GFI and Chi-square is that the calculation of GFI is not sensitive to sample size (Bollen, 1989). The GFI was .978 indicating good overall model fit.

Content validity also was evaluated for each of the twelve sustainable agriculture items in two ways. First, t-ratios were examined to determine if each item was loading on the factor (i.e., sustainable agriculture meaning) it was suppose to. The results from this evaluation, like that of the Chi-square, was negatively affected by sample size. Therefore, a modification index was used to examine whether the individual items loaded on sustainable agriculture meanings they were not suppose

to. The modification index is a measure that evaluates the change in model Chi-square values resulting from relaxing (or freeing) a single constraint (Joreskog and Sörbom, 1989). A value of 3.845, therefore, would indicate that the path should be freed and the model re-run to check for a significant t-ratio and a significant decrease in Chi-square at 1 degree of freedom. Again, because of sample size, this evaluation is difficult to interpret. Detailed output for the iterations conducted will not be reported here. The results of this procedure, however, did indicate two of the environmental farming items loaded significantly on the food sufficiency meaning. The statistical significance of these cross-loadings, however, was relatively low given the sample size. The conclusion from the confirmatory factor analysis is that the proposed model was good, with some problems of content validity because of the cross-over.

A second approach to testing adherence to a single measure of sustainable agriculture was a correlation analysis. Pearson correlation coefficients for the twelve sustainable agriculture items are presented in Table 5.9. Two comments are warranted regarding this matrix. First, the differences between the correlation coefficients for items within the scales were substantially greater than those for items between scales. For example, the correlation coefficients for items within the food sufficiency scale ranged from .197 to .474. The correlation coefficients for food sufficiency items to other scale items was under .11. This comparison was even stronger for the environmental farming items. The intra-scale correlation coefficients ranged from .32 to .56 while off-scale items were less than .05. Moreover, only three of the off-scale correlations were positive indicating a strong differentiation between environmental farming scale items and other scale items. Agrarianism correlation coefficients ranged from .20 to .55 while off-scale

Table 5.9. Pearson correlation coefficients for the twelve sustainable agriculture items^a.

	FS1	FS2	FS3	FS4	EF1	EF2	EF3	EF4	AG1	AG2	AG3	AG4
FS1	1.000											
FS2	0.224*	1.000										
FS3	0.197*	0.345*	1.000									
FS4	0.474*	0.310*	0.234*	1.000								
EF1	0.021	0.043	-0.042	0.047	1.000							
EF2	-0.116*	-0.049	-0.128*	-0.102*	0.551*	1.000						
EF3	-0.229*	-0.173*	-0.177*	-0.229*	0.315*	0.391*	1.000					
EF4	-0.230*	-0.145*	-0.209*	-0.181*	0.366*	0.456*	0.558*	1.000				
AG1	0.102*	0.002	-0.000	0.039	-0.101*	-0.031	-0.109*	-0.105*	1.000			
AG2	0.021	-0.069*	-0.078*	-0.073*	-0.132*	-0.025	-0.071*	-0.084*	0.550*	1.000		
AG3	0.059*	-0.073*	0.009	0.011	-0.088*	-0.028	-0.103*	-0.116*	0.297*	0.344*	1.000	
AG4	0.076*	-0.012	0.009	-0.050*	-0.055*	-0.027	-0.092*	-0.086*	0.200*	0.222*	0.350*	1.000

^a FS=food sufficiency; EF=environmental farming; AG=agrarianism. Numbers 1 through 4 represent questionnaire item within the scale. For exact item wording, see Table 5.8. First columns for each table correspond. * $p < .01$.

correlations were under .11. These correlation coefficients confirm the three factor scenario and also lends support to Hypothesis 1.

Second, because of the large sample size, correlation coefficients of .05 and greater were deemed statistically significant. Therefore, discount the statistical significance of the relationships. Rather, assert additional significance on the absolute level of correlation.

Findings - hypothesis 2

Festinger (1957) states that an individual familiar with a subject is more likely to notice inconsistencies in cognitions and act to remove those inconsistencies prior to, or as a direct result of, cognitive dissonance. Thus, the higher the respondent's familiarity with agriculture, the higher their adherence to a particular meaning of sustainable agriculture (Hypothesis 2). To test Festinger's theoretical assumption, zero-order correlations between measures of familiarity and adherence were calculated (Table 5.10).

The Pearson correlation coefficient between familiarity with agriculture and

Table 5.10. Pearson correlation coefficient between familiarity with agriculture and adherence to a particular meaning of sustainable agriculture.

	Familiarity	Adherence
Familiarity	1.000	
Adherence	0.226*	1.000

*p<.01

adherence to a particular meaning of sustainable agriculture equaled .226. Although the coefficient is statistically significant ($p < .01$), it shows a weak relationship between familiarity and adherence.

A second approach to testing the relationship between adherence and familiarity was to categorize individuals into two groups; those who adhered to a particular meaning and those who did not. Using the D-statistic outlined in Chapter 4 to determine adherence, all three sustainable agriculture scale scores would need to be equal (e.g., 12, 12, 12) to attain a zero adherence score. This definition is too restrictive for categorical tests. That is, an individual with sustainable agriculture scale scores of 12, 12, and 2 reveals no adherence to a single dimension of sustainable agriculture. A third scale score of 12 is not necessary to determine absence of adherence. Therefore, a slight relaxation was implemented such that if the highest two scale scores were equal then no adherence to a single dimension was assumed to exist (i.e., a zero adherence score). Although an adherence score could be calculated for the 12, 12, 2 example using the D-statistic formula, by definition, the individual is not adhering to a single dimension of sustainable agriculture. Therefore, individuals who revealed no adherence to a single dimension were given a zero adherent score. Of the 2,647 non-missing observations, 421 individuals (15.9 percent) had a zero adherence score. This relaxed definition of adherence was implemented in each test using a 0,1 categorical variable of adherence. The results of a t-test procedure for these categories (0 for non-adherents and 1 for adherents) is presented in Table 5.11.

Using $\text{prob} > t$ as an indicator of model fit, adherence category did not explain variability in adherence scores. Individuals who adhered to a single sustainable agriculture meaning did not have a significantly different familiarity score than

Table 5.11. T-Test procedure testing the influence of presence or absence of adherence (adherence category) on familiarity with a particular sustainable agriculture meaning.

Adherence Category	N	Mean	Variances	T	DF	Prob> T
0	421	2.67	Equal	-0.60	2645	0.546
1	2226	2.73				

those who did not show any tendency to adhere.

The results from the Pearson correlation (Table 5.10) and t-test procedure (Table 5.11) indicated that variability in adherence scores was not explained by familiarity. To help explain the lack of fit between familiarity and adherence, a probit analysis and regression analysis using socioeconomic variables and familiarity as explanatory variables and adherence as the dependent variable were conducted. Because of missing values on socioeconomic variables, the adherence categories of 0 and 1 had 410 and 2142 observations, respectively. Results of the probit procedure are presented in Table 5.12. No explanatory variables were found to be statistically significant (at $p < .05$) in explaining the variation in adherence category.

The results of the general linear regression model with adherence as the dependent variable and familiarity, gender, age, and education as explanatory variables are presented in Table 5.13.

Familiarity, in this case, was the only explanatory variable that was statistically significant (i.e., $pr > |t|$ is less than .05). The overall model R^2 was only 0.05

Table 5.12. Probit analysis using familiarity and selected socioeconomic variables as potential explanations for adherence.

Variable	DF	Estimate	Std Err	ChiSquare	Pr>Chi
Intercept	1	-1.996	0.307	42.390	0.0001
Familiarity	1	-0.022	0.030	0.548	0.459
Age	1	0.003	0.003	0.704	0.401
Gender	1	0.107	0.122	0.772	0.380
Education	1	0.045	0.044	1.023	0.312

Table 5.13 General linear model using familiarity, gender, age and education to explain variation in adherence.

Variable	DF	Estimate	Std Err	T for Ho	Pr> T
Intercept	1	0.015	0.003	5.78	0.0001
Familiarity	1	0.003	0.0002	11.03	0.0001
Age	1	-0.00003	0.00003	-1.13	0.257
Gender	1	0.001	0.001	1.43	0.153
Education	1	-0.002	0.0004	-0.56	0.576

indicating that while familiarity was significant, it was not substantively important. Had the variable carried substantive importance and influence, the overall model fit would have been greater. Of the four analyses conducted, the regression procedure and the zero-order correlation statistically substantiated the relationship between adherence and familiarity. In both cases the substantiating evidence can be weakened through arguments of large sample size influences and overall model inadequacies. This interpretation does not dismiss the statistical significance of the results. It does, however, weaken the argument that familiarity substantially influences (or affects) adherence. We, therefore, must be careful not to overstate statistical results in light of other contrary evidence. We must conclude, contrary to the two statistically significant findings, that familiarity with agriculture has no substantive relationship to adherence of one meaning of sustainable agriculture over others.

Next, analyses of the relationship between the socioeconomic variables (gender, age, and education) and adherence were conducted. These analyses were undertaken to explain the lack of fit between familiarity and adherence. The results from a t-test procedure using gender as a categorical variable (classification variable) and adherence as a continuous variable are presented in Table 5.14.

Testing for differences in means based on an equal variance assumption indicated that gender does statistically influence the adherence of a sustainable agriculture meaning. That is, the probability $> t$ of 0.003 is less than the typical .05 established for such tests.

Because age and education are continuous variables rather than classification variables, a t-test procedure was not appropriate. Instead, a correlation analyses between adherence and the socioeconomic variables of age and education was

Table 5.14. T-Test procedure testing the influence of gender on adherence of a particular sustainable agriculture meaning.

Gender	N	Mean	Variances	T	DF	Prob> T
1	1816	0.022	Equal	3.664	2623	0.0003
2	809	0.018				

conducted (Table 5.15).

As presented in Table 5.15, the Pearson correlation coefficients of less than .03 between age and adherence and between education and adherence indicated no statistical relationship between adherence and these socioeconomic variables.

Table 5.15. Correlation analysis between adherence and socioeconomic variables age and education.

	Adherence	Age	Education
Adherence	1.000		
Age	0.003	1.000	
Education	-0.026	-0.302*	1.000

*p<.01

Findings - hypothesis 3

The third hypothesis tested was that the greater the familiarity in agriculture the greater the correspondence between declared political orientation and adherence in a specified dimension of sustainable agriculture. Individuals classifying themselves as politically conservative were hypothesized to score higher on food sufficiency in relation to scores on environmental farming and agrarianism, individuals classifying themselves as middle-of-the-road were hypothesized to score higher on environmental farming in relation to scores on food sufficiency and agrarianism, and political liberals were hypothesized to score higher on agrarianism in relation to scores on food sufficiency and environmental farming. Individuals were categorized according to their highest scale score on the food sufficiency, environmental farming, and agrarianism scales. The grouping was then compared to the political classification indicated by each individual and a success rate calculated. Of the 2,142 observations without missing values, 508 (23.7%) were classified correctly. This level of correct categorizations is quite small and therefore leads to inconclusive results.

The question of why classifications were so poorly predicted was analyzed. A probit analysis (using logistic regression) was conducted with the categorical variable success (i.e., 0,1) as the dependent variable and familiarity, age, gender, and education as the independent variables. Results of this procedure are presented in Table 5.16.

Familiarity did help explain whether political ideology "successfully" matched adherence to a particular sustainable agriculture dimension ($p < \chi^2 .0009$). Age and gender did not significantly explain variation in the success variable. Education, on the other hand, was statistically significant ($p < \chi^2 .0001$).

Table 5.16. Probit analysis using familiarity and selected socioeconomic variables as potential explanations for successful matches between political orientation and adherence to a particular sustainable agriculture dimension.

Variable	DF	Estimate	Std Err	ChiSquare	Pr>Chi
Intercept	1	1.911	0.294	42.313	0.0001
Familiarity	1	0.096	0.029	11.096	0.0009
Age	1	0.002	0.003	0.416	0.519
Gender	1	-0.129	0.114	1.282	0.258
Education	1	-0.246	0.043	32.006	0.0001

Hypothesis 2 results revisited

In summary, adherence to a sustainable agriculture dimension cannot be explained by familiarity or socioeconomic variables. Therefore, a last set of analyses was conducted to determine if familiarity and socioeconomic variables could explain the variation in the individual sustainable agriculture scores rather than a calculated net adherence score. That is, would the results be different (i.e., familiarity would explain adherence) if analyses were conducted using raw scale scores for each sustainable agriculture dimension independently rather than a calculated net adherence score.

The first procedure used a correlation analysis and is presented in Table 5.17. Because the statistical significance of many of the correlations are a result of the large sample size, the absolute level of the correlation coefficient should be

emphasized. Reviewing the correlation coefficients in Table 5.17, only 5 of 21 coefficients (24 percent) were larger than ± 0.20 and only one above ± 0.30 . These results show that the correlations among these variables are weak to moderate in strength.

Table 5.17. Pearson correlation coefficients for the three sustainable agriculture dimensions, familiarity and selected socioeconomic dimensions.

	FS	EF	AG	Familiarity	Age	Gender	Education
FS	1.000						
EF	-0.220*	1.000					
AG	0.012	-0.145*	1.000				
Familiarity	0.052*	-0.152*	0.246*	1.000			
Age	0.102*	-0.069*	0.156*	0.091*	1.000		
Gender	-0.192*	0.095*	0.004	-0.206*	-0.097*	1.000	
Education	0.174*	0.049	-0.242*	-0.136*	-0.303*	0.014	1.000

* $p < .01$

A second procedure used to test the relationship between the individual sustainable agriculture scale scores and explanatory variables was regression analysis. Three different models were analyzed with each of the sustainable agriculture dimensions as the dependent variable and familiarity and socioeconomic variables as explanatory variables. The results for the three models are presented in

Tables 5.18 through 5.20.

Familiarity is the only variable that does not significantly explain some variation in the food sufficiency scale score. Unfortunately, familiarity is required by Festinger's assumption regarding the relationship between familiarity with an issue and adherence to a single dimension. Even with the significant t-scores stated in Table 5.18, the overall model R^2 was only .09.

All variables except education were found to be statistically significant in explaining the variation in environmental farming scale scores (Table 5.19).

Table 5.18. General linear model using familiarity, gender, age and education to explain variation in food sufficiency scale scores.

Variable	DF	Estimate	Std Err	T for Ho	Pr> T
Intercept	1	10.097	0.262	38.57	0.0001
Familiarity	1	0.044	0.026	1.71	0.0867
Age	1	0.023	0.003	7.53	0.0001
Gender	1	0.921	0.103	8.92	0.0001
Education	1	0.432	0.038	11.32	0.0001

Familiarity was significant with a t-ratio of -6.57 and an estimate of -0.215. Interestingly, while this has little bearing on our ability to confirm or refute Festinger's theory, this estimator would indicate that people most familiar with agriculture have lower environmental farming scale scores. Conversely, people

with a lower familiarity with agriculture have a tendency to be more environmentally-minded. The overall R^2 for this model, however, was just .03.

All variables within this model (Table 5.20) were found to be statistically significant. Familiarity had a positive estimator contrary to that found for environmental farming, which, indicated a direct relationship between familiarity and agrarianism scale scores. The overall model R^2 was .11.

In summary, familiarity was found to be statistically significant in two of the three models. The socioeconomic variables also were found to be statistically significant in all but one case. These results have to be used with caution however, because

Table 5.19. General linear model using familiarity, gender, age and education to explain variation in environmental farming scale scores.

Variable	DF	Estimate	Std Err	T for Ho	Pr> T
Intercept	1	12.856	0.335	38.36	0.0001
Familiarity	1	-0.215	0.033	-6.57	0.0001
Age	1	-0.008	0.004	-2.21	0.0275
Gender	1	-0.417	0.132	-3.16	0.0016
Education	1	0.039	0.049	0.79	0.4298

Table 5.20. General linear model using familiarity, gender, age and education to explain variation in agrarianism scale scores.

Variable	DF	Estimate	Std Err	T for Ho	Pr> T
Intercept	1	14.947	0.280	53.46	0.0001
Familiarity	1	0.319	0.027	11.70	0.0001
Age	1	0.014	0.003	4.31	0.0001
Gender	1	-0.351	0.110	-3.19	0.0014
Education	1	-0.385	0.041	-9.45	0.0001

each model explained very little of the variation in the respective scale scores as shown by the very small R^2 s.

Summary of Results

The data utilized in this study, through a variety of statistical procedures, have partially confirmed the theoretical framework as outlined in Chapter 2. Respondents to the survey did adhere to a single dimension of agriculture as confirmed by a factor analysis and correlation analysis. The important concept of familiarity, however, was not significantly related to adherence. Also, the socioeconomic variables selected did not have consistently strong relationships with adherence. Therefore, it appears that Hypothesis 1 was supported whereas Hypothesis 2 was not supported by the data. That is, the higher the familiarity with agriculture does not lead to a higher adherence to a particular dimension of sustainable agriculture. Second, the data do not support Hypothesis 3a, b, and c. There appears to be no relationship between familiarity, political orientation, and

adherence to a particular meaning of sustainable agriculture. Lastly, independent analyses of the three sustainable agriculture meanings provided inconclusive results regarding the relationships between sustainable agriculture meanings and familiarity and socioeconomic variables. In none of the regression analyses was the overall model R^2 above .11.

CHAPTER 6. SUMMARY AND IMPLICATIONS

The field of policy analysis falls into two broad categories; "knowledge of" and "knowledge for" (Bobrow and Dryzek, 1987). The first relates to better understanding the process of policy development and debate and is at the center of political science research. The second includes studies that give policy makers a better understanding of the consequences of one or more policy options or alternatives. "Knowledge for" studies can be either predictive or evaluative. The analytical and theoretical frameworks used for each is likely to be different. For example, evaluative studies often utilize opinion polls to gather information. The purpose of these studies is to inform policy makers regarding general trends in opinions (or social paradigms) about policy issues. The theoretical framework used for general trend studies, as outlined in the Introductory Chapter, is generally based on the sociology of knowledge.

Predictive studies, on the other hand, attempt to forecast outcomes of a given set of policy options or alternatives. It is here that sociologists can, and perhaps need, to become more involved. Outcomes, are predictable; and they can and should be empirically-based. The tool for the analyst is empirical models and grounded theoretical frameworks. In this dissertation, Festinger's theory was examined to determine its usefulness (as a theoretical framework) for policy. Specifically of interest was the hypothesized relationship between familiarity and attitude consistency. If this relationship holds, policy analysts then would be able to conduct studies of population which measure familiarity (with a policy issue) and attitudes toward that issue. If attitudes were consistently held, behavior would follow (or be consistent with) the prevailing attitudes. The policy analyst, then

could predict what behavioral changes, if any, would occur given the various policy options. That is, the analyst would study the attitudes (related to the policy options) and predict behavioral change.

It is this author's contention that a theoretical framework (i.e., predictive study) is of higher value to policy makers than opinion polling (i.e., evaluative study). For example, consider an issue for which three policy alternatives or options were debated. If an opinion poll was conducted and revealed that Policy A was favored by 50 percent of the citizenry whereas Policy B and Policy C were favored by 30 and 20 percent, respectively. Policy makers using the opinion poll as a base of information and wishing to satisfy as many of their constituents as possible, would likely favor Policy A. Let's also assume that these same data were inserted into a predictive model using Festinger's theory. The findings of this study revealed that of the 50 percent that favored Policy A, only 10 percent were strong adherents of that policy. That is, only 10 percent strongly favored Policy A over Policy B or Policy C. The findings also revealed that all of the 30 percent that favored Policy B were strong adherents of that policy, whereas 50 percent of those favoring Policy C were strong adherents. Given this new information, should policy makers still favor Policy A? Wouldn't Policy B, with its higher percentage of strong adherents, effect more behavioral change? That is, wouldn't this result contradict a general belief that the most popular policy would effect the largest behavioral change?

An underlying notion of this dissertation is policy is enacted to solve social problems through social change. Further, policy aligned with strong attitudinal adherence (and ultimately behavior) is likely to be most successful in achieving change. Therefore, if sociology is to help policy makers predict consequences to policy actions, likely actions of individuals to policy options should be valued.

A theoretical framework describing the relationships between attitudes and behavior is key. Unfortunately, the framework outlined in this dissertation did not include a behavioral component, and is a serious weakness based on the chosen data set.

While predictive modeling has been advocated, there are limitations. The first, is policy makers potentially may favor policies with the highest number of strong adherents. This is appropriate if policy makers review and understand any distributional effects that the policy may have. That is, it must be clear (as stated in the Introductory Chapter) to the policy makers who are the potential winners and losers of the policy. If distributional effects are not considered, then attitudinal theory may be no better than models based on welfare economics or public choice.

A second limitation of predictive models is they are prone to error. If the predictive level is poor and results from model recommendations are not met, then policy makers will call into question sociology's relevance toward policy analysis. Therefore, research must be conducted to construct the best predictive models available.

With these underlying assumptions, a policy analytical framework on a specific issue, namely sustainable agriculture, was conducted. Two theoretical frameworks were explored. The first was Festinger's theory as outlined earlier in this section. The second was Billig's conceptualization of attitudes. The implications for policy research given Billig's theoretical perspective is that if individuals can hold multiple, conflicting attitudes at any time attitude inconsistency is a result of individual nuances, not very predictive, and not very useful to policy makers. Given Billig's hypothesis, policies directed toward behavioral change won't be

successful. Consequently, the need exists to resolve what appear to be incongruent positions.

Research Hypotheses and Summary of Results

Following Festinger's Theory of Cognitive Dissonance, three hypotheses were proposed. The first was that respondents will perceive the three dimensions of sustainable agriculture as separate and distinct. Reliability, factor, and correlation analyses were conducted on the three sustainable agriculture scales. The overall reliability of the scales ranged from .62 to .75. A rotated factor matrix confirmed three factors, although a confirmatory factor analysis revealed some minor problems with cross-over of items. The overall model fit, however, was good as indicated by a goodness of fit index of .978. Further, a correlational analysis revealed distinct differences between inter- and intra-scale items. Although, reliability scores were not ideal, they were satisfactory to document the existence of three distinct dimensions of sustainable agriculture. Therefore, Hypothesis 1 was supported.

The second research hypothesis was that the higher respondent's familiarity (with agriculture), the higher their adherence with a particular dimension of sustainable agriculture. Familiarity was measured by an aggregate scale of six individual items and had reliability score of .76. The statistical procedures to test Hypothesis 2 consisted of correlation analyses, t-test procedures, and probit and linear regression models. The correlation between familiarity and adherence (to a single dimension of sustainable agriculture) and a t-test comparing group means associated with familiarity scores revealed that familiarity scores did not explain adherence to a single sustainable agriculture dimension. Probit and general linear regression analyses to "explain" who adheres and who does not revealed that none of the socioeconomic variables tested were statistically significant. Likewise, a t-test

procedure and correlation analysis did not reveal other relationships between adherence and socioeconomic variables. In summary, Hypothesis 2 was not supported.

The third set of hypotheses was that the higher the respondent's familiarity (with agriculture), the greater the relationship between declared political orientation and adherence (to a specified dimension of sustainable agriculture). Using a face validity test, a success rate was calculated. Less than one-fourth of the sample observations were correctly classified. A probit analysis was then conducted to investigate why the classification results were so poor. Again, the socioeconomic variables age and gender were not statistically significant whereas education was leading to inconclusive results. Therefore, Hypothesis 3 was not supported.

The failure to find significant relationships in the empirical analyses can be reviewed from both a conceptual and methodological viewpoint. Regardless, key weaknesses are the result of using a survey instrument (as a secondary data source) for a purpose other than its intended use. Therefore, the question becomes: what should have been the concepts selected and the measures developed for testing Festinger's theory if the constraints of an existing data set had not limited this inquiry?

Clearly, stronger and more germane measures for the sustainable agriculture dimensions are needed. First, the agrarianism scale was assumed to measure sustainability as community. The items used for the agrarianism scale were utilized from previous research (see Dalecki and Coughenour, 1992; Molnar and Wu, 1989) and were found to be multi-dimensional. None of the four dimensions found by Dalecki and Coughenour (1992), however, explicitly defined agrarianism as community. Although an argument was made (in this dissertation) that

agrarianism was a measure of sustainability as community, items are needed (in future research) directly related to the concept of community (as written by sociologists) rather than using agrarianism as a proxy.

Second, the three sustainable agriculture scales were, statistically, found to be separate and distinct. But are these dimensions conceptually distinct? The following example was given in Chapter 2. Farmers have in repeated studies shown that they are concerned about water quality and health issues. At the same time farmers use chemicals to provide a cheap and abundant food source. According to Festinger's theory, people put into this position would feel dissonance and change attitudes and/or behavior. But from a conceptual level, couldn't it be possible to rank high (i.e., have a high favorableness rating) in all three sustainable agriculture scales? That is, isn't it possible to believe that science is good and will take care of the environment while leaving farmers on the farm to support the community? This belief or set of beliefs is conceptually consistent and would show no adherence to one of the dimensions of sustainable agriculture. Therefore, more discussion is needed on the conceptualization of sustainable agriculture and the existence or absence of dimensions.

Third, the concept of social distance was used as a proxy for familiarity. The scale appears to have measured "social distance" well (as indicated by the high reliability score) rather than familiarity. Therefore, a concept for familiarity more closely related to the study issue should be used in future research. That is, a measure more closely related to the practices or activities conducted within a sustainable agriculture versus conventional agriculture farming system should be used.

Fourth, the hypotheses formulated for this dissertation were based on an adaptation of Festinger's theory. Festinger's theory states that cognitions (i.e., beliefs, values, knowledge, etc.) regarding an issue are consistently held by individuals. This dissertation assumed that one type of cognition, beliefs, regarding an issue (i.e., sustainable agriculture) were consistently held. Unfortunately, the data set did not include measures of knowledge or behavior which are essential to a full test of Festinger's theory. Therefore, inconclusive results found here indicate that a full-test of Festinger's theory, as well as theoretical modifications, may be needed.

Methodologically, there were several weaknesses which lead to questions regarding the validity of the measures. First, two of the sustainable agriculture scale reliability scores were slightly under .7 indicating measurement error. The higher the measurement error, the more likely the analyses will lead to inconclusive results. This further leads to the issue whether the sustainable agriculture dimensions are distinct or whether measurement limitations contributed to low reliabilities.

Second, the familiarity scale was comprised of six items ranging from social distance measures of "current ownership of a farm" to "working on a farm at one time". If Festinger's theory is correct that familiarity causes increasing adherence, then a more appropriate measure for familiarity may have differentially weighted the six items. For example, a measure of extreme familiarity such as current ownership could be weighted higher than the less familiar items such as working on a farm at one time.

Third, the survey response rate was less than 40 percent which often calls into question the representativeness of the sample, and therefore the external validity of

the findings. In fact, comparing the sample characteristics to U.S. census data did reveal some significant differences. The low response rate also could indicate that agriculture in general just was not that important of an issue to the respondents. After all, less than two percent of the nation's population live on farms. The survey length (10 pages) and the wide variety of topics covered related to agriculture (i.e., government involvement, environmental issues, food safety, etc.) also may have led to a poor response rate. Focusing on only the meanings of sustainable agriculture, thereby reducing the survey instrument to 1 to 2 pages in length, may increase the response rate substantially for future research. Methods other than mail survey, such as telephone and personal interview, consistently result in response rates double that of this survey.

Implications for This and Future Policy Research

The results of this investigation found the three dimensions to be separate and distinct. This supports the contention that attitudes (as related to sustainable agriculture) are consistently held (Festinger), rather than being fluid, flexible and based on individual nuances (Billig).

This support for Festinger's theory, however, was only partial. The hypothesized relationship with familiarity was not supported, perhaps due to the validity problems addressed earlier. Respondents adhered to only one meaning of sustainable agriculture regardless of familiarity level. Can it then be concluded that individuals hold attitudes consistent regardless of familiarity? Is it possible that by simply asking people to respond to a series of questions that familiarity with the issue, and therefore, consistency arises? If answers to these questions are "yes", then is Festinger's theory appropriate for policy analysis? Probably not. But, these questions cannot be answered by this study. Future research regarding the

relationship between adherence to a single meaning of an issue and familiarity with that issue is needed. Future research also needs to look at making additional adaptations to Festinger's theory, such as those noted earlier (i.e., full cognition set of beliefs, knowledge, etc. versus consistency within a cognition). It is the author's contention that Billig's flexible and fluid attitudinal framework was not supported by the data. But, could there be a middle ground between Billig and Festinger? Are attitudes consistently organized and stable over very short periods of time? If stability is short term, what kind of information or education shifts attitudes? Again, to answer these questions, future research is needed.

In summary, if future research continues to find that attitudes are consistent and that attitudes are predispositions toward behavior, then sociologists have a predictive role in policy analysis. That is, if attitudes are consistent and predispositions to behavior, then public policies can be developed and implemented consistent with attitude-behavior predisposition relationships. The behavioral change required to bring about the desired social change then can be reasonably anticipated *a priori*.

What implications, then, do these results and proposed future research needs have for sociological theory-building as related to policy analysis? It is the author's contention that adaptations to Festinger's theory need to continue. In particular, more work is needed on the causes (i.e., the independent variables) and the duration (i.e., stable over short or long term) of consistent attitudes. That is, as sociologists we need to know how stable or fluid attitudes are as they relate to policy issues.

Along with examining models similar to this dissertation, it is also believed that alternative models and theories need to be examined. For example, the Fishbein-

Ajzen model has been used quite extensively in recent years (Sabini, 1992) and its use toward policy analysis could be substantial. Unfortunately, the Fishbein-Ajzen model, compared to Festinger's theoretical framework, is quite complex. In its general form, the model states that behavioral intentions are a function of the attitude toward the act and subjective norms (Sabini, 1992). Behavioral intentions, in turn, affect behavior through intervening variables (e.g., socioeconomic variables).

Additional research (Sapp and Harrod, 1989) have added other variables to the model such as social acceptability (which is a measure of influence by a reference group). The model has been extensively used particularly in consumer attitude studies.

The Fishbein-Ajzen model, with its multiple levels of causation, has more statistical rigor than models based on Festinger's theory. That is, the model would compare, from a statistical sense, to those derived by economists (i.e., econometric models). Unfortunately, there often is an inverse relationship between model complexity and ease of understanding. To the policy maker, Festinger's theory may then be seen as more simplistic and understandable and, therefore, more apt to be integrated into policy decisions. Notwithstanding this limitation, future research is needed to determine whether the Fishbein-Ajzen model (or an adaptation to it) can be consistently applied to policy issues.

Additional social psychological theories that should be examined for relevance are social learning theory (as applied to adoption and diffusion of innovations, see Rogers, 1983), reference groups and their impact on individual attitudes, and social exchange theory (Rosenberg and Turner, 1981). Each of these theories attempts to

explain how individuals change attitudes based on experiences received, persuasion felt, or benefits obtained.

Social learning theory has predominantly involved the use of demonstrations to illustrate the advantages or disadvantages of an action or practice (Rogers, 1983). As such, learning and ultimately behavior, occurs through interpersonal networks as information is transferred (i.e., exchanged) from one individual to another. The researcher using this theoretical framework would study the information network and how the individual uses it rather than a cross-section of individual attitudes. Therefore, research on opinion leadership, the importance of change agents, and reference groups have been at the center of this theory as it applies to adoption and diffusion of information.

Reference group and exchange theories, like social comparison theory, emphasize interpersonal communication and networks. These types of theories have worked well with adoption-diffusion models. The limitation for these models is not in their predictive ability, but in their methodology. Typically, studies using these theories are conducted over a period of months and years, and therefore, may have limited usefulness (i.e., lack of timeliness) toward policy analysis. An exception may be with those policies, such as the agricultural farm bill, which are renewed every few years.

The emphasis on social psychological theories here does not infer that middle range theories such as social movement theory, or a range of social organization theories do not have relevance to policy analysis. Rather, it simply implies that it is my contention that the payoff may be higher analyzing the individual as sociologists attempt to "explain" how changes in attitudes alter behavior. Others may disagree.

Finally, concerning sustainable agriculture as a policy issue, these findings indicate that attitudes toward sustainable agriculture are consistently-held among individuals. Once these results can be predicted based on a theoretical framework, research can be added to determine which dimension of sustainable agriculture is emphasized over the others. As stated earlier, without a theoretical grounding based on theory (attitudinal in this case), research showing aggregate preferences is no different than opinion polling (i.e., evaluative research). Social psychological theory (as discussed in this study) is needed so that the policy corresponding to the preferred meaning could be implemented to induce the desired social change.

It is the author's contention that this study, with its focus on attitude consistency, was only a first step toward developing a sociologically-based predictive model for policy analysis. It is hoped that further research continues where this study ended. That is, more research is needed to develop better constructs for familiarity, substantiate the relationship between familiarity and adherence, and continue research efforts in attitude-behavior relationships. With this total package at hand, sociologists can make additional contributions toward predictive ("knowledge for") policy analysis.

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