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An Integrated Framework: Applying Attitude Theory to Environmental Concern & Public Support for Environmental Policy

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I am submitting herewith a thesis written by Aaron Scott Routhe entitled "An Integrated Framework: Applying Attitude Theory to Environmental Concern & Public Support for Environmental Policy." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Social Work.

Robert Emmet Jones, Major Professor

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Sherry Cable, David L. Feldman

Accepted for the Council:

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Vice Provost and Dean of the Graduate School

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Robert Emmet Jones
Robert Emmet Jones, Major Professor

We have read this thesis and
recommend its acceptance.

Sherry Cable

David L. Feldman

Acceptance for the Council:

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Studies

(Original signatures are on file with official student records.)

**AN INTEGRATED FRAMEWORK: APPLYING ATTITUDE THEORY TO
ENVIRONMENTAL CONCERN & PUBLIC SUPPORT FOR
ENVIRONMENTAL POLICY**

A Thesis
Presented for the
Master of Arts
Degree
The University of Tennessee, Knoxville

Aaron Scott Routhe
August 2003

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Abstract

There is increasing public debate over how to meet future water supply needs in historically humid, water-abundant areas such as the southeast United States. Citizens and policymakers struggle to reach accord on the appropriate environmental policy proposals for meeting those needs and the political strategies for implementing them. This study examines the social-psychological factors affecting environmental policy by developing a heuristic framework that integrates the recent conceptualization of environmental concern by Dunlap and Jones (2002) with the attitude-behavioral theories of Ajzen (1985) and Fishbein (Ajzen and Fishbein, 1980). Specifically, it tries to understand and predict expressions of public support (i.e. intentions or commitment) for building a dam to meet water supply needs in Cumberland County using the Theory of Planned Behavior. The linkages postulated by the theory are empirically tested using the survey responses from a random sample of 433 county residents age 18 and older. Results indicate people's attitudes towards building a dam and subjective norms are highly predictive of their expressions of support (i.e. intentions) for building a new dam to meet the county's future water supply needs, explaining sixty-one percent of its variance at the highest level of significance ($p < .001$). They also demonstrate that while overall public support for building a dam is weak, knowledge of residents' attitudes towards its construction provide us with a good understanding of their level of support. In addition, the findings suggest that people believe they have some degree of personal control over behaviors that express their support or opposition. Overall, the study demonstrates the Theory of Planned Behavior is useful for understanding the social-psychological determinants of public support for environmental policy related to water supply proposals such as building a dam. Furthermore, by integrating the theoretical components of the theory with the affective, cognitive, conative, and behavioral dimensions of environmental concern, it is possible to employ an explanatory framework based on attitude theory and apply it to an environmental problem, i.e. meeting water supply needs. Examining public support and concern for the environment with a heuristic framework such as this may yield theoretical and policy-relevant results that would be of interest to researchers of environmental concern, attitude theorists, decision-makers, and the general public.

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Chapter I: Introduction

Environmental policy is not simply based on technical information about the ecological characteristics of natural resources. It is also shaped by macro-sociological factors such as the decision-making processes institutionalized in management agencies and micro-sociological factors such as the beliefs and attitudes of people managing natural resources. Environmental policy is created, constrained, and implemented within *both* social and natural systems. Its effectiveness for addressing environmental problems is hampered when policy and management agencies are not adaptive to changing social and natural conditions (Gunderson and Holling, 2002; Holling, 1995). Traditional environmental decision-making divided the management of natural resources among various jurisdictions, emphasized selective utilitarian values, and limited participation in the decision-making process to agency officials, technical experts, and select constituent groups. The resolution of many environmental problems such as the depletion of shared water supply sources is no longer effectively achieved through a fragmented management approach that solely emphasizes understanding natural systems. Demands for increased participation by those excluded from environmental decision-making strain the traditionally centralized management strategy focusing on the collection and analysis of data about the ecological characteristics of natural resources. As the decision-making process becomes more democratic, the advocacy of other social values such as the intrinsic value of natural resources, the needs of fish and wildlife, and more equitable policy outcomes increase the potential for environmental conflict and the need to better understand the social forces influencing the management of natural resources (Cortner and Moote, 1999).

In response to these changing social and natural conditions, many now advocate a more regional, ecosystem-based approach, emphasizing collaboration among management and political jurisdictions with authority for managing a given natural resource, and more democratic decision-making (e.g. Wondolleck and Yaffee, 2000). In contrast to the traditional approach, these collaborative natural resource management efforts are “multiparty natural resource management projects, programs, or decision-making processes using a participatory approach” (Conley and Moote, 2003:372). However, this alternative approach is not necessarily a panacea for addressing environmental problems. There remain many social and political barriers to transforming the traditional management paradigm. For example, environmental conflict occurs “when one or more parties involved in a decision-making process disagree about an action that has the potential to have an impact on the environment” (Blackburn and Bruce, 1995:1). A more participatory

decision-making process increases the number of participants with different views about the impact of a particular policy on a natural resource. These different views about a policy's possible outcomes can impede collaborative management if attention is not paid to the beliefs and attitudes on which they are based. In addition, the willingness of decision-makers to participate in more democratic and participatory decision-making processes is often contingent on public support (Wondolleck and Yaffee, 2000:203).

Current U.S. environmental policy is marked by tension between the requirements of "technical competence and a participatory process", and the reality of "interest group intermediation and net welfare maximization" (Daniels and Gregg, 2001:4). Thus, environmental policy is ultimately the *social* management of natural resources. Participants in decision-making processes use technical information about the ecological characteristics of natural resources to advocate particular means and ends based on beliefs, attitudes, and values about the societal and environmental benefits provided by the resource. This suggests a fundamental task for establishing effective and adaptive environmental policy is to add to the knowledge of how social systems shape and impact the management of natural resources. Consequently, a better understanding of the major social factors that influence public support for environmental policy may help efforts to establish collaborative, regional, and ecosystem-based management strategies for natural resources such as water resources. One set of these factors is the social-psychological determinants of people's behavior.

This study examines the social-psychological factors affecting environmental policy. It does so by developing a heuristic framework that integrates the recent conceptualization of environmental concern by Dunlap and Jones (2002) with the attitude-behavior theories of Ajzen (1985) and Fishbein (Ajzen and Fishbein, 1980). It then applies this framework in order to understand public support for a specific water supply policy proposal in Cumberland County, Tennessee. It attempts to understand and predict expressions of public support (i.e. intentions or commitment) for building a dam to meet water supply needs in Cumberland County. This has both theoretical and practical implications. While much environmental concern research examines a single dimension or expression of public concern for the environment, few explore how these dimensions relate to one another based on a social-psychological model of attitudes and behavior. Researchers examining environmental concern approach it from a variety of disciplinary perspectives. They focus more on practical policy implications rather than theory. According to Dunlap and Jones, this approach has resulted in most of these studies being "... ad hoc and atheoretical ..." (2002:42). Their recent review of environmental concern research

identified several facets or dimensions of environmental concern based on attitude theory. They found that many of the policy-directed studies use affective, cognitive, conative, or behavioral indicators to measure this concern, but rarely employed attitude theory to examine and understand the relationships between them. Thus, this study integrates Dunlap and Jones' multi-dimensional conceptualization of environmental concern with the attitude theories of Ajzen and Fishbein.

The theoretical linkages postulated in the Theory of Planned Behavior and the Theory of Reasoned Action are tested using the survey responses of a random sample of Cumberland County adults. The study assesses how people's attitudes towards building a dam, their perceptions of social pressure to support it, and their perceptions of personal control influence their expressions of support (i.e. intentions or commitment) for its construction. In addition, it also explores people's beliefs regarding the outcomes of building a dam, beliefs about whether specific individuals important to them think they should support it, and beliefs regarding whether they have the necessary resources to successfully express support for its construction. By not only identifying public support for building a dam, but also understanding the social-psychological determinants of this support, and how different aspects of people's environmental concern influence their expressions of it, this study has practical policy implications as well.

Citizens and decision-makers in Cumberland County are trying to reach accord on what alternatives are appropriate for meeting the future water supply needs of the county, and what political strategy should be employed to implement them. Environmental factors, such as drought and few new sources of supply, force water users with competing in-stream and off-stream needs to compete for available supply. Social factors such as the public acceptability of and support for building a dam constrain the feasible options available to decision-makers. Meeting the needs of communities such as this is becoming increasingly challenging – even in historically water-abundant regions such as the southeast United States. The public is most familiar with the historical method employed by traditional water policy planners of constructing impoundments to meet rising water supply demands, while it is increasingly difficult to obtain regulatory permits and build them. Thus, it is important not only to identify public support for building a dam to meet water supply needs, but also to comprehend its social-psychological determinants as a way of understanding public opinion and potentially to resolve water supply disputes. Consequently, this study should yield results that would be of interest to researchers of environmental concern, attitude theorists, decision-makers, and the general public.

Overview

The remainder of the thesis is organized in the following manner. Chapter II presents an overview of the complex environmental and social context for meeting water supply needs by examining four issues that frame most water supply disputes in the southeast United States. They include: 1) questions about water sources, needs, and uses that decision-makers face when trying to meet supply needs, 2) factors driving rising demand, 3) the legal foundation for the water rights of users and the primary differences between two strategies for developing water resources, and 4) the challenges and barriers to implementing these strategies to meet water supply needs. Chapter II concludes with a case study description of Cumberland County, Tennessee – the study area of the project. Chapter III outlines the study's theoretical framework by reviewing some conceptual issues related to the historical research approaches for understanding environmental concern and presenting a multi-dimensional conceptualization of environmental concern by Dunlap and Jones (2002) based on attitude theory. This is followed with a review of Icek Ajzen's (1985) Theory of Planned Behavior and its predecessor, Martin Fishbein's (1967) Theory of Reasoned Action. The chapter ends by demonstrating how the Theory of Planned Behavior can be used to understand public support for environmental policy. Chapter IV details how the mail questionnaire used in the project was designed, the theoretical components of the theory were operationalized, and the sample for the study obtained. Chapter V presents the findings and results of the study. It begins with those obtained for people's expressions of support (i.e. intentions or commitment) and follows with those for other dimensions of environmental concern (i.e. the theoretical components of the Theory of Planned Behavior). These include attitude towards building a dam, subjective norms regarding expressing support for its construction, and perceptions of personal control for expressing support. A summary of the findings and univariate statistics for all of the variables in the theory concludes Chapter V. Chapter VI examines the theoretical and practical implications of public support for environmental policy with the heuristic framework employed by this study. It explores how this framework contributes to better understanding the social-psychological determinants of public support for environmental policy, the correspondence between a model of attitudes and behavior with the multiple dimensions of environmental concern, the practical policy implications for meeting water supply needs, and avenues for future research. Finally, the thesis includes appendices of the research instruments.

Chapter II: Meeting Water Supply Needs

The southeast United States is a region of abundant water resources. However, rising demands by multiple users for water withdrawn from the same source create environmental and societal challenges to meeting future supply needs (Arrandale, 1999). Disputes among surface and groundwater users become turbulent when environmental conditions such as drought reduce the total available water supply. They are further exacerbated when societal factors such as public support constrain the actions of decision-makers trying to simultaneously meet in- and off-stream needs. These conditions create a context for environmental conflict in which citizens, stakeholders, and decision-makers debate what methods to use to meet water supply needs and the political strategy to implement them. Under these conditions, meeting the needs of society and protecting the environment becomes a “wicked” policy dilemma.

Water policy problems are wicked, not in an ethically deplorable sense, but ... because they involve multiple definitions as to their nature, because they are the object of multiple and conflicting criteria for defining solutions, because the “solution” to one interested party is a “problem” for others, and because there are no obvious stopping rules that define when enough has been accomplished (Freeman, 2000:483).

Chapter II presents four major issues that frame an escalating number of debates in communities of the southeast United States about how to meet future water supply needs. The purpose of the chapter is to provide a broad overview of the complex social and natural systems in which environmental policy for meeting water supply needs are embedded. The first issue involves three intertwined questions at the core of most water supply disputes: where will the water come from, where is it needed, and how consumptive are different uses? Another issue is the various factors contributing to rising demands for supply. A third is how water rights are ascribed to users and the development strategies employed to meet supply needs. Finally, a fourth issue is the barriers and constraints citizens and decision-makers face when trying to reach accord while both meeting the water supply needs of society and protecting the natural environment. Chapter II concludes with an overview of how these issues are visible in the project’s study area, Cumberland County, TN.

Water Sources, Needs, & Uses

Despite the apparent ease at which clean, cold water flows from the taps and faucets of most homes, businesses, and industries in the United States, it takes planning, organization, and money to transport water from its source to a user. One of the first questions requiring an answer

in any water supply discussion is from where will the water come? Water supply is obtained from either surface or groundwater and is originally either freshwater or saline. In the Southeast, freshwater is the predominant supply, with its source varying by state. For example, Alabama uses fifteen times more surface freshwater, while Mississippi uses more than five times more groundwater. In 1995, Tennessee withdrew the largest quantity of freshwater within the Southeast, approximately 10 billion gallons daily (Feldman and Albertson, 2003:15). The use of saline water for supply is marginal and restricted to only a few coastal states. Florida is the largest user of surface saline water with 11,000 million gallons withdrawn per day (Solley, Pierce, and Perlman, 1998:9). While overall demand for the nation's available water supply historically increased over time, total water withdrawals decreased from 1980 to 1995 – despite a 16% percent population increase over the same 15 year period. In 1995, the total volume of water withdrawn from surface sources, including saline and reclaimed wastewater, equaled 1990 estimates; the total groundwater withdrawal was reduced by 12 percent due to reductions in water use related to the passing of the Clean Water Act (Solley, Pierce, and Perlman, 1998).

As potential supply sources are identified, a second task facing decision-makers is how to allocate the total available water supply among various in- and off-stream needs. In-stream needs are defined as “a water use occurring within the stream channel for such purposes as hydro-electric power generation, navigation, fish and wildlife preservation, water-quality improvement, and recreation.” (U.S Geological Survey, 2002b) More recently, in-stream uses also include the intrinsic and aesthetic values of a free-flowing stream (Feldman, Albertson, and Nickell, 2001). Off-stream needs are “water use that depends on the diversion or withdrawal of water from a surface- or ground-water source and conveyed to the place of use.” (U.S Geological Survey, 2002b) These are uses such as public supply, domestic, commercial, irrigation, livestock care, industrial production, mining, and thermoelectric power generation. The largest off-stream use in the Mid-Atlantic and South Atlantic-Gulf Region is for thermoelectric power generation (Solley, Pierce, and Perlman, 1998:6). The first need, or water use, pursued in federal water supply planning was developing inland waterways for navigation (Feldman, 1995:8). In recent decades, others such as wetlands protection were incorporated into the official missions of federal management agencies (Cech, 2003:222).

While in- and off-stream needs symbolize the potential human and ecological purposes served by water supply, a third aspect decision-makers must consider in water supply planning is the consumptiveness of a given use. Consumptive use is “the use of water in a manner that makes it unavailable for use by others, generally because of absorption, evaporation,

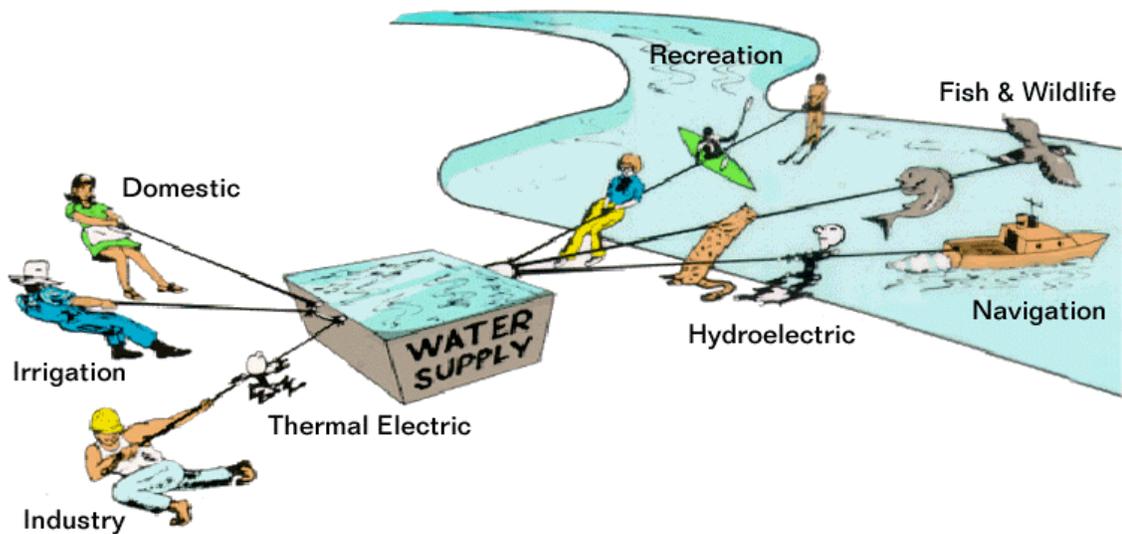


Figure 2.1: Conflicts Between In-stream & Off-stream Needs
(Armbruster, 1998)

transpiration, or incorporation into a manufactured product”¹ (Feldman and Elmendorf, 2000:91). Within the Southeast, Florida, Mississippi, and Georgia have the greatest freshwater consumptive use, while Virginia, Kentucky, and South Carolina have the least (Solley, Pierce, Perlman, 1998:9). Some of the most consumptive water uses in the Southeast are agricultural irrigation (Feldman and Albertson, 2003:15) and combined-cycle wholesale electric generating plants (Routhe and Feldman, 2003). In contrast, non-consumptive uses are those such as hydrological power generation that do not remove water from a river, but simply direct it through a generating station’s turbines (Solley, Pierce, Perlman, 1998:54). In summary, as Figure 2.1 illustrates, in- and off-stream users compete for a finite volume of available water supply to meet their corresponding needs.

Water use trends have fluctuated over time in the Southeast and in Tennessee. The United States Geological Survey (USGS) is the federal agency responsible for tracking water use across the nation and providing water resource data for decision-makers (U.S. Geological Survey, 2002b). National water use estimates² were not available until 1950 when the USGS began its

¹ “In some instances, when water is returned to a stream at a distance downstream from the point of diversion, the use may be consumptive as to users immediately below the point of diversion, but non-consumptive as to users below the point where water is returned.” (Feldman and Elmendorf, 2000:91)

² The USGS only compiles data for the following uses: public supply, domestic, commercial, irrigation, livestock, industrial, mining, and thermoelectric (Solley, Pierce, and Perlman, 1998).

Water Use Program (Solley, Pierce, Perlman, 1998:62). However, the predominant historical purposes of supply can be inferred from the legislated missions of the first federal agencies tasked with managing the nation's water resources. For example, the oldest federal water resource agency is the U.S. Army Corp of Engineers (USACE), which began training new federal engineers in 1802. Responding to regional concerns, including in the Southeast, its original mission consisted only of flood damage control and navigation improvement activities such as building levees (Cech, 2003:222). Also in the Southeast, the Tennessee Valley Authority (TVA) in 1933 became, and remains, the foremost federal entity involved in the region's water supply planning. Its core mission was ensuring minimum river depths for the navigational use of Tennessee River Basin's waterways. Other legislated objectives were flood damage control, water supply, recreation, and irrigation and providing low-cost electric power (Nelson, 2003:173).

Drivers of Demand

The expressed needs of water users represent an implied demand for water to meet competing in-stream and off-stream needs. For example, an association of golf course operators will seek to ensure they have adequate supply for irrigation purposes. The second major issue in debates about how to meet future water supply needs is the influence of environmental and societal factors on rising demand. These include such factors as drought, population growth, urbanization, lack of available supplies, and minimum flow requirements.

Recurring or extended drought reduces the total available supply of renewable water. As supply declines, demands by current users become more strident. For example, in the Dalton area of north Georgia, severe drought in recent years, in conjunction with rapid population growth, are driving efforts to obtain adequate water supply to simultaneously sustain the region's extensive carpet industry and population growth. This has led to efforts to obtain additional water supply from sources outside the state such as Tennessee (Feldman and Albertson, 2003:23).

Population growth drives demand for water primarily when there is a concomitant increase in the amount of publicly supplied water (Feldman, Heinrich, and Route, 2003). Public supply is "water withdrawn by public and private water suppliers and delivered to multiple users for domestic, commercial, industrial, and thermoelectric power uses" (Solley, Pierce, and Perlman, 1998:20). Rapid population growth strains existing capacity by increasing demand for residential, commercial, and industrial water use. One important aspect for water supply planning is understanding what factors contribute to population growth. For example, population growth

has been linked to areas with environmental amenities such as less urban development, green forests, blue lakes, and increased recreation opportunities (Jones, Fly, Talley, and Cordell, 2003). Thus, areas high in environmental amenities but with less developed water supply and treatment capacities are susceptible to water supply shortages resulting from demands associated with rapid population growth.

Linked with population growth is urbanization. The direct effects of urbanization on water quality indirectly impact water supply issues (Feldman and Albertson, 2003:23). Increased concentrations and volume of pollutants may need to be mitigated with larger volumes of more pristine water in order to meet water quality requirements. When the volume of urban pollution remains constant or increases while the total volume of a stream declines, pollution by upstream users negatively impacts the water quality downstream (Pringle, 2000). This may force downstream users to consider a costly choice: either treat water after withdrawal and before using it for public supply purposes, or seek a new source.

Identifying new, untapped water sources is increasingly difficult, even in water-abundant regions like the Southeast (Arrandale, 1999). The decline in available new supplies in the Southeast induces decision-makers to consider more distant locations as potential sources, often outside their own river basins. Consequently, this increases competition among decision-makers and users as they seek to maintain existing water use level and sustain future growth (Feldman, 2001:2).

A final driver of demand is minimum flow requirements or increased in-stream appropriations. These are government-mandated allocations of water to meet in-stream needs such as fish, wildlife, scenic beauty, waterborne recreation, environmental protection, or similar purposes (Feldman and Elmendorf, 2000:93). For example, in Virginia, the U.S. Army Corps of Engineers is evaluating the effects of alternative reservoir release schedules on the whitewater rafting industry. "Recent legislation in most states calls for substantial increases in in-stream flows to meet a variety of human and environmental needs" (U.S Geological Survey, 2002b). These requirements may limit the actual amount of the renewable supply available for use (U.S Geological Survey, 1984), therefore increasing the demand by off-stream users for an adequate allocation of water from the remaining available supply.

Water Law & Management Strategies

Efforts by water users to obtain adequate supply and the actions of decision-makers to meet in-and off-stream needs are influenced by two cultural forces. One is the ascription of water

rights to users institutionalized in law. The second is the institutional characteristics of development strategies embedded in different water resource management approaches. A water right is a “legally enforceable right to use water and typically refers to the right to water from a naturally occurring source, such as a stream, river, lake, or aquifer.” (Feldman and Elmendorf, 2000:96) The legal traditions delineating water rights in the United States flow from English common law (Reuss, 1993). From this, two types of water law emerged in the western and eastern U.S. West of the Mississippi River, water law is primarily based on prior appropriation doctrine, while east of it, the riparian doctrine predominates (Haber and Bergen, 1958)³.

Literal interpretation of riparian law that is based on common law restricts its application to surface water flowing in a defined watercourse; however, in practice (e.g. Georgia) it is also applied to groundwater (Dellapenna and Draper, 2002). Essentially, it ascribes “riparian rights” to water users and establishes the “right of the owner of land abutting a stream or other natural body of water to use such water. Originally, every riparian or surface water user had a right to the natural flow of the stream, ‘undiminished in quantity and unaffected in quality,’” (Feldman and Elmendorf, 2000:96). Traditionally, riparian law gives preference to domestic uses such as household water use over ‘artificial’ uses such as commercial irrigation or manufacturing. (Feldman and Elmendorf, 2000:92)

One important aspect of riparian law is the “reasonableness test,” an assortment of traditional criteria used by judicial courts to adjudicate disputes between one riparian’s water use against another’s claim of injury.⁴ The reasonable use doctrine displays weaknesses in that there is no mechanism for balancing one user’s groundwater rights with another’s (Tarlock, 1988). Thus, surface riparian law was extended to groundwater use by requiring the equitable sharing of shortages of overlying landowners through the Correlative Rights Doctrine (Grigg, 1996). This essentially balances the rights and needs of groundwater users against one another in a manner similar to surface water users (Reuss, 1993).

Riparian law in the Southeast has undergone many modifications. Using statutory legislation, most Eastern states now have some form of regulated riparian law (Tarlock, 1988). For example, Florida eliminated private riparian rights and transferred them to the state under a 1972 Water Resources Act (Lynne, Milon, and Wilson, 1990:669). Federal legislation also

³ For more comprehensive descriptions of riparian doctrine and water allocation in the Southeast see Getches, 1990 and Walker, 1984.

⁴ “The traditional factors employed for the ‘reasonableness test’ include the purpose of the use of water, its sustainability to the water body, its economic value, its social value, the harm the use causes, its potential

mandates the protection of water quality by curtailing a riparian’s historic right to a stream’s ‘unaffected flow’ to allow all riparian landowners to withdraw water for ‘reasonable’ use on their riparian lands (Feldman and Elmendorf, 2000:96). In Tennessee, one of the least regulated southeastern states, water law is primarily based on common law and little legislation (Jones, 1983; Public Administration Service, 1956; Sheridan, 1963).

With water law delineating, sometimes ambiguously, the rights of water users, federal, state, and local institutions each play a role in developing the nation’s water resources. Numerous federal agencies such as the Army Corps of Engineers, Bureau of Reclamation, and Geological Survey assist in meeting the water supply needs of society by constructing and managing development projects. In contrast, other federal agencies such as the Fish and Wildlife Service, National Park Service, and the Environmental Protection Agency are interested with ecological concerns (Cech, 2003:221). Under modern statutes, state agencies regulate the acquisition of new water rights or changes in the use of water (Feldman and Elmendorf, 2000) through administration of regulatory programs (Grigg, 1996:161). Finally, municipalities and water utility districts, under local control, are responsible for delivering water to users in compliance with state and federal regulations (Cech, 2003:264). As Table 2.1 indicates, federal involvement in water supply planning and its relationship with the states has changed through the years. Today, “the states and local governments in the modern era are the primary agents responsible for water development, planning, and management” (Marshall, 2000:58).

The second major cultural force influencing how water users obtain adequate supply and decision-makers meet supply needs is the institutional characteristics of different strategies for

Table 2.1: Evolution of Federal Water Supply Planning

Est. Years	Period
1804-1878	Formative development of federal intervention in response to specific regional needs
1879-1932	Federal-state cooperative planning era following Civil War with a primary focus on navigational improvement
1933-early 1960	Multi-program era characterized by the establishment of national priorities
1960s-1980s	Effort to “federalize” planning through Presidential-level coordination
1980s to present	New federal-state partnership marked by increased sensitivity to environmental protection and habitat restoration

(Feldman, in press: 2)

for coordination with competing uses, its temporal priority relative to competing uses, and the justice of imposing loss on the use.” (Feldman and Elmendorf, 2000:19)

managing water resources. These differ in two fundamental aspects: the management approach for developing water resources and the decision-making process employed to assess the views of water users. The management approach for traditional water supply planning is a fragmented and technocratic strategy. Traditional water policy is fragmented because it is implemented according to political boundaries from the federal to the local level that bisect water resources flowing across and through multiple jurisdictions (Marshall, 2000:63). The strategy proves technocratic because the typical response to user demands with water resource concerns is a structural solution crafted by engineers (Feldman, 1995:9). It was typically implemented in the following manner: Water users such as floodplain farmers clamor for relief from recurring disturbances, i.e. floods in a regional river system. Technical and engineering experts then plan and construct a structural solution designed to eliminate a specific threat. The purpose of the plan is to control a single environmental variable such as river flow for a specific outcome such as increased crop yields to local farmers. The success of the management policy is then determined by comparing its actual outcomes with these select social benefits. Once the structural solution is in place, the objective of the managing agency becomes maintaining or increasing operational efficiency, lowering its responsiveness to changing environmental and social conditions (Holling, 1995).

The decision-making process of the traditional development strategy is exclusive in participation and homogenous in values. Participation in the supply planning process is limited to decision-makers and agency officials who solicited input from a limited constituency of water users (Wilkinson, 1992:21-22). This narrow set of interests shares common utilitarian and development-oriented values (Feldman, 1995:2). Thus, with minimal differences in attitudes, values or value priorities, there is minimal disagreement about how to develop water resources among participants in the decision-making process.

Federal management agencies such as the USACE and USGS emphasized this “supply management approach” for meeting a narrow set of society’s water needs for approximately 100 years. However, overall demand for off-stream use began shifting from rural irrigation to urban public supply, while greater demands were voiced for in-stream needs such as recreation, habitat protection, and improving water quality (U.S. Geological Survey, 2002a). As demands changed, alternative development strategies emerged for developing water resources and management agencies began focusing on new needs. For example, additional in-stream and off-stream needs such as wetlands protection and environmental restoration were incorporated into the USACE’s mission (Cech, 2003:222).

An alternative strategy for managing water resources to meet supply needs is a social ecological approach. From this perspective, the influence of “cultural values, societal beliefs, social institutions, personal attitudes, technology, and the natural environment” each must be considered when trying to manage water resources (Hayden, 1993). Applied to water resource management, its approach is an integrated and dialogue-oriented strategy. Examples of this approach include watershed management (e.g. Marshall, 2000) and river basin planning (e.g. Margerum, 1997). Similarly, the integrated water-resources management approach emphasizes the “traditional supply-management options with demand-management options” (U.S Geological Survey, 2002b). This strategy is an integrated approach because it emphasizes inter-jurisdictional coordination of agencies and institutions sharing a common inter-connected water resource. For example, in Tennessee, the Cumberland River Compact seeks to “educate and facilitate cooperation between citizens, businesses and agencies across Kentucky and Tennessee” (Farnsworth, 2002).

The decision-making process characteristic of this alternative strategy encourages the participation of multiple users with a broader range of attitudes and values towards water resources (Wilks-Duncan, 2000). In the Southeast, the Southeast Watershed Roundtable and Forum typifies this aspect of fostering dialogue (Feldman and Hanahan, 1999a; Feldman and Hanahan, 1999b). The types of organizations interested in water supply issues run the gamut from public (e.g. water utility district) to private (e.g. conservation organization), federal (e.g. U.S. Army Corps of Engineers) to local (e.g. a municipality), business (e.g. industrial production) to recreational (e.g. white-water rafting), and economic (e.g. inland navigation) to non-economic (e.g. habitat protection). Each of these represents different in- and off-stream needs and varies in the consumptiveness of their particular use. For example, in-stream users such as hydroelectricity producers and recreation enthusiasts compete with off-stream users such as homeowners and farmers. With stakeholders like these increasingly participating in the decision-making process, the water policy process becomes more complex and challenging (Feldman, 2000).

Challenges & Barriers

In water supply planning, there is truth to the adage, “nothing fails like success.” C.S. Holling (1995) terms this phenomenon “the pathology of effective management.” While initially effective for meeting narrow management objectives, the traditional strategy for managing water resources is increasingly challenged by the fragmentation and variation of natural and social systems. This fragmentation and variation takes many forms. Boundary fragmentation refers to

the multiple geographic (e.g. sub-watershed, watershed, river basin) and political (e.g. city, county, state, Native American Nation) boundaries with which decision-makers must contend with when implementing a management strategy. Spatial and temporal scales (Yoffe and Ward, 1999) refer to the nested properties of ecosystems that exist at sub-watershed, watershed, and river basin levels. Temporal scales represent the different time intervals at which data is collected about water resources. Value variation is the broader array of values and value priorities (e.g. utilitarian, justice, preservation values) included in the decision-making process. Cultural fragmentation represents the different ways water users are socially organized (e.g. downstream/upstream, rural/urban) and how this influences their participation in the decision-making process. Finally, information fragmentation refers to the different forms of knowledge (e.g. ecological/cultural, local/non-local, technical/non-technical) available for managing water resources. In addition, available information often proves inadequate because of a high degree of uncertainty (Blattner and Ingram, 2001). As this fragmentation and variation increases, the emphasis of the traditional strategy on narrow management objectives for specific benefits becomes less adaptable to the myriad environmental and cultural constraints facing water supply planners (Holling, 1995).

In the Southeast there exists environmental, economic, legal and regulatory, and social-political constraints to meeting water supply needs (see Table 2.2). Environmental constraints, strictly speaking, are the limitations imposed by naturally occurring events or the innate physical properties of water. Thus, they include drought, the hydrological characteristics of water, and its geological distribution. Drought effectively reduces the total available supply in a surface water source and slows the recharge rate of groundwater sources. Another environmental constraint is the hydrological characteristics of water such as its flow properties and renewal rate. The natural flow of streams from a source to downstream users creates potential conflict between upstream users and those downstream who must draw treated wastewater for their supply. When

Table 2.2: Constraints on Water Supply Planning

Constraint	Example
Environmental	Drought, flow, geological distribution of groundwater, renewal rate
Economic	Cost of needs assessment studies or replacing water infrastructure
Legal	Limits on impacts to endangered species, federal water rights
Regulatory	Water quality and Total Maximum Daily Load (TMDL) requirements
Social	Public awareness and concern, data issues, competing user values
Political	Jurisdictional fragmentation, public acceptability

withdrawal rates exceed renewal rates the available water supply⁵ is reduced as the total volume of a source declines. This is especially salient in the case of groundwater sources such as aquifers (Allen, 2001:164). Finally, the geological distribution of groundwater sources determines its availability and how easily municipalities can utilize it for public supply. In areas with karst terrain, e.g. Tennessee, municipalities augmenting their sources of supply may encounter legal challenges from landowners adversely affected by withdrawal (Richardson, Jr., 2002).

Economic constraints include costs associated with conducting needs assessment studies, upgrading and replacing distribution and treatment infrastructure, and implementing methods for meeting future supply needs. For example, when a local municipality is considering a U.S. Army Corp of Engineer reservoir as a potential new source, federal regulations require them to conduct a needs assessment and consider the feasibility of all available alternatives (Routhe, Heinrich, Feldman, and Jones, 2003). A second economic constraint is the cost of upgrading or replacing aging water distribution and treatment infrastructure. With few available new sources and rising user demands, attention is turning towards reducing the percentage of unaccounted water (UAW) lost when transporting it from a source to a residential or business user. In Tennessee, the average UAW loss of a utility is 16.4% (Feldman and Albertson, 2003:29). A recent report on the potential funding gap for clean water and drinking water infrastructures in the U.S. notes that water providers with small customer bases lack the economy of scale necessary to accommodate the cost of installing and maintaining infrastructure. The potential gap between the projected need and spending levels for clean water and infrastructure systems suggests providers may have to increase spending and employ innovative management strategies in the future (US EPA, 2002:43). Finally, some methods for meeting supply needs simply are more costly than others. For example, the most expensive alternative for meeting the water supply needs of Cumberland County, Tennessee is building a new impoundment on the Caney Fork River at an estimated cost of \$63.5 million dollars (U.S. Army Corp of Engineers, 1998).

There are also legal and regulatory constraints. These encompass restrictions stemming from legislation, judicial opinions, or regulatory rule making. They include federal water rights issues, habitat protection, in-stream flow requirements, and limitations on inter-basin transfers. Federal water rights can supercede those of local municipalities and limit the development impact on streams within federal jurisdictions such as national parks (Routhe, Heinrich, Feldman, and Jones, 2003). The protection of endangered species is often characterized as an environmental

⁵ Available water supply is “the quantity of water in a stream or groundwater basin, over and above the quantity needed to supply all water rights and demands” (Feldman and Elmendorf, 2000:91).

constraint. However, strictly speaking, a species protected under the Endangered Species Act represents social values formalized in legal code. Regardless, protecting or enhancing habitat mandated by the ESA also limits development impact on streams containing endangered species (Cech, 2003:240). Increasing or maintaining in-stream flows can also constrain efforts to meet water supply needs. For example, less water is available for off-stream use during periods of drought if in-stream uses such as habitat preservation, recreation, navigation, aesthetic, public health uses must also be maintained (Feldman and Albertson, 2003:45). Finally, decision-makers sometimes seek to augment existing supplies by transferring water from another river basin. However, states in the Southeast such as Tennessee are passing legislation prohibiting inter-basin transfers without regulatory approval (Feldman, 2001).

Social and political constraints differ from economic and legal and regulatory constraints because they represent the attitudes, values, concern, and support directed by people towards water resources. Examples of social constraints include public awareness and concern for water resources, disagreements among users over available data, public satisfaction with management, and differences in values among users. The attitudes of water users towards water resources may influence people's willingness to take personal action in resolving water supply problems (Watkins, 1974). Knowledge about water resources and how personal water use affects them is related to willingness to believe a problem exists. The greater a person's knowledge, the more likely they are to acknowledge a problem (Ballweg and Ibsen, 1971; Dynes and Wenger, 1971). Knowledge also motivates the public to participate in decision-making for managing water resources (Ibsen and Ballweg, 1969). Differences in concern for water resources among decision-makers, however, can stymie efforts to resolve a problem. When decision-makers disagree about the seriousness of a water problem, it is more difficult to create consensus (Dynes and Wenger, 1971). Decision-makers often respond to perceptions of public support, which can constrain officials when choosing methods for meeting supply needs (Feldman, Heinrich, and Routhe, 2003). Finally, natural resource policy such as water supply planning is increasingly characterized by a growing chasm between the outcomes of management strategies and the dissatisfaction of participants in the decision-making process (Marshall, 2000; Jones, Marshall, and Talley, 2000; Thomas, 1995). Political constraints include the strength of decision-maker's negotiating position (Feldman, 2001), political control of water infrastructure (Routhe, Heinrich, Feldman, and Jones, 2003), and public acceptability of methods for meeting supply needs (e.g. Bruvold, 1985).

In summary, the task of providing water where it is needed, when it is needed, and in the quantity necessary for a given purpose is complex and embedded within natural and social systems. Decision-makers must identify new sources of supply, decide which in-stream and off-stream needs warrant allocations, and gauge the impact of consumptive uses on existing supplies. Demand for increased supply is driven by factors such as drought, population growth and urbanization. Under these rising pressures, water users lobby for adequate supply based on their water rights and decision-makers employ various management strategies to meet the needs of users. The effectiveness of these strategies is challenged by the increasing fragmentation of the social and natural systems in which water resources are embedded. This fragmentation creates environmental, economic, legal, regulatory, social, and political barriers, further constraining efforts to meet the water supply needs of a community. Thus, social constraints impact political and institutional constraints and serve as “filters” for defining the limitations imposed by environmental constraints. One example representative of the challenges facing many communities in the Southeast is Cumberland County, Tennessee.

Cumberland County, TN – A Case Study

Cumberland County, Tennessee is the first county of Middle Tennessee encountered when driving west on Interstate 40 from east Tennessee (see Figure 2.2). Established on November 16, 1855 (Bullard and Krechniak, 1956:48), it lies mostly on the easternmost edge of the Cumberland Plateau Physiographic Province. Encompassing roughly 679 square miles, it is the fourth largest county in Tennessee (CCRPC, 1997). With an average elevation of 1,980 feet above sea level, its climate is moderate with an average annual temperature of 54 degrees and prevailing winds from the Southwest. Its annual average precipitation and snowfall is 52 and 12 inches respectively (Thompson, 2003). Cumberland County remains primarily rural and undeveloped. Approximately more than ninety percent of the land cover is deciduous or evergreen forest. Urban development covers about five percent of the county, with the remaining land use including cropland, pasture, grassland, or water (Cumberland County Water Resources GIS Atlas, 2003).

The population of Cumberland County is increasing at one of the fastest rates in the Tennessee. In 1980 the population of the county was 28,676. The 2001 estimated population is 48,667, almost doubling in twenty years. Despite rapid population growth, its population density remains sparse at 69 persons per mile with about sixty-nine percent of residents living in rural areas in the county (U.S. Census, 2000). As shown in Figure 2.2, a significant portion of

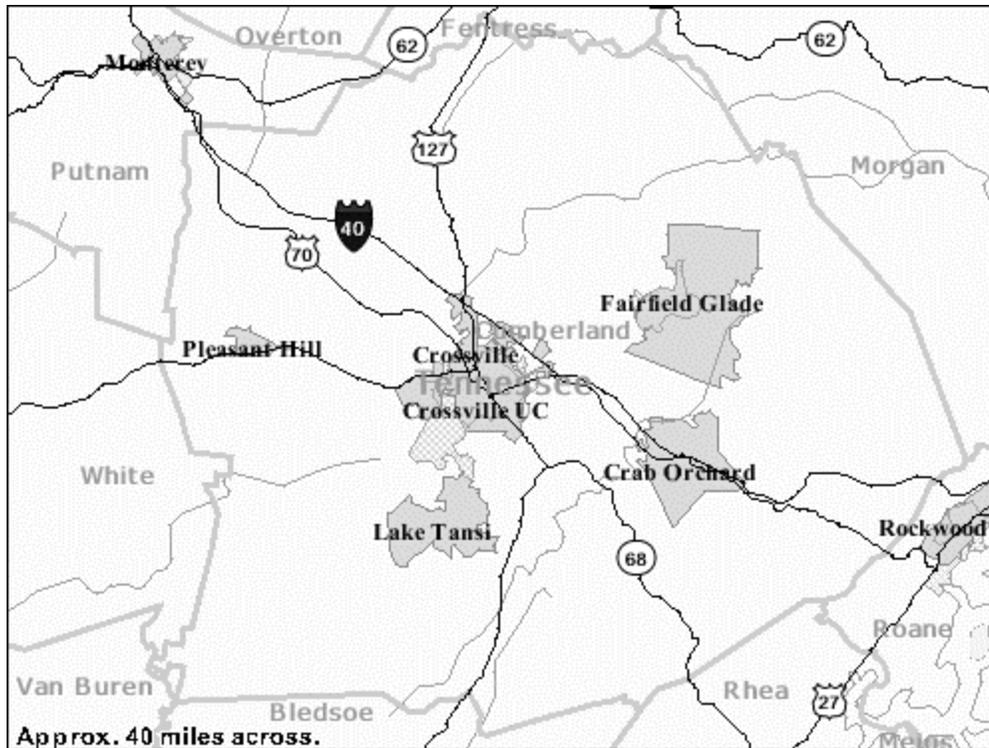


Figure 2.2: Cumberland County, Tennessee
 (US Census Bureau, 2003)

this population resides in the resort communities of the county, the largest being Fairfield Glade and Lake Tansi (CCRPC, 1997). Many of the new residents to the county are retirees moving from the northern Midwest. They choose to retire to the region because of its amenities such as pristine lakes, forests, and recreational opportunities such as extended golf seasons (D. Feldman, personal communication, April 9, 2001; J. Graham, personal communication, April 11, 2000).

In terms of services available in the county, there are ten elementary schools and one senior high with a combined enrollment of approximately 6,600 students. Between the single technology center and two colleges (2 and 4 year), there are 2,400 students. One hospital serves the county, while there are eleven public or private golf courses and four separate country clubs. Two newspapers, the Crossville Chronicle and the Glade Sun, are distributed tri-weekly and weekly (Thompson, 2003).

The county seat, Crossville, is 75 miles west of Knoxville and 120 miles east of Nashville. A mayor, city manager, and city council govern it; the county government consists of a county executive and commission. While both have planning commissions, neither has established zoning regulations. Both however, have industrial development corporations. The

county's unemployment rate is 6.4 percent with a total employment of 20,380 individuals. The per capita income is \$20,932 (Thompson, 2003).

The county is not served by any railroad lines, but is bisected by Interstate 40, two U.S. highways (U.S. 70 and 27), and four state highways (TN 26, 68, 101, and 98). There are no navigable waterways through the county. The primary natural resources of Cumberland County are sandstone, coal, timber, and agricultural products such as beans, corn, tobacco, pimento, and peppers. Excluding the service industry, there are eight different product-producing companies with one hundred to four hundred and fifty employees. These firms are involved in warehouse and distribution; industrial production of vehicle mirrors, ceramic tiles, and water heaters; agricultural products, and trade journal publications. The primary source of treated water is from lake reservoirs in the county. Current water consumption is 3 million gallons per day (MGD) with a total capacity of 7.5 MGD. The total sewage treatment capacity is 3.5 MGD with a current use of 2.3 MGD (Thompson, 2003).

Located atop the Cumberland Plateau, the county is a headwater for the surrounding region, with its streams carrying precipitation downhill out of the county. It is divided by the Tennessee Basin Divide, with the Caney Fork River flowing west to the Cumberland River and the Obed River and Daddy's Creek flowing east to the Tennessee River. Before the 1930s there were no lakes in the county (Bullard and Krechniak, 1956:197).

The water supply for water users in the county, including the city of Crossville, originally came from wells drilled from 1928 to 1937. However, these proved costly, unreliable, and insufficient for sustaining economic growth in Crossville (Bullard and Krechniak, 1956:324). In 1939, a 30-foot dam and filtration plant were built, creating Meadow Park Lake. The ample supply of water met the existing needs of Crossville and provided water for a new three million dollar prisoner of war camp to the county (Bullard and Krechniak, 1956:117). Thus, early efforts to develop the water resources of the county emphasized capturing stream flow and storing it in lake reservoirs – a strategy still pursued sixty years later. In 1955, the annual daily average water use was 300,000 gallons with a peak in August of 539,000 (Bullard and Krechniak, 1956:324).

The city of Crossville remained the only public water provider until the establishment of the West Cumberland District in 1965. Other rural utility districts soon followed: Crab Orchard (1967), South Cumberland (1972), Bon de Croft (1974), Catoosa (1977), and Grandview (1985). Figure 2.3 illustrates the jurisdictional boundaries of the utility districts in the county. In 1997, Crab Orchard had the largest number of estimated customers, 4,800, other than the city of Crossville. The city of Crossville serves an estimated total of about 6,000 customers, including

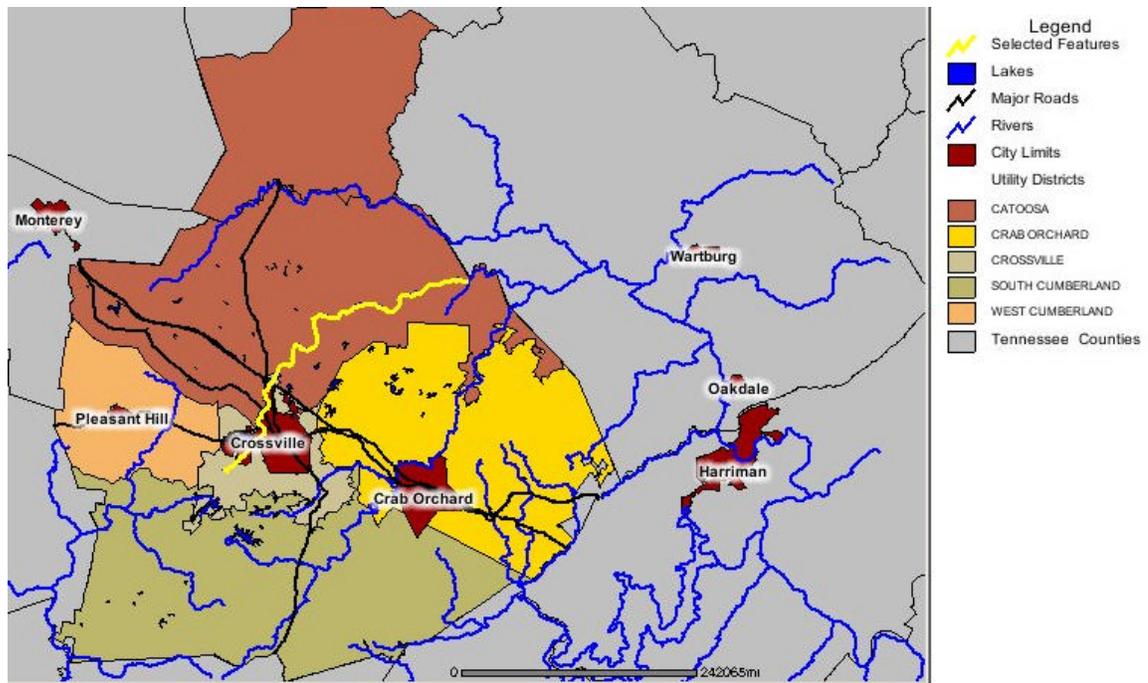


Figure 2.3: Water Utility Districts in Cumberland County
 Bon de Croft district not shown. (Cumberland County Water Resources GIS Atlas, 2003).

2,270 outside the city limits. Grandview and Bon de Croft⁶ serve the least number, 140 and 16, respectively (CCRPC, 1997).

Water supply requires “a raw water source such as a river, lake, or stream impoundment and a water treatment or purification facility.” (CCRPC, 1997:1) There are more than five hundred community water systems in Tennessee (Feldman and Albertson, 2003:28). Rural Water Utility Districts (RWUD) collect, treat, and distribute water to any water user not on a city water system. Historically, whenever an RWUD needed more water, it received state and federal approval to build a lake reservoir by constructing an impoundment (B. Hill, personal communication, April 17, 2001; Paine, 1998). The rural districts in the county first relied on wells as sources of supply; however, when they became unreliable, the districts began purchasing water from the city of Crossville (Young, 2000b).

In Cumberland County, the only district not dependent on the city of Crossville for supply and treatment capacity is Crab Orchard. Each of the other districts purchase a combined total of roughly forty-two percent, or 1.05 MGD, of Crossville’s water supply and store it in

⁶ Besides serving only 16 customers, the Bon de Croft district provides water to the W. Cumberland district. Therefore its role in Cumberland County is not discussed further.

ground or elevated tanks. Besides Crossville, only Crab Orchard has a total storage capacity greater than 1 million gallons daily. The only water quality treatment facilities in the county are in Crossville or Crab Orchard. No district provides water to its entire service area. The percent of service area provided water in each district varies from Crossville (95%) to Catoosa (70%). This leaves some county residents to rely on self-supplied water obtained from wells. Finally, besides Crossville, the largest communities in the county served by the districts are Fairfield Glade (Crab Orchard), Pleasant Hill (West Cumberland), and Lake Tansi in South Cumberland (CCRPC, 1997).

The districts with the greatest daily water use are the city of Crossville, 2.5 million gallons daily (MGD), and Crab Orchard, .95 MGD. Grandview, .06 MGD, and West Cumberland, .18 MGD, have the lowest daily use (CCRPC, 1997). Total water use in the county increased 92% from 1985 to 1995, at a rate three times greater than most other surrounding counties. Consumptive water use also reflects this trend, increasing 15% over the same period (Heinrich, Freeland, Feldman, Wilson and Routhe, 2002).

A number of factors drive the increased demand for water in the county. Consumptive water use is driven by the irrigation of farms and golf courses. Cumberland County has one of the largest average farm sizes (150 to 190 acres) in the region. Another driver related to the increased consumptive use by county golf courses is population growth. From 1990 to 2000, the county had the sixth greatest percent increase (34.7%) in total population among Tennessee's 95 counties (U.S. Census, 2000). Compared to adjoining counties, Cumberland County had the greatest percent growth (56%) in population from 1970 to 2000 (Routhe, Heinrich, Feldman and Jones, 2003). A significant percentage of this population growth is related to the in-migration of retirees. Billboards in the county along Interstate 40 espouse its retirement communities, resorts, golf courses, and homes. Compared to surrounding counties, Cumberland County has the largest percent of residents over the age of fifty. In addition, it had the third highest percent increase (59%) in people over 50 from 1990 to 2000 in the state (U.S. Census, 2000). This influx of in-migrants places added demands on the public water supply provided by utility districts in the county due to amenities such as golf resort communities that draw them to retire to the county.

Another factor driving the increased demand for water is efforts by the city of Crossville to lure prospective industries to locate new facilities in the county. Corporations such as PepsiCo have declined to build a bottling facility in the county without stronger guarantees of an adequate future water supply (J. Graham, personal communication, April 11, 2001). A final driver of demand is the few available new sources of supply existing in the county. Situated on the

plateau, there are few viable groundwater sources and the streams in the county are the headwaters of larger rivers downstream. One of those is the Obed River, whose designation as a Wild and Scenic River under a federal act, limits the environmental impact of development (Simmons, 2000).

According to the Rural Water Improvement Plan of the Cumberland County Commission, “adequate supply and distribution of potable water are essential for the growth and development of any community [and] when public water is not available, the intensity and diversity of land use ... are severely restricted” (CCRPC, 1997:1). Both the traditional and an alternative regional strategy for managing water resources are being employed by decision-makers to meet the county’s water supply needs. Table 2.3 presents a timeline of recent actions taken by utility districts and decision-makers in the county. These actions received county-wide attention in 1992 when Catoosa Utility District, following a traditional strategy for managing water resources, proposed constructing a new impoundment on Clear Creek to increase its own supply capacity (Rich, 1997). This proposal, by one of the six utility districts with jurisdiction in the county, mobilized proponents and opponents within and outside the county because the stream was a tributary of the Obed River, a designated Wild and Scenic River. While ultimately unsuccessful (Simmons, 1997) Catoosa’s dam proposal instigated a countywide effort by decision-makers to consider what could be done to meet the growing supply needs of the county.

Tennessee state regulatory officials encouraged county decision-makers to consider a more regional approach. In 1997, the county commission’s Rural Water Improvement Plan included a recommendation that “a consolidation of one or more of the water utility districts be considered to provide financial savings and a standardization of service” (CCRPC, 1997:8). They also identified such water supply priorities as increasing the supply and treatment capacities of the rural utility districts in the county (i.e. Catoosa, Crab Orchard, South and West

Table 2.3: Recent Efforts to Meet County Supply Needs

Year	Action
1992	Catoosa Utility District proposes dam on Clear Creek
1996	County Commission rejects TVA Needs Assessment
1998	USACE completes Preliminary Engineering Report – Cumberland County Regional Water Supply Study
1999	State legislation creating the Cumberland Plateau Regional Water Authority is passed and signed into law
2001	County Commission hires consulting firm to conduct a second needs assessment of water supply needs

(Heinrich, Freeland, Feldman, Wilson, and Routhe, 2002)

Cumberland), and permitting and developing “a new, large capacity, water source to supply long range needs beyond the year 2010 of a consortium of water systems” (CCRPC, 1997:9). In 1999, the Cumberland Plateau Regional Water Authority (CPRWA) was established by the Tennessee legislature (H. Res. 1993, 1999). CPRWA provided a structural mechanism for integrating the county’s historically uncoordinated water management. The boards of the rural utility districts expressed support for the regional authority. However, the city of Crossville declined to participate, citing concerns about the authority’s “one member, one vote” decision-making process (Young, 1999; Young 2000a). Consequently, the regional water authority has yet to take any substantive action. Numerous barriers remain, both for legitimizing the regional authority and implementing alternatives for meeting the future water supply needs of the county.

A number of barriers constrain the efforts of Cumberland County decision-makers to meet water supply needs. One economic constraint is the cost of replacing aging infrastructure to address unaccounted for water loss (Routhe, Heinrich, Feldman, Jones, 2003). Another is that the financial burden for water varies widely among county utility districts. One of the priorities of the Cumberland County Commission’s 1997 Water Supply Plan was to negotiate “a long term agreement between the Crossville Water system and the Catoosa, Grandview, and South and West Cumberland Utility Districts for the purchase of water at a rate acceptable to all parties” (CCRPC, 1997:9). However, Figure 2.4 illustrates that the cost for 2,000 gallons of water among the different districts in the county still varies widely.

A regulatory and legal barrier limiting future development of water resources in the county is the designation of the Obed River as a Wild and Scenic River. This means that the federal government has reserved water rights that take precedence over local water rights and impose regulatory restrictions on the use of its water. Thus, the designation limits water withdrawal from the headwaters of the Obed River. In Cumberland County, this includes Clear Creek and the Caney Fork River, tributaries of the Obed (Routhe, Heinrich, Feldman, and Jones, 2003).

One political constraint involves the ownership and control of the water supply and water quality treatment capacity in the county. Eighty percent of Cumberland County’s water supply is provided by the city of Crossville. The city provides most of the treatment capacity and is also the main provider of sewer services. This leaves three alternatives to utility districts in the county for meeting future supply needs: 1) county utilities continue relying on the city, 2) county utilities establish an independent infrastructure, or 3) county and city utilities seek an equitable management solution (Routhe, Heinrich, Feldman, and Jones, 2003). However, any regional

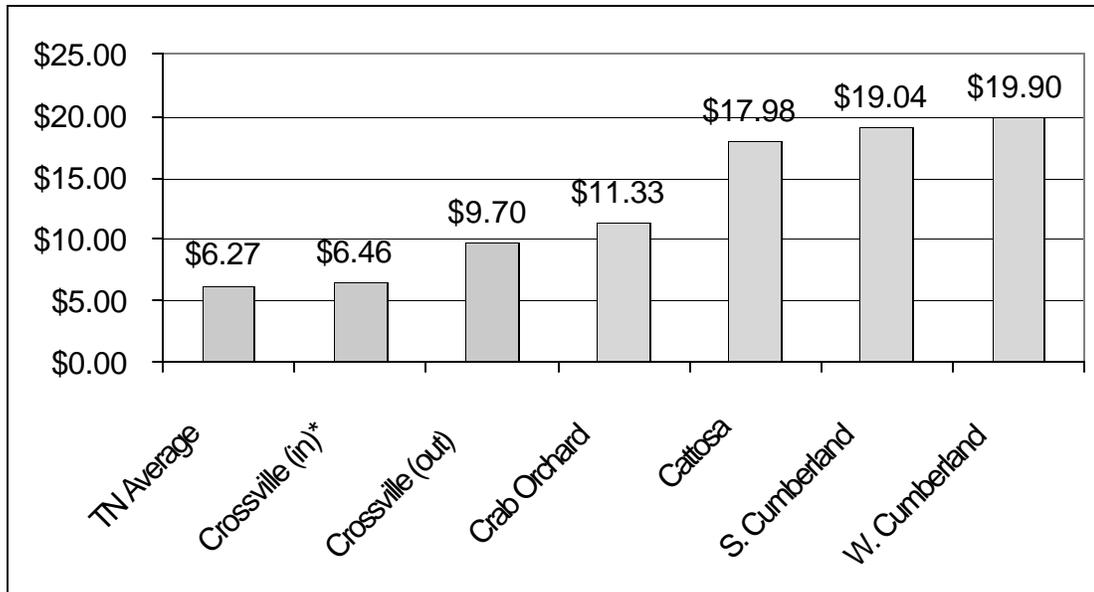


Figure 2.4: Cost of 2000 Gallons for Cumberland County Utility Districts

*Crossville (In) = cost inside city limits; (Out) = cost outside city limits.

approach such as the Cumberland Plateau Regional Water Authority requires cooperation by the multiple jurisdictions in the county.

Further complicating a regional approach is the historic independence of the utility districts in the county from local government. A “Utility District Law” in the Tennessee state code established rural utility districts as independent boards under a state charter franchise. Thus, local utility boards in the county operate with a wide degree of latitude in each of their respective service areas (CCRPC, 1997:9). Traditionally, each district’s board members and the district manager and employees were a familial and close-knit community (Heinrich, personal correspondence, February 11, 2003). This traditional independence of the rural utility districts makes it difficult to establish a coordinated approach like the regional authority.

One of the few legal mechanisms enabling local government to influence the utility boards allows the county commission to approve appointments to the rural utility district boards (excluding Crossville and West Cumberland⁷) by the county executive under certain conditions (CCRPC, 1997:9). On January 31, 2003, the Tennessee Association of Utility Districts informed the Cumberland County Executive that the commissioner boards for the Catoosa, Crab Orchard, and South Cumberland Utility Districts were illegally seated. Since then, the county executive

⁷ West Cumberland is exempt since it was created by a private act of the Tennessee legislature (Butler, 2003).

began reappointing utility board members while urging them to consider consolidating utility operations into the existing Cumberland Plateau Regional Water Authority (Butler, 2003). The city of Crossville, however, prefers to absorb the rural utility districts and be the sole provider for water users in the county (Young, 2000c).

There are also social factors that are barriers to meeting water supply needs in the county. One is concern about the development impacts on the Obed Wild and Scenic River. Many non-county water users such as whitewater raft enthusiasts (e.g. Tennessee Paddle Association) and environmental organizations (e.g. Tennessee Citizen's for Wilderness Planning) are interested in maintaining its free-flowing condition and protecting its water quality (Moser, 2001). Another constraint is public opinion about alternatives for meeting supply needs. Decision-makers are reluctant to build a pipeline from the Watts Barr reservoir partly due to its cost, but also because residents distrust its water quality (Young, 2000c). Consequently, decision-makers in Cumberland County continue to seek publicly acceptable methods for meeting water supply needs and a politically feasible way to implement them.

Summary

The citizens and decision-makers of Cumberland County are still striving after more than ten years to effectively answer two important water policy questions in their efforts to meet the future supply needs of the county. The first is what specific methods should be employed to increase the supply and water quality treatment capacity. The second is what management strategy should be used to implement selected methods and accommodate the growing demands for increased supply. The challenge of providing water for societal and environmental needs while protecting the natural environment in Cumberland County is similar to those facing other communities in the Southeast. The disagreement between people and groups inside and outside the county about the priority of different in-stream and off-stream needs reflects public discourses about environmental policies for other natural resources across the nation.

The debate in Cumberland County about what water policy proposal to implement and the structure of the decision-making process for managing its water resources has not yet reached a flashpoint. However, the potential for exacerbated environmental conflict between groups with different views about the potential impact of particular proposals exists. In addition, efforts to establish a more regional, ecosystem-based approach utilizing a collaborative management approach remain stalled by social and political barriers. One possible bridge to establishing an effective management strategy is improving the understanding of how social factors in the county

impact management of its water resources. Rather than focusing on technical comparisons of different alternatives available for meeting its water supply needs, greater attention should be given to understanding how people's beliefs and attitudes impact their public support and concern for water resources in the county. One potential tool for accomplishing this is to employ attitude theory to identify and understand people's environmental concern and the social factors influencing their support for particular water supply policy proposals. By not only identifying the strength of public support for environmental policy, understanding its social-psychological determinants may reveal how different aspects of people's environmental concern influence their expressions of support. Information such as this should be of interest to researchers of environmental concern, attitude theorists, decision-makers, non-governmental organizations and the general public.

Chapter III: Theoretical Framework

Ever since Gordon Allport asserted in 1935, “the attitude construct is the central social psychological concept used to explain behavioral intentions and actual behavior,” (Ajzen, 1996:298) researchers remain interested in the nature of attitudes. Even before investigators began purposefully examining a person’s attitudes towards the environment, much attention was, and still is, given to understanding how attitudes relate to behavior. Though faith in their utility for this purpose waned during the mid-1960s to mid-1970s (Eagly and Chaiken, 1993:156), it is now generally accepted that the attitude-behavior relationship can be robust under certain conditions (Kim and Hunter, 1993: 131). There exist myriad theoretical models postulating how attitudes relate to behavior but many of them are based on expectancy-value theory. These theories assume “attitude toward a behavior is itself a function of the value one assigns to the perceived consequences of the behavior” (Eagly, 1992:694) and the likelihood or expectation that each outcome will occur. Two of the most popular derivations of expectancy-value theory are the Theory of Reasoned Action and the Theory of Planned Behavior.

Researchers examining environmental concern approach it from a variety of disciplinary perspectives. They also focus more on practical policy implications rather than theory. According to Dunlap and Jones, this resulted in most of these studies being “... ad hoc and atheoretical ...” (2002:42). Their recent review of environmental concern research identified several facets or dimensions of environmental concern based on attitude theory. They found that many of the policy-directed studies use affective, cognitive, conative, or behavioral indicators to measure this concern but rarely employed attitude theory to examine and understand the relationships between them. Thus, this study integrates this multi-dimensional conceptualization of environmental concern with the attitude theories of Ajzen (1985) and Fishbein and Ajzen (1975).

Chapter III first reviews some major conceptual and measurement issues related to understanding environmental concern. Following this, Fishbein and Ajzen’s Theory of Reasoned Action (Fishbein, 1967; Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980) and Ajzen’s Theory of Planned Behavior (Ajzen, 1985, 1987) are each presented. Finally, the chapter concludes by demonstrating how the Theory of Planned Behavior is applied to an environmental policy topic such as public support for meeting water supply needs.

Environmental Concern

The purpose of this overview of environmental concern research is to review the various methodological approaches employed by researchers to understand it. It is not to provide an overview of the extensive body of research exploring its social bases (see Dietz, Stern, and Guagnano, 1998; Dunlap and Scarce, 1991; Guagnano and Markee, 1995; Klineberg, McKeever, and Rothenbach, 1998 for examples). Thus, the focus is on conceptual and measurement issues related to environmental concern research, the historical approaches used to understand it, and the utility of applying Dunlap and Jones' (2002) multi-dimensional conceptualization of environmental concern to environmental policy.

Two major conceptual issues in much of the research are the neglect of many researchers to explicitly define environmental concern and its ambiguity as an attitude object. Environmental concern is "the degree to which people are aware of problems regarding the environment and support efforts to solve and/or indicate a willingness to contribute personally to their solution" (Dunlap and Jones, 2002:485). Reiterating past assertions about the ambiguous meaning of "environment," Dunlap and Jones also note that the construct of environmental concern amalgamates two distinct conceptual "universes:" the theoretical components of "the environment" and that of "concern" (2002:486). They observe in their review that most studies fall within a matrix based on how researchers operationalize each component. As Figure 3.1 illustrates, applying this framework to environmental concern research reveals that studies exist on a continuum from narrow-range studies of single topics and expressions, to those of two or more topics and expressions of concern, and finally to broad-range studies of multiple topics and expressions of concern (Dunlap and Jones, 2002:493). This study examines a single topic of "the environment" and multiple expressions of people's concern. Thus, to compare future research with existing studies, one must be cognizant of how researchers conceptualize both "environment" and "concern."

The diversity in how environmental concern is conceptualized is reflected in the methodological approaches for examining it. Dunlap and Jones identify two general approaches employed to understand environmental concern: a policy-relevant approach and a theory-relevant approach. The policy-relevant approach encompasses research exploring expressions of concern such as people's opinions about the seriousness, causes, and preferred solutions of environmental problems. While of great interest to policy-makers, findings such as these usually rely "on a researcher's intuitive understanding of environmental problems and policy" and not a theoretical framework (Dunlap and Jones, 2002:489).

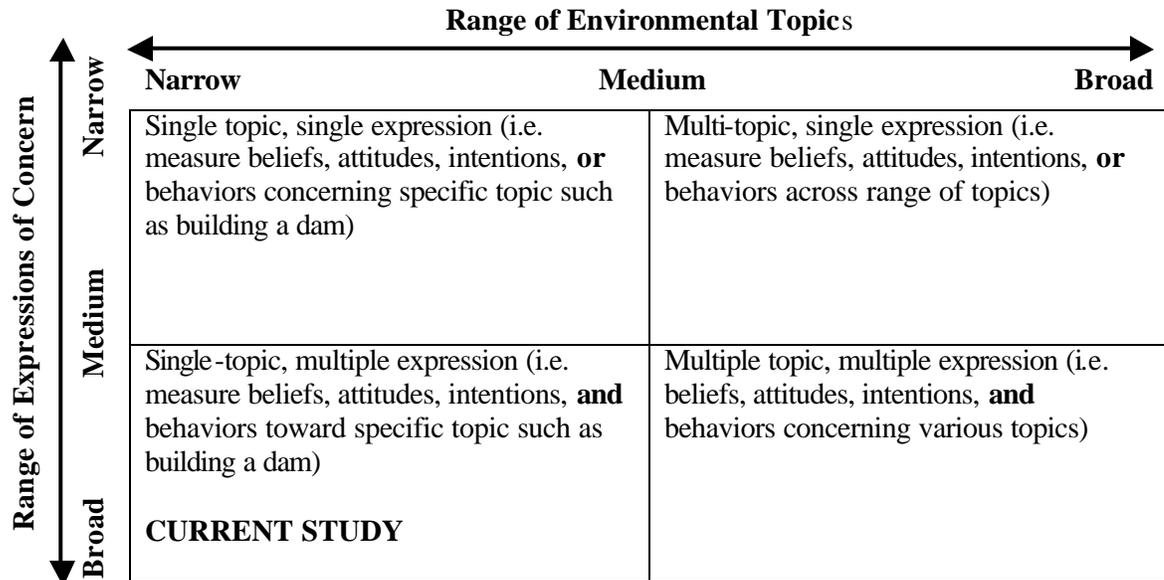


Figure 3.1: Approaches for Understanding Environmental Concern
(Dunlap and Jones, 2002:493)

This approach is typically more macro-level in focus, emphasizing the role of institutions (Dunlap and Jones, 2002: 492). Theory-based research normally employs attitude-behavior theory to explore specific types of environment-related behaviors such as recycling or composting. It accomplishes this with an array of theoretical constructs beyond people’s opinions such as knowledge, norms, attitudes, beliefs, and intentions. This approach improves the understanding of the social-psychological determinants of people’s behavior but often yields findings more difficult for those in the policy arena to apply (Dunlap and Jones, 2002:490).

The challenge proffered by Dunlap and Jones is to integrate these traditional approaches for understanding environmental concern and yield theoretical and policy-relevant results. They note two important points of convergence. First, efforts are already underway to explicitly incorporate policy-relevant variables into theoretical frameworks based on attitude theory (e.g. Stern, Dietz, Abel, Guagnano, and Kalof, 1999). Second, many measures in policy-relevant studies implicitly assess constructs of attitude theory such as “attitudes, beliefs, behavioral intentions or actual behaviors” (Dunlap and Jones, 2002:492). Consequently, researchers should be attentive to the multi-dimensionality of environmental concern when trying to understand the strength and depth of people’s concern and support for environmental problems or policy (Dunlap and Jones, 2002).

The multiple dimensions of people’s environmental concern are manifested through affective, cognitive, conative, and behavioral expressions. Affective expressions refer to

Table 3.1: Dimensions of Environmental Concern for Environmental Policy

Dimension of Environmental Concern	A Person's Expression of Support	Object of Concern
Affective	Evaluative attitudes about building a dam (e.g. it is good/bad)	Building a dam to meet water supply needs
Cognitive	Beliefs, knowledge, norms related to building a dam (e.g. it will meet water supply needs)	
Conative – Personal	Willingness to personally perform specific actions supporting the construction of a dam (e.g. talking with friends)	
Conative – Public	Expressed support for building a dam (e.g. stated support for building a dam)	
Behavioral – Personal	Actual or reported actions of personal behaviors expressing support for building a dam (e.g. talking with friends)	
Behavioral – Public	Actual or reported behavioral expressions of support for building a dam (e.g. writing a letter)	

Adapted from Dunlap and Jones (2002)

“attitudes toward very specific problems or issues, such as toxic wastes or recycling, [or] to very broad ones like environmental problems or protection”; cognitive expressions are “peoples’ expressed knowledge and beliefs about environmental issues” (Dunlap and Jones, 2002:490). Conative expressions represent people’s “readiness to perform, or a commitment to support, a variety of actions that can potentially impact environmental quality”; behavioral expressions include “actual or reported actions taken by individuals and their behavioral expressions of support for environmental policies, programs, and organizations” (Dunlap and Jones, 2002:491). Table 3.1 presents how this multi-dimensional conceptualization of environmental concern may be used to better understand public support for a potential environmental policy proposal. By being cognizant of the different possible expressions of people’s environmental concern, it is possible to integrate these multiple dimensions with a theoretical model of people’s attitudes and behavior and apply it to an environmental problem to yield theoretical and policy-relevant results.

Theory of Reasoned Action

Attitude theory may be used to conceptualize the different ways that people express their environmental concern through their affective, cognitive, conative, and behavioral expressions (Dunlap and Jones, 2002). The discussion now focuses on how a theoretical model of attitudes and behavior may be applied to understanding public support for environmental policy. The

Theory of Reasoned Action (TRA) is the predecessor of the Theory of Planned Behavior. Martin Fishbein (1967) first formulated the basic tenets of the Theory Reasoned Action and later refined it with the help of Icek Ajzen (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980). Prior to these theories, the assumption of a direct relationship between attitudes and behavior was the foundation of most existing research by attitude theorists. When critics began noting the mixed research findings regarding this causal relationship, many questioned its legitimacy and suggested abandoning it (e.g. Wicker, 1969).

While Fishbein and Ajzen (1975) concurred that ambiguous empirical support existed for the relationship between attitudes and behavior, they attributed the poor findings to methodological and conceptual problems. First, they observed that many studies employed measures for attitudes and behavior that violated the principle of correspondence (Ajzen and Fishbein, 1980:27). For example, general measures of people's attitudes must be used predict general behavior, not single actions. Secondly, they suggested with TRA that another variable mediated the influence of attitudes on behavior (Fishbein and Ajzen, 1975). Fishbein and Ajzen assert that the most proximate determinant of someone's behavior is not their attitude, but instead their behavioral intention to perform the action. They define behavioral intention as "a person's subjective probability he will perform the behavior in question" (Fishbein and Ajzen, 1975:12). Put another way, intentions represent a "person's motivation in the sense of his or her conscious plan to exert effort to carry out a behavior" (Eagly and Chaiken, 1993:168). The stronger people's intention to perform a given behavior, the more likely they will actually do it. Thus, one of the fundamental assumptions of the theory is that people engage in behaviors they intend to perform.

A person's behavioral intention is assumed to be a function of two factors. One factor, attitudes, reflects the influence of a person's internal psychological forces. The other factor, subjective norm, represents the influence of social forces external to an individual (Ajzen and Fishbein, 1980:6). Thus, in this theoretical model, attitudes and subjective norms are each independent variables that together should be predictive of the corresponding dependent variable, behavioral intentions. Behavioral intentions are subsequently also an independent predictor of the people's actual behavior. Figure 3.2 presents the theoretical framework of TRA. It also denotes what expressions of environmental concern are represented by each component. As one observes from the figure, attitudes towards a behavior are important, not those directed towards an object or target. Thus, in the model, attitudes represent a person's favorable or unfavorable evaluation of the performance or non-performance of a behavior (Ajzen and Fishbein, 1980). For

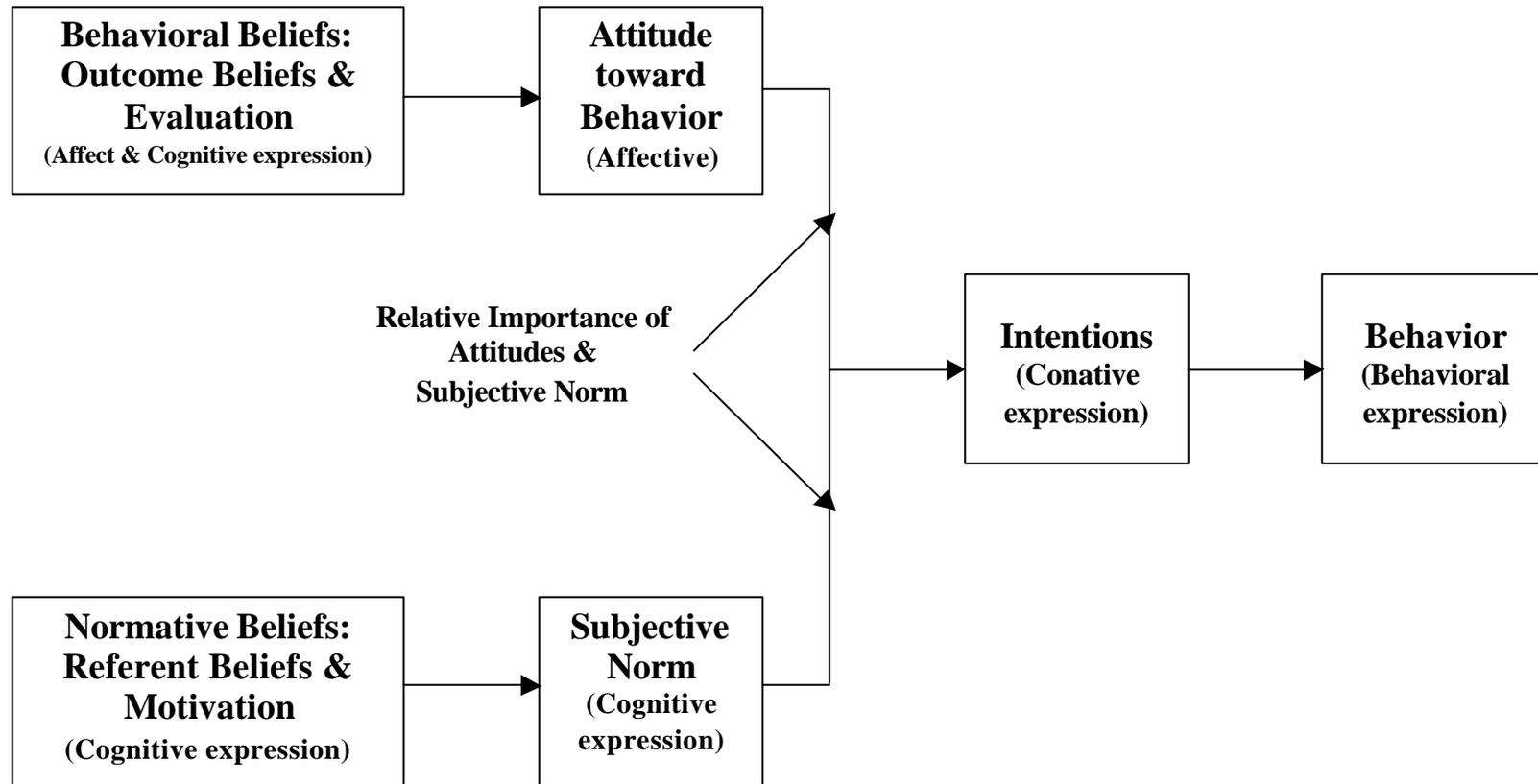


Figure 3.2: The Theory of Reasoned Action

Note: Arrows indicate direction of influence. Adapted from Jones (1990) and Ajzen & Fishbein (1980)

example, it is a person's attitude (i.e. affective expressions of environmental concern) towards building a dam to meet local water supply needs which should be more predictive of their expression of support (or opposition), than attitudes about the environment or attitudes about dams in general. In short, attitudes about supporting a specific policy action, rather than a general attitude, are a better predictor of a person's intention to support this action or policy alternative.

The theory further asserts that subjective norm is a second independent predictor of behavioral intentions (i.e. conative expressions of environmental concern). This is an individual's overall perception of the social pressure from important others to perform or not perform an action. This component of the theory corresponds with cognitive expressions of environmental concern. The linkage between subjective norm and intentions suggests that the more strongly a person believes important others think he should perform an action, the stronger his intention to engage in the corresponding behavior (Ajzen and Fishbein, 1980:57). For example, the stronger a person's perception that important others think he should support building a dam, the more willing someone is to support it. In summary, TRA hypothesizes that people's willingness to perform a behavior (i.e. intentions or commitment) depends on the extent that they hold a favorable attitude towards performing it (i.e. attitude toward the behavior) and perceive a general social pressure from important others to perform it (i.e. subjective norm).

As shown in the figure, TRA also postulates that a person's attitudes towards a behavior and their subjective norm are further linked to a person's underlying beliefs. While attitudes towards a behavior serve as independent predictors of intentions in the theory, they are also simultaneously a dependent variable of a person's salient behavioral beliefs. These behavioral beliefs are the small number of specific beliefs about a given object that a person may reference at any particular moment. (Ajzen and Fishbein, 1980:63). They have two components. A person's beliefs about the likelihood, or perceived probability, of specific consequences occurring as a result of a given behavior are called outcome beliefs. The second component is known as outcome evaluations and represents someone's subjective evaluation for each corresponding outcome (Ajzen and Fishbein, 1980). Both components of behavioral beliefs include affective and cognitive expressions of people's environmental concern. Thus, if someone believes that more positive outcomes will result from building a dam (i.e. behavioral beliefs), they are more likely to hold a favorable attitude towards supporting it (i.e. attitude toward the behavior). Ultimately, TRA postulates that knowledge about people's behavioral beliefs may be used to predict their attitudes towards a behavior.

While subjective norms are predictive of intentions, they too are a dependent variable of corresponding normative beliefs. Like behavioral beliefs, TRA hypothesizes that normative beliefs are a function of two components: normative referents and referent motivation. Normative beliefs are beliefs about whether specific individuals or groups important to a person think they should or should not perform a behavior. Normative referents are important others such as family members or close friends whose opinions about engaging in an action matter to a person. Referent motivation is the degree to which a person is motivated to comply with the wishes of specific important others regarding the performance, or non-performance, of the behavior (Ajzen and Fishbein, 1980:73). The more a person believes specific important others approve of performing a behavior and the greater someone's motivation to comply with the wishes of specific important others, the stronger a person's subjective norm to perform the action. Thus, normative beliefs include cognitive expressions of people's environmental concern and should function as an independent predictor of the corresponding dependent variable, subjective norms.

In summary, TRA assumes that people are consistent in their salient behavioral and normative beliefs, attitudes towards a behavior, subjective norm, intentions to perform a behavior, and their actual performance or non-performance of it (Eagly and Chaiken, 1993:173). Ultimately, knowledge about people's behavioral and normative beliefs are the most distal independent predictors of actual behavior. In the model, they function as proximate predictors of people's attitudes toward a behavior and subjective norm. Attitudes toward a behavior and subjective norm are both dependent variables of their corresponding beliefs and independent predictors of behavioral intentions. Finally, behavioral intentions should be predictive (i.e. independent variable) of actual behavior (i.e. dependent variable). Thus, the role of each variable in TRA depends on the linkage being examined. However, based on the framework of the theory, it is possible to predict a person's intentions and behavior based on knowledge about their relevant beliefs, attitudes, subjective norm, and intentions regarding the corresponding behavior.

The principle inherent in using a person's salient beliefs for predicting attitudes towards a behavior and subjective norm extends to assessments of behavioral intentions (i.e. expressions of support) and actual behavior (i.e. actual behaviors expressing support). The observed correlation between components in the theory and the degree to which a given variable is predictive of its dependent variable is related to the correspondence of measures employed for gauging them. Ajzen and Fishbein (1980:34) note in their instructions for applying TRA that survey measures must correspond in action, target, context, and time. Corresponding measures for action include

distinguishing between single-action criteria (e.g. calling a public official in the next six months to express support for building a new dam) and behavioral categories (e.g. expressing support for the construction of a new dam in the next six months). Following the previous example, measures must also correspond in their target (e.g. building a new dam), time frame (e.g. in the next six months), and social context (e.g. building a new dam in the county). Greater correspondence between measures of the theory's components will result in more accurate study findings (Ajzen and Fishbein, 1980).

The theoretical linkages proposed by TRA have generally been strongly confirmed in studies whose survey measures were precisely operationalized (Eagly and Chaiken, 1993:175). For example, it has been applied successfully to predict behavioral intentions and behaviors in such disparate domains as voting (Fishbein, Middlestadt, and Chung, 1986), family planning (Crawford and Boyer, 1985), smoking marijuana (Ajzen, Timko, and White, 1982), dental hygiene (McCaul, O'Neill, and Glasgow, 1988), anti-pollution behavior (Hamid and Cheng, 1995), and attending an employee training session (Fishbein and Stasson, 1990). Literature reviews by Fishbein and Ajzen (Ajzen and Fishbein, 1980; Fishbein, 1980) support the assertion that behavioral intentions to perform volitional behaviors are usually well predicted using a person's relevant attitude toward the behavior and subjective norm. In more recent meta-analyses, Sheppard, Hartwick, and Warshaw (1988) reported a mean multiple correlation of $R = .66$ from 87 estimates for predicting intentions and found a mean correlation of $r = .53$ for the intention-behavior linkage. Finally, in a review of 113 articles by Van den Putte (1991), he found a mean $R = .68$ for predicting behavioral intentions from its two predictors and a mean $r = .62$ for the intention-behavior relationship (Eagley and Chaiken, 1993:176). Despite these confirmatory findings, some still suggest expanding the theory to account for other possible influences on a person's behavioral intentions (e.g. Jones, 1990) or critique it regarding limitations stemming from the boundary conditions of the theory (e.g. Liska, 1984).

TRA assumes a person's attitudes towards a behavior and subjective norm alone are the proximal predictors of their behavioral intentions and subsequent actual behavior. Others argue that additional factors also exert significant influence on intentions. Past behavior or habit (e.g. Bentler and Speckart, 1981; Jones, 1990), perceived moral obligation or personal responsibility (e.g. Gorsuch and Ortberg, 1983; Heberlein and Black, 1976), and self-identity (e.g. Granberg and Holmberg, 1990) each have been shown to influence behavioral intentions and actual behavior in different social contexts. Besides excluding these, the theory also does not account for variables of classic interest to social scientists such as demographic variables (i.e. age, sex,

socioeconomic status, education) or attitudes towards targets and objects (i.e. people or institutions). Ajzen and Fishbein (1980:84) maintain these are external variables that influence a person's intentions and behavior through their effect on a person's behavioral and normative beliefs. Consequently, some argue, "The theory of reasoned action is not a general theory of behavior. Rather it is a theory of the immediately proximal causes of volitional behavior" (Eagly and Chaiken, 1993:173).

Probably the most important critique directed towards TRA is that its application is limited to volitional behaviors. Volitional behaviors are actions that lie well within a person's personal control to successfully perform them and are mostly unconstrained by internal or external factors (Ajzen, 1985:24). For example, a person has a high degree of personal control over choosing whether to discuss one's support for building a dam with close friends. Liska (1984), however, notes that because the theory does not account for factors that can impede the actual performance of behavior, TRA cannot adequately account for habitual actions or those requiring skills, resources, the cooperation of others, or the opportunity to perform them. In other words, it is ill equipped to explain non-volitional behavior that is not completely under a person's control to successfully perform an action. People may hold favorable attitudes toward an action, perceive an overall strong social pressure to perform it, and indeed intend to engage in the behavior, but be constrained in their actual performance of it by factors beyond their control. For example, individuals who are willing to express their support (i.e. intentions or commitment) for building a new dam by speaking to a public official are limited in their actual performance by whether they can establish contact with the official. Thus, while inserting behavioral intention as a mediating variable between attitudes and behavior improved the understanding of how a person's attitudes are transformed into actions, it also served to elicit further debate about the underlying assumption of TRA that people always reflectively consider the consequences of their actions and then perform every behavior they intend.

Theory of Planned Behavior

Icek Ajzen developed the Theory of Planned Behavior (TPB) partly in response to critiques of the assumption of TRA that most behaviors of interest to social scientists are volitional (Ajzen, 1996b:312). In it, Ajzen (1985) modifies the conceptualization of behavior to better account for behaviors that are less volitional. Strictly speaking, even highly volitional behaviors may conceivably be prevented by events beyond an actor's control. In turning on the television to watch a favorite program, a puff of smoke could indicate a blown fuse has rendered

it non-functional (Ajzen, 1985:24). Thus, every action, in a literal sense, is plausibly a behavioral goal a person intends to achieve. Behavioral goals exist on a continuum, from those on one end under an actor's complete volitional control, to those on another end that are limited by factors internal and external to a person and not completely under an actor's volitional control (Ajzen, 1987:45).

While "reasoned action" implies the performance of calculated behavior without restrictions, "planned behavior" denotes the possibility that even the best laid plans can go awry due to circumstances beyond one's control. "According to Ajzen (1985), the extent to which one's intentions to perform behaviors can be carried out depends in part on the amount of control one has over the behavior" (Eagly and Chaiken, 1993:186). The implication is that a person considers the degree to which a given action is under their personal control and whether it is limited by internal or external factors. Internal factors include such things as individual differences among people; information, skills, and abilities available to a person; someone's power of will, and their emotions and compulsions (Ajzen, 1985:25). Factors external to a person include time, opportunity, and dependence on other people (Ajzen, 1985:27). The challenge in extending TRA to non-volitional behaviors is determining the actual control a person has over an action.

A person's actual control over the performance of a given action, however, is difficult to gauge. Ajzen (1985) conceptualizes a proxy variable that represents an individual's subjective perception of their actual control over the performance or non-performance of a given behavior. In other words, this represents a person's assessment of the probability of successfully attaining a behavioral goal. This is based on the assumption that a person's perception of their control is reasonably accurate and closely corresponds to their actual control. The idea of using a person's perception of control is similar to Bandura's (1977) concept of self-efficacy, "the conviction that one can successfully execute [a given] behavior" (Eagly and Chaiken, 1993:187). In TPB, perceived behavioral control is added as a third independent predictor of behavioral intentions, along with attitudes toward a behavior and subjective norm. Figure 3.3 illustrates how Ajzen integrated perceived control into TRA to expand its application to non-volitional actions.

The solid line between perceived control and intentions indicates that perceived control should exert an independent and direct effect on a person's behavioral intentions (Ajzen, 1987:44). The more strongly a person believes the successful performance of a behavior is not under their personal control, the weaker their intention to undertake the action. The more strongly someone perceives an action is under their personal control, the stronger their intention

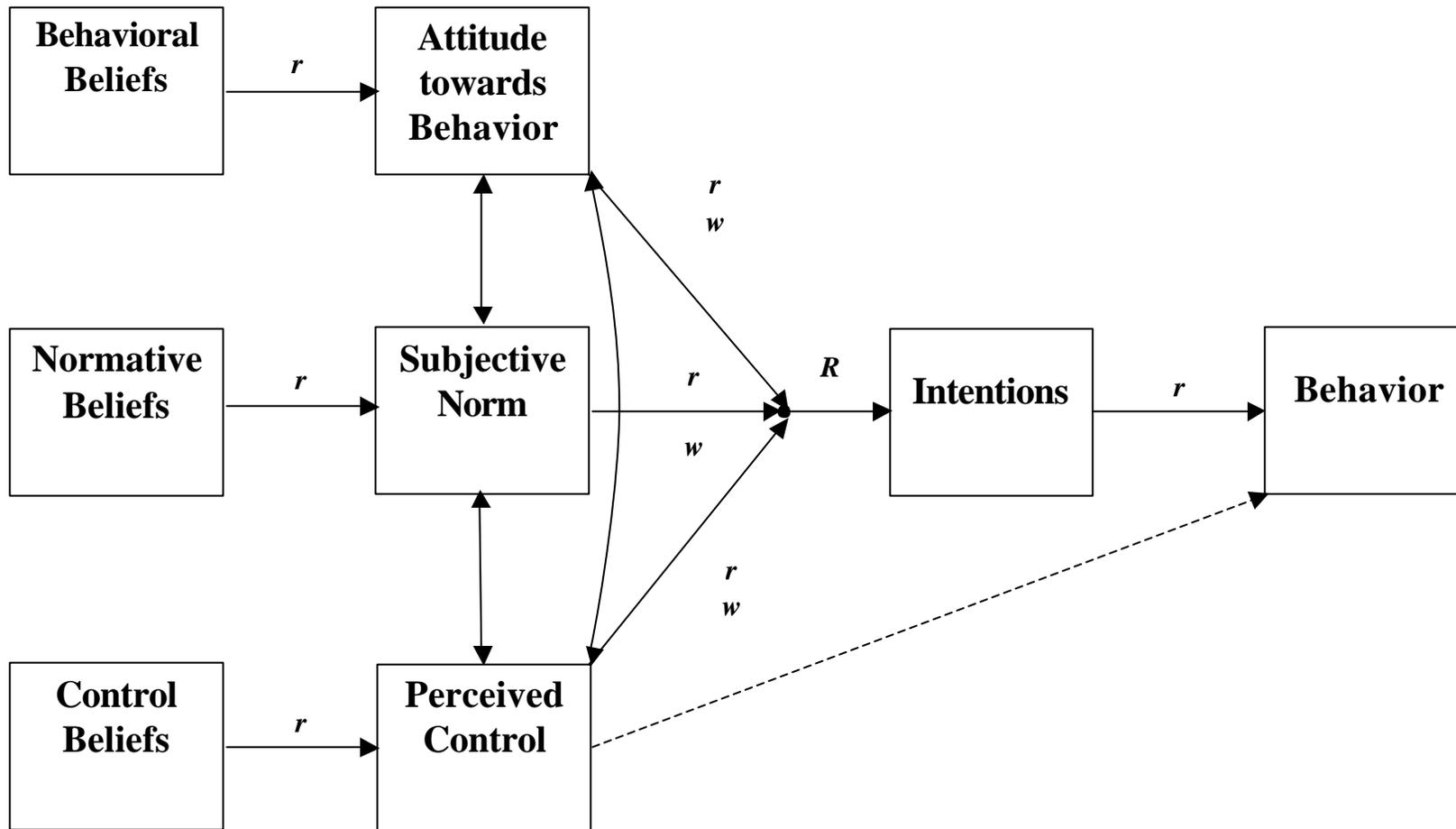


Figure 3.3: The Theory of Planned Behavior
 Note: Arrows indicate direction of influence (Ajzen, 1991)

to perform the behavior. In other words, perceived control should be predictive of people's willingness to perform or not perform a given action (i.e. intentions), regardless of how volitional the behavior may be. For example, if a person strongly believes it is easy to successfully express their support for building a new dam (i.e. a cognitive expression of environmental concern), they will also be more willing to express their support (i.e. a conative expression).

As noted earlier, Ajzen conceptualizes a person's perceived control as the subjective probability of successfully performing an action. Ajzen claims that when this probability, and a person's actual control over internal and external factors, is maximal, TPB and TRA are identical (Ajzen, 1985:36). When an actor's choice to perform an action is completely volitional, the relationship between perceived control and behavioral intentions dissipates because control beliefs are not salient to the performance of the behavior. Thus, perceived control should not add to the prediction of intentions above and beyond the explanation provided by attitudes toward the behavior in question and the corresponding subjective norm. Under these conditions TRA "can be viewed as a special case of the theory of planned behavior, applicable to situations in which behavioral control is high and can thus be discarded" (Ajzen, 1996:387). However, when a behavior is non-volitional, perceived control, attitudes towards the behavior, and the corresponding subjective norm should each be significant independent predictors of intentions.

The final linkage postulated by TPB is illustrated by the dashed line in the figure between perceived control and actual behavior. This relationship denotes that under certain conditions perceived control should function as an additional independent predictor, along with intentions, for predicting the dependent variable, actual behavior. The more closely people's *perceptions* of control correspond to their *actual* control over successfully performing a behavior, the more perceived control should add to the prediction of actual behavior above and beyond that of intentions. The dashed line indicates this relationship should emerge only when there is some agreement between perceptions of control and actual control (Ajzen, 1987:46).

As with behavioral and normative beliefs, a person's perceived behavioral control is also assumed to be a dependent variable of underlying salient beliefs. These are termed control beliefs. Control beliefs are people's subjective assessment of whether they possess the necessary skills, resources, and opportunity to successfully perform a behavior (i.e. cognitive expressions of environmental concern). The more strongly people believe they possess the necessary resources and opportunities, and the fewer obstacles they anticipate, the greater their perceived control over the action (Ajzen, 1987:47). Taken together with a person's other behavioral and normative beliefs, TPB

stipulates that when confronted with the need to decide on a course of action, people consider the likely consequences of available alternative; they weigh the normative expectations of important reference individuals or groups; and they consider required resources and potential impediments or obstacles (Ajzen, 1996a:387).

Two final aspects of TPB worth noting are the illustrated linkages between attitudes towards a behavior, subjective norm, and perceived control and the preconditions for accurate prediction of intentions and actual behavior. The theory suggests that these three independent predictors of behavioral intentions are related to one another and are expected to interact. However, their interaction terms have not typically been found to be significant. Most of the variance in people's intentions and behavior are explained by linear combinations of the variables in the theory (Ajzen, 1996b:312; Ajzen, 1991). For accurate prediction of behavioral intentions and actual behavior, two conditions must be met. First, all of the variables of TPB must correspond in target and action. Second, when predicting behavior, a person's perceived control and intentions must remain stable and not change from when their intentions are measured and their actual behavior is assessed. The more these conditions are violated, the lower the predictive utility of TPB (Ajzen, 1996:389).

The critiques of TPB echo those of TRA. While it expands the number of independent predictors for a person's behavioral intentions from two to three, it still does not explicitly account for how variables such as personal responsibility and past behavior may influence their intentions and behavior (Jones, 1990). Ajzen expresses a willingness however, to incorporate additional variables into the theory – if they are shown to enhance the prediction of behavioral intentions and actual behavior for a wide range of behaviors (Eagly and Chaiken, 1993:189). However, he still maintains the effects of other variables of traditional interest to social scientists such as demographic characteristics and attitudes towards objects such as institutions on people's intentions and behavior are mediated by their behavioral, normative, and control beliefs (Ajzen, 2001).

With this continuing debate, the theory continues to be applied on less volitional behaviors in a number of different behavioral domains. These include alcohol consumption (e.g. Conner, Warren, Close, and Sparks, 1999), leisure choice (e.g. Ajzen and Driver, 1992), weight loss (e.g. Netemeyer, Burton, and Johnston, 1991), and smoking cessation (e.g. Norman, Conner, and Bell, 1999). In most applications, “the prediction of behavior was improved by adding perceived behavioral control as a predictor” (Eagly and Chaiken, 1993:188). In more recent

reviews it continues to improve the prediction of intentions and in many cases behavior (Ajzen, 1996, 2001).

A small subset of the behaviors to which TRA and TPB are applied involve environmental behaviors. In a partial listing of behaviors identified in a 1993 review of over 250 empirical studies by Fishbein and Ajzen, just four of the fifty-two behaviors were environmental behaviors (Ajzen, 1996a:388). These include actions such as conserving water (e.g. Kantola, Syme, and Campbell, 1982), composting (e.g. Taylor and Todd, 1995), energy consumption (e.g. Stutzman and Green, 1982), leisure and recreation activities (e.g. Ajzen and Nichols, 1995), and recycling (e.g. Cheung, Chan, and Wong, 1999). The most common application of the theories to environmental behaviors appears to be for predicting a person's behavioral intentions and actual behavior for recycling (e.g. Jones, 1990).

Only two studies were identified that explicitly examined aspects of a person's support for an environmental policy. One examined a person's willingness to vote for a construction ban on nuclear power plants (Bowman and Fishbein, 1978). The other considered factors affecting a person's willingness to support (i.e. intentions or commitment) the controlled burn policy of the National Park Service. In this study, a person's willingness to support the environmental policy was gauged by "if it was extremely, moderately, slightly, or neither true or false that they support a controlled burn policy" (Bright, Manfredo, Fishbein, and Bath, 1993:276). Both tested the Theory of Reasoned Action. In the first, a single measure for a person's support, e.g., voting, was employed. In the second, a person's personal commitment to the broad conceptual category of "support," was the behavior measure. Consequently, this study tests the utility of the Theory of Planned Behavior for predicting people's willingness to support (i.e. intentions) a proposal to meet water supply needs using multiple indicators of a person's support. This reflects the fact that a person may express their support for an environmental policy through different social behaviors.

The study's primary purpose is to examine the efficacy of the theory for predicting and understanding the factors influencing people's willingness to express support (i.e. behavioral intentions and a conative expression of environmental concern) for building a dam to meet future water supply needs by performing multiple specific actions.⁸ People's attitudes (i.e. affective and cognitive expressions of environmental concern) towards supporting the construction of a dam, overall perception of social pressure to support it (i.e. cognitive expression of concern), and

⁸ TRA postulates, and past research supports, the linkage between intentions and actual behavioral. In this study, intentions to express support are a proxy for people's actual behavior and this linkage is not tested.

perception of the difficulty of successfully expressing their support (i.e. cognitive expression) are each assumed to independently predict people's intentions to support the construction of a dam. In other words, people who more favorably evaluate supporting it (i.e. intentions) and more strongly believe important others think they should support it (i.e. subjective norm) should be more willing to express their support (i.e. intentions). If people believe more strongly that supporting a dam is difficult (i.e. perceived control), they should be more likely to express a weaker commitment to support it (i.e. intentions).

In addition, the theory postulates that for a deeper understanding of the social-psychological factors influencing people's intentions, researchers should examine the independent effects of salient beliefs on each of the predictors of intentions. People's beliefs about the consequences of building a dam (i.e. behavioral beliefs), their perceptions about whether significant others think they should support it (i.e. normative beliefs), and their beliefs about whether they possess the necessary skills and resources to support it (i.e. control beliefs) should each independently predict their corresponding attitudes towards the behavior, subjective norm, and perceived control. People who more strongly believe more positive consequences will result from building a dam should express a more favorable attitude towards supporting it. Those who more strongly believe specific important others such as close friends think they should support it, and who are more strongly motivated to comply with the wishes of specific important others, should perceive a stronger overall social pressure to support the construction of an impoundment. Finally, people who more strongly believe they do not possess the necessary information, skills, or opportunity to support a dam should express a weaker commitment for supporting its construction. Figure 3.4 on the following page illustrates how the components of TPB are conceptualized in this study and the theoretical linkages presumed to exist between them. By integrating Ajzen and Fishbein's attitude-behavior theories with Dunlap and Jones (2002) multi-dimensional conceptualization of environmental concern, it is possible to understand the social-psychological determinants of public support for environmental policy and how different expressions of environmental concern relate to one another.

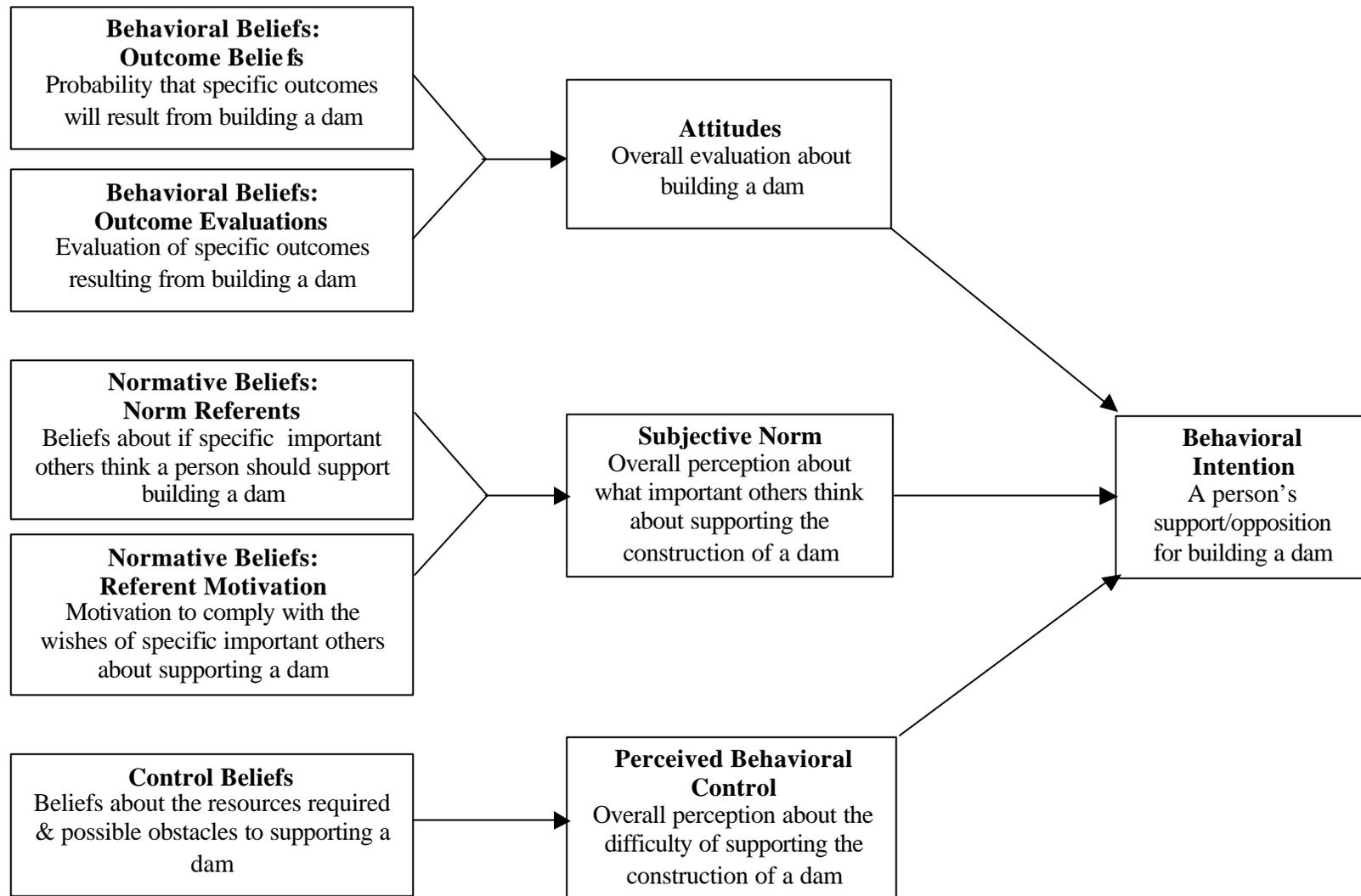


Figure 3.4: Factors Influencing Public Support for Environmental Policy – Water Resources Management

Chapter IV: Research Design

Chapter IV outlines the procedures used to test the Theory of Planned Behavior's utility for predicting people's intentions to support building a new dam in Cumberland County, Tennessee. It includes an overview of the project's background and study area, the construction and design of the mail questionnaire, and how the variables of the theory were operationalized in the questionnaire. Chapter IV concludes by outlining the statistical procedures employed for testing the theory's linkages and how the study sample was obtained.

Background & Study Area

Initial development of the project began in spring 2002 with the construction of a draft questionnaire for a possible study assessing the public's views about water resources to fulfill requirements of a survey research course. During summer 2002, the primary investigator and thesis committee members refined the study's purpose and objectives. The study's primary purpose is to assess the utility of the Theory of Planned Behavior (TPB) for predicting people's intentions to express their opposition to or support for building a dam in Cumberland County.⁹

The project proposal was approved by the thesis committee in August 2002 and was subsequently submitted for a Human Subjects Compliance Review by the University of Tennessee's Institutional Review Board. The Board approved the project September 20, 2002. Funding for the project was provided by a grant from the Waste Management Research and Education Institute (WMREI), a Center of Excellence at the University of Tennessee.

The project's study area is Cumberland County, Tennessee, which is located on the eastern edge of Tennessee's Cumberland Plateau. Citizens, local elected officials, and water utility officials are struggling to reach accord on how to meet the county's future water supply needs. A recent U.S. Army Corps of Engineer needs assessment study (U.S. Army Corp of Engineers, 1998) identified seven options, presented in Table 4.1, available to the county. The option of taking no action is included due to National Environmental Policy Act (NEPA) requirements.

The option of "building a dam" was used to test the utility of TPB for predicting people's expected support for it. It was selected for a number of reasons. First, it is the preferred option

⁹ A secondary purpose was to identify which policy option residents preferred for meeting water supply needs, and to describe residents' views and awareness of management of water resources in the county.

Table 4.1: Options for Meeting Cumberland County’s Future Water Supply Needs

#	Potential Option
1	Build a new impoundment (e.g. dam)
2	Build pipeline from existing reservoir
3	Conserve water (e.g. identify and reduce unaccounted water loss, increase use of water efficient technology)
4	Drill for new groundwater sources
5	Harvest and store water from storm events
6	Raise the height of existing impoundments
7	Take no action

(U. S. Army Corp of Engineer, 1998)

of city, county, and utility district officials (Moser, 2001). In contrast, state and federal regulators staunchly oppose it unless a regional strategy is implemented for managing the county’s water resources.¹⁰ This decision was affirmed in focus groups conducted prior to implementing the study’s mail survey. Participants cited “building a dam” as the most frequent response for their preferred option to meet the county’s water supply needs. In addition, they were most knowledgeable about and familiar with this option. Finally, public opinion about dams is typically polarized, increasing the likelihood of variation among survey responses – a methodological necessity for statistically testing the theory’s linkages.

Ajzen and Fishbein (1980) direct researchers to use an initial pilot study to identify modal behavioral beliefs (i.e. those most salient to the behavior under investigation), and norm referents, (i.e. individuals or groups whose opinions are important to subjects about the behavior of interest). These salient beliefs and referents are then incorporated into a survey questionnaire designed to measure all of the theory’s components. The following section details how focus groups were used to verify and refine the design, format, and structure of the project’s mail questionnaire.

Questionnaire Design

Development of the mail survey’s objectives by thesis committee members began in January 2002. These objectives guided the construction of a draft questionnaire subsequently evaluated by peer researchers in a survey design and analysis class (Sociology 633) during the spring of 2003. It was significantly revised during the summer to more accurately meet the

¹⁰ Environmental regulatory officials are not opposed to permitting a dam to meet water supply needs *if* it is part of a regional strategy; they are unwilling to allow each utility district to build separate impoundments.

project's research purpose and objectives. A draft version of the mail questionnaire was then evaluated during two focus groups conducted in early October 2002.

The purpose of the focus groups was to have a representative cross-section of Cumberland County's community leaders discuss their views on water supply issues facing the county. The meetings were structured to meet the following objectives: 1) identify participants' preferred option for meeting future water supply needs in the county, 2) identify salient behavioral beliefs and normative referents, and 3) elicit participants' views about a draft of the survey questionnaire. Each focus group was facilitated by the study's primary investigator and included the assistance of two or three additional researchers. The role of the assisting investigators was to record participant comments using written notes.

A list of 198 potential focus group participants was compiled from key informants and an Internet index of county clubs and organizations (Crossville Chamber of Commerce, 2003). Key informants were asked to provide names and contact information for individuals whom they believed represented groups or interests in Cumberland County. Potential focus group participants were required to be county residents and 18 years or older. Contact information for each individual was entered into a password-protected Microsoft Excel spreadsheet.

A coding scheme was employed to selectively sample individuals so that the focus groups would include both county and city of Crossville residents and be somewhat representative of various county groups. Individuals were coded according to organizational affiliation (identified, unidentified), residence location (city of Crossville, county resident), representative interest (business, charitable, education, environment, health, miscellaneous, political, religious, or unknown), and gender.

Individuals were recruited to participate in the focus groups through telephone interviews. The targeted number of participants for each meeting was eight to twelve participants. Those known to represent a county group or interest were contacted first, followed by those whose organizational affiliation could not be determined. An interview script directed participant recruitment (see Appendix A). As individuals agreed to attend the meetings, researchers contacted subsequent potential participants based on their characteristics to ensure a fairly representative sample. The focus group recruitment response rates are presented in Table 4.2. Approximately fifty percent of the sample was telephoned before twenty-three individuals expressed an interest in attending one of the focus groups. Individuals interested in attending a focus group were subsequently mailed a follow-up letter with further instructions and were telephoned one day prior to their scheduled date as a reminder to attend (see Appendix A).

Table 4.2: Focus Group Recruitment Response Rates

N		Percent
198	Potential participants	100
109	Potential participants phoned	55.1
109	Potential participants phoned	100
4	Ineligible participants (deceased, wrong #, disconnected)	3.7
37	No answer or left message	33.9
68	Answered on first or follow-up attempt	62.4
68	Answered on first or follow-up attempt	100
27	'No interest' (No, out of town, no time)	39.7
18	'Call back' to reach possible participant	26.5
23	'Yes, I will attend'	33.8
23	'Yes, I will attend'	100
3	Did not attend	13.0
10	Thursday, October 10, 2002	43.5
10	Monday, October 14, 2002	43.5

Two focus groups were conducted on Thursday, October 10, 2002 and Monday, October 14, 2002. Both meetings had ten participants and lasted approximately two hours. One was held at Cumberland State Park and the other at the public library in Crossville. At the beginning of each meeting, participants were provided with the following information: the purpose and funding of the project, the objectives of the focus group, how participants were selected, their rights, and their acknowledgement of consent. The goal of the first hour was to identify participants' preferred option for meeting the county's future water supply needs and elicit related behavioral beliefs and norm referents. Following a short break, they completed a draft of the mail survey and shared their views about its questions and design.

During the first half of the meetings, participants completed a short survey including seven open-ended questions designed to meet the focus group objectives (see Appendix B). Participants were asked to identify which option they preferred for meeting the county's water supply needs, the advantages and disadvantages they associated with it, and the groups or individuals they thought might approve or disapprove of it and whose opinions were important to them. These responses were then compiled for each question and thematically organized into categories.

The response frequencies of focus group participants' preferred option for meeting the county's water supply needs are presented in Table 4.3. Some individuals identified multiple

Table 4.3: Response Frequencies for Participants' Preferred Option

Frequency	Option for Meeting Water Supply Need (USACE)
16	Build a new impoundment (e.g. dam)
2	Build pipeline from existing reservoir
2	Conserve water (e.g. identify and reduce unaccounted water loss, increase use of water efficient technology)
0	Drill for new groundwater sources
5	Harvest and store water from storm events
2	Raise the height of existing impoundments
0	Take no action

n = 20.

options despite instructions to select only one option. Building a dam was either the only option, or at least one of the preferred options, identified by fourteen of the participants. Consequently, this option was used to test the utility of the Theory of Planned Behavior and to design measures of the theory components in the mail survey questionnaire. Thus, only responses related to this option will be reported for the remaining questions of the focus group survey.

The second objective of the focus groups was to identify participants' salient behavioral beliefs about building a dam for meeting water supply needs. This was accomplished by asking participants to identify the disadvantages and advantages they associated with building a new dam (see Appendix B: Questions 2-3). Economic reasons (e.g. more efficient in terms of amount of money invested and additional supply obtained, lower transportation and treatment costs, or more affordable water) were the most frequently identified advantages. Other advantages mentioned more than once include the provision of a reliable source of clean water, its longevity as a supply source, and the tourism and recreational benefits related to a new reservoir in the county. The most frequently identified disadvantages to building a new dam were having to "deal with environmentalists", its high construction cost, and the length of time necessary for the regulatory permitting process. Like the identified advantages, about one-fifth of the disadvantages identified by participants were mentioned once. However, the second most frequent response from participants was that there were no disadvantages to building a dam.

The third objective of the focus group was to identify participants' salient normative referents. This was done by asking participants to identify groups or individuals they believed would approve or disapprove of building a new dam (see Appendix B: Questions 5-6). The referents most frequently identified as approving of it were county residents (5), water users (5), tourism and recreation businesses (3), and local city and county officials (2). The referents most frequently identified as disapproving of it were environmentalists (8), outside county interests

such as whitewater paddling enthusiasts or property owners (3), and property owners whose property would be affected by reservoir construction and flooding (2). Almost all of the behavioral beliefs and referents identified by participants had previously been incorporated into the draft mail survey questionnaire. Overall, the focus group findings validated the measures included in the draft mail survey for assessing the theory's components.

The second part of each meeting was structured to meet the focus group's fourth objective. It involved participants completing a draft of the mail survey and subsequently sharing their opinions about its questions and design. Participants expressed concerns about the questionnaire's length, cover page appearance, and the purpose of the project. A number of revisions were subsequently made to the mail survey based on this information. The overall length of the questionnaire was reduced from sixteen to twelve pages based on comments about the length of the survey and the time required to complete it. Design changes were also made to the questionnaire's cover page following suggestions to improve the likelihood that potential respondents would open the questionnaire. All of the norm referents identified by participants in the focus group survey were not included in the final version of the questionnaire since participants' written and verbal comments indicated no motivation to comply with the wishes of those referents. The remaining referents included in the final version were close personal friends, most family members, and most neighbors. Finally, the entire questionnaire was subsequently reviewed to address participants' concerns about respondent misperception and perceived bias. For example, in some cases the phrase "support of" was replaced with "opposed to" in some questions to more clearly convey the study's focus on factors influencing peoples' support for or opposition to building a new dam. The final version was reviewed by project investigators and then printed in booklet form according to the principles set forth by Salant and Dillman (1994) in mid-October 2002.

The mail questionnaire contains eighty-five questions: eighty-four close-ended and one open-ended (see Appendix C). The first fifty-six questions are topical and divided into two sections. The first section measures aspects of county water policy such as respondents' awareness and knowledge of water supply problems facing Cumberland County (Questions 1 – 9) and their views about options available for meeting its future supply needs (Questions 10 – 19). The second set of topical questions measure components of the theory (Questions 20 – 56). The questionnaire's remaining twenty-nine questions focus on sociodemographic characteristics of respondents.

The University of Tennessee's Human Dimensions Laboratory (HDL) administered and implemented the mail survey in consultation with project investigators. It employed a four-wave mailing approach designed to improve mail survey response rates (Salant and Dillman, 1994). The first wave was an introductory letter personally hand-addressed to potential respondents explaining how they were selected, the purpose of the project, and the mailings that would be following. A second hand-addressed envelope containing a letter, survey questionnaire, and a stamped business reply envelope followed this. The third mailing was a postcard reminder thanking respondents who had already returned questionnaires and encouraging those who had not yet returned them to do so as soon as possible. Finally, the fourth mailing was a hand-addressed letter sent to every potential respondent who not yet returned a blank or completed questionnaire (see Appendix C). The mailing cycle began on October 24 and continued into mid-December. Originally scheduled to conclude before the Thanksgiving holiday, it was lengthened to counter possible declines in the response rates related to a natural disaster in Cumberland and adjacent counties in mid-November.

All survey materials returned by mail were received at the University's Energy, Environment, & Resources Center, marked with their arrival date, and then delivered by the project investigator to HDL. HDL personnel tracked response rates using Excel, obtained census tract information for each respondent using an online data information web site (MelissaDATA.com, 2003)¹¹, and entered survey responses into a digital data file using Statistical Package for the Social Sciences (SPSS, version 11.0). All written responses were entered into a WordPerfect file and sorted according to question number and survey identification number. All project materials (e.g. complete and incomplete questionnaires, Excel and SPSS digital data files) were delivered to project investigators in early January 2003. The SPSS data file was then cleaned and examined for data entry errors through January and February 2003. The next section describes how the theory's components were operationalized in the mail survey questionnaire.

Operationalizing Variables

The mail questionnaire was constructed following guidelines outlined by Ajzen and Fishbein (1980). Focus groups were used to evaluate its design and refine measures for variables in the theory. This section details how each component of TPB, except actual behavior, is operationalized in the questionnaire beginning with intentions, proceeding to its proximate

¹¹ Census information will be used to graphically display survey results according to places (e.g. Crossville) and utility districts in the county using Geographic Information Systems software.

predictors (i.e. attitudes, subjective norms, and perceived behavioral control), and then concluding with its distal predictors.

Intentions

The Theory of Planned Behavior (Ajzen, 1985, 1987) posits intentions to perform a behavior (i.e. willingness to express support for building a dam) are a function of attitudes towards the behavior, corresponding subjective norms, and perceived behavioral control. Intentions were measured with a five-item index (see Appendix B: Questions 20-24) since respondents can express their support or opposition in a variety of ways (e.g. voting for, or contacting, public officials; attending public meetings; donating money to groups; and talking to neighbors, friends or relatives). Each question employed a Likert response scale with anchors of “likely” and “unlikely”, and adverb modifiers of extremely, quite, and slightly. Three questions asked subjects to estimate the likelihood they would perform behaviors that would express “support for” building a new dam (see Appendix C: Questions 20, 21, and 24). Two questions asked respondents to estimate the likelihood they would perform behaviors that would express “opposition to” building a dam (see Appendix C: Questions 22 and 23). Each question was originally coded 1 through 7, with 4 (unsure) serving as the midpoint. All of the questions were recoded into a bipolar scale with 0 (unsure) remaining as the midpoint. For example, survey responses for questions including the phrase “support for” (Questions 21, 21, and 24) were recoded from 1 (extremely likely) to +3. Survey responses to questions with the phrase “opposition to” (Questions 22 and 23) were reverse coded so that responses of 1 (extremely likely) corresponded to -3. The five measures were then summed for a general measure of respondent intentions (Ajzen and Fishbein, 1980:55). The alpha reliability test for the index yielded a satisfactory alpha of 0.68. Higher values indicate stronger intentions to support building a dam.

Survey responses for the INTENTIONS index range from +15 to -15 with a mode of zero. Its mean is 3.43 with a standard deviation of 5.50. Overall, residents express weak support for building a dam to meet the county’s water supply needs. There was variation in the responses for the different actions for expressing support. Residents were most willing to talk about their support (44%) or vote for a public official supporting the construction of a dam (42%). However, of all the behaviors measuring a person’s support, residents were most unsure about voting (40%). Finally, county residents were most unlikely to attend a public meeting to oppose building a dam (71%) or donate money to a group opposing it (80%).

Attitudes Towards Building a Dam

Attitudes are assumed by the theory to be one of three predictors of intentions. In the Theory of Planned Behavior, it is someone's overall negative or positive evaluation of a given behavior that is important (Ajzen and Fishbein, 1980:62). A five-item index (see Appendix B: Questions 26 – 30) was used to measure attitudes about building a dam. Respondents were asked to estimate the strength of their attitudes by completing the statement "Building a new dam in the County is . . ." for five different pairs of anchors (e.g. bad/good, positive/negative) representing the evaluative dimension on the semantic differential (Osgood, Suci, Tannebaum, 1957). Each item employed a Likert scale with the adjective modifiers extremely, quite, and slightly, and unsure as a midpoint.

Each question was originally coded 1 through 7 with 4 (unsure) as the midpoint. All of the five items were recoded into a bipolar scale with 0 (unsure) serving as the midpoint. The survey responses for three questions (see Appendix C: Questions 27, 29, and 30) were recoded so that values of 1 corresponded with +3, indicating more positive attitudes about building a new dam. The responses for two questions (see Appendix C: Questions 26 and 28) were reverse coded so that responses of 1 corresponded with scores of -3, indicating more negative attitudes about building a dam. Summing the survey responses, the five items constructed an overall measure of attitudes towards building a dam. An alpha reliability test produced an alpha of 0.94. Higher values on the index reflect a more positive evaluation about constructing a dam.

Survey responses for the ATTITUDE index range from +15 to -15 with a mode of zero. Its mean is 5.66, with a standard deviation of 6.93. This suggests that the average resident holds a slightly positive attitude about building a dam in the county, but that there is a great deal of variation in the responses for the measure. While seventy-two percent of residents had index values ranging from +1 to +15, they tended to cluster at the +5, +10, and +15 scores. Examining the response frequencies for the five measures of a person's attitude towards building a dam shows that they ranged from sixty-one to sixty-eight percent for some degree of positive evaluation (+1 to +3). Twenty-four to twenty-eight percent of residents were unsure for each of the items. The modal response for three of the items (bad/good, positive/negative, important/unimportant) was +2. The highest mean response (1.24) response was observed for whether a person felt that building a dam was important (Question 30).

Subjective Norm

A subjective norm is an individual's overall perception of the social pressures from important others to perform or not perform a given behavior (Ajzen and Fishbein, 1980:56). The

theory hypothesizes it is both a predictor of intentions and a function of normative beliefs. It was gauged using a single item measure scored from zero (“Most people important who are important to me think I should never support building a new dam in the county.”) to six (I should always). Respondents who were unsure or did not care whether others thought they should support the construction of a dam were scored with a three (see Appendix C: Question 45). These coding values were printed in the questionnaire as placeholders in the response scale to counter the tendency for subjects to overwhelmingly select the mid-point of the response scale for a subjective norm measure. The survey responses were recoded into a bipolar scale from positive three (I should always) to negative three (I should never) with zero as the midpoint. Higher scores indicate greater perceived normative pressure to support building a new dam.

Survey responses for the single item SUBJECTIVE NORM measure range from +3 to -3 with a mean of 0.40. The modal response is zero with a standard deviation of 1.12. Overall, residents perceive a weak generalized social pressure to express their support for building a new dam. Only twenty-seven percent indicated some (scores of +1 to +3) normative pressure. A substantial percentage of residents (67%) were either unsure or believe that other people do not care whether respondents support the construction of a dam.

Perceived Behavioral Control

Perceived behavioral control is the third independent variable for predicting people’s intentions to perform a particular behavior. It represents a subject’s overall perception of the difficulty in performing a given behavior (Ajzen, 1987:40). A single item measure with a seven point Likert scale was used to obtain an overall measure of respondent’s perceived control. It employed the bipolar anchors “agree” and “disagree” with the adverb modifiers extremely, quite, and slightly. Respondents were asked to estimate the degree to which they agreed with the statement, “Overall, I think it will be hard for me to express my support for or opposition to building a new dam in the County” (see Appendix C: Question 53). The measure was originally coded from 1 (extremely agree) to 7 (extremely disagree) with 4 (unsure) serving as a midpoint. Survey responses for Question 53 were recoded to a bipolar scale so that 7 (extremely disagree) equaled +3. Higher values for the overall PERCEIVED CONTROL measure indicate a stronger belief by respondents that expressing their support for building a dam is not difficult and within their personal control.

The mean for PERCEIVED CONTROL is 0.33 with a range from +3 to -3. Its standard deviation equaled 1.83, with a mode of zero. It appears the average resident holds weak beliefs

about whether expressing their support or opposition to building a dam is within their volitional control. Reviewing the aggregate frequencies for the response categories shows that forty-three percent believe they have some degree of personal control (scores of -1 to -3) compared to thirty-two percent who do not. Twenty-five percent of residents are unsure about the extent of their ability to successfully express their support. Overall, a greater number of residents believe they have some degree of personal control over behaviors for expressing their support.

Behavioral Beliefs

According to the theory, behavioral beliefs are the independent predictors of attitudes towards a behavior and are comprised of two components. Outcome beliefs are an individual's cognitive belief about the likelihood that a specific consequence will result from a given behavior. Outcome evaluations are an individual's estimation of the desirability of those specific outcomes or consequences (Ajzen and Fishbein, 1980:63). For example, a person could indicate that lowering the cost of water is extremely likely to result from building a dam and that this is extremely desirable. Taken together, outcome beliefs and evaluations represent a person's behavioral beliefs about building a dam in the county to meet its water supply needs.

The theory defines behavioral beliefs as the sum of the weighted averages for each pair of corresponding measures for outcome beliefs and evaluations (Ajzen and Fishbein, 1980). Residents were asked to estimate the likelihood that various outcomes identified by the focus groups (e.g. lowering the cost of water) would result from building a dam (see Appendix C: Questions 31-37). Seven questions with the anchors "likely" and "unlikely" on a seven point Likert scale and the adverb modifiers extremely, quite, and slightly were used to obtain an overall measure of respondents' behavioral beliefs. Each question was originally coded from 1 to 7 with 4 (unsure) serving as the midpoint. The survey responses for every item except Questions 31 and 35 were recoded to a bipolar scale so responses of 1 (extremely likely) equaled +3. Questions 31 and 35 were reverse coded so that responses of 7 (extremely unlikely) corresponded with +3. All recoded items have zero (unsure) serving as a midpoint on the bipolar scale. Higher values indicate a stronger belief that a given outcome will occur as a result of building a dam.

The same outcomes (e.g. lowering the cost of water) were used to assess respondents' outcome evaluations (see Appendix C: Questions 38-44). Residents were asked to indicate the desirability of each outcome occurring. The seven questions used a seven point Likert scale (extremely desirable – extremely undesirable). Each question was originally coded from 1 to 7 with 4 (unsure) serving as the midpoint. The survey responses for every item except Questions

38 and 42 were recoded to a bipolar scale so values of 1 (extremely desirable) correspond to +3. Questions 38 and 42 were reverse coded so that 7 (extremely undesirable) equaled +3. Each of the recoded items have zero (unsure) as the midpoint. Higher values indicate a stronger desirability for each outcome to occur.

Following Ajzen and Fishbein's (1980) guidelines for constructing an overall measure of behavioral beliefs, each outcome belief (e.g. Question 31) was multiplied with its corresponding outcome evaluation (e.g. Question 38). The product of each corresponding pair is a weighted average representing the relative strength of respondents' behavioral beliefs about building a dam. The products for the seven behavioral beliefs were then summed to form a BEHAVIORAL BELIEF index. An alpha reliability test on the seven-item index yielded an acceptable alpha of 0.76. Higher scores indicate respondents believe it is more likely that positive outcomes will occur as a result of building a dam. Survey responses for the index range from +63.00 to 45.00 with a mode of zero. Its mean is 13 with a standard deviation of 17.8.

Results for the BEHAVIORAL BELIEF index demonstrate that, in general, residents believe it is a bit more likely that more positive outcomes rather than negative ones will occur as a result of building a dam. Seventy-five percent of residents believe it likely to some degree (+1 to + 63 index scores) that more positive outcomes will occur rather than negative ones. Residents believe it most likely that building a dam will help utility companies (75%), provide new recreational opportunities (70%), and help the economy (67%). A significant percentage expressed uncertainty about the effect of a dam on meeting water supply needs (37%), personal water costs (35%), and whether it would degrade the environment (30%) or fish and animal habitat (27%). Finally, residents expressed the strongest disbelief (39%) about whether their cost of water would decrease as a result of building a dam.

Normative Beliefs

The theory asserts that subjective norms are dependent variables of normative beliefs, i.e. respondents' beliefs that specific important others think they should or should not perform a given behavior. Like behavioral beliefs, normative beliefs are a composite of two aspects: norm referents and referent motivation (Ajzen and Fishbein, 1980). Norm referents are an individual's significant referents; referent motivation is the strength of a person's motivation to comply with each referent's wishes. Focus group results revealed little or no motivation to comply with some referents. Thus, only significant referents such as a respondent's family, personal friends, and neighbors were included in the survey instrument (see Appendix C: Questions 46-48).

Respondents were asked to estimate the degree to which they believed “family members (Question 46) and “neighbors” (Question 48) thought they should oppose building a new dam. They were also asked to estimate the degree to which their “close personal friends” thought they should support building a new dam (Question 47). Each question was coded from zero (I should never) to six (I should always) with three serving as a midpoint. Survey responses for Question 47 were recoded into a bipolar scale so that responses of 6 (always support) equaled +3 with zero as a midpoint. Responses to Questions 46 and 48 were reverse recoded so that those of zero (I should never oppose) correspond to +3. Higher values indicate stronger beliefs that various norm referents think respondents should support building a dam.

The scores obtained for respondents’ significant referents were weighted by the strength of their motivation to comply with each referent according to the guidelines of Ajzen and Fishbein (1980). Consequently, respondents were asked to indicate the strength of their motivation to comply with each of the referents (see Appendix C: Questions 50-52). Each question was originally coded using a unipolar scale from one (extremely agree) to seven (extremely disagree) since “people are unlikely to do the opposite of what their salient referents think they should do” (Ajzen and Fishbein, 1980:75). The survey responses were reverse coded so that scores of seven (extremely agree) represented stronger motivation to comply with significant referents. Each respondent’s belief about a significant referent was weighted by the strength of his or her motivation to comply with the corresponding referent (e.g. Question 46 and 50). These products were then summed to form a NORMATIVE BELIEF index. An alpha reliability test yielded an alpha of 0.54. Higher index values represent stronger beliefs by respondents that significant referents think they should support building a dam.

Survey responses for the index range from +63 to -45 with a mode of zero. The mean for the NORMATIVE BELIEF index is 3.7 with a standard deviation of 14.1. These results indicate seventy percent of residents are either unsure whether their significant referents think they should support the construction of a dam or that residents believe important others do not care if they express their support. About thirty percent perceive an overall normative pressure to support it. Among a person’s significant referents, the greatest number of residents (33%) believed their close personal friends thought they should support the construction of a dam.

Control Beliefs

The theory posits that perceived behavioral control is the dependent variable of underlying control beliefs. Control beliefs are individuals’ perceptions about whether they

possess the skills, knowledge, and opportunity to perform a given behavior. Residents were asked to indicate their agreement to three statements about whether they had the necessary information, skills, and opportunity to express their support for or opposition to building a new dam (see Appendix C: Questions 50-52). Each question employed a seven point Likert scale (agree –disagree) with the adverb quantifiers extremely, quite, and slightly. The items were originally coded from 1 (extremely agree) through 7 (extremely disagree) with 4 (unsure) as a midpoint. They were each recoded into a bipolar scale so that survey responses of 1 (extremely agree) equaled +3 with zero serving as a midpoint. The survey scores for Questions 54 – 56 were then summed into a CONTROL BELIEF index representing an overall measure of control beliefs. The alpha reliability test for the three-item index yielded an acceptable alpha of 0.67. Higher scores represent stronger beliefs that respondents possess the necessary information, skills, and opportunity to express their support for or opposition to building a new dam.

Survey responses for the index range from +9 to -9 with a mode of zero. The mean for the CONTROL BELIEF index is 1.0 with a standard deviation of 4. The survey results indicate the average resident holds weak beliefs about whether they have the necessary information, skills, or opportunity to successfully express their opinion about building a dam. However, there is variation in the range of their responses as suggested by the index's standard deviation. Fifty percent of residents believe they have some degree (scores of +1 to +9) of personal control, while thirty percent believe they do not. Examining the response frequencies for the index items reveals that people vary in their beliefs about the skills, opportunity, and information needed to express their opinions. The greatest percentage of residents (40%,) indicated to some degree (-1 to -3) that they feel they do not have enough information. People had the strongest beliefs for whether they had the skills (57%) or opportunity (44%) necessary to express their support or opposition. Overall, slightly more than a quarter of people surveyed (25-36%) indicated they were uncertain whether they possessed the necessary information, skills, or opportunity to express their opinion about building a dam.

A summary of the univariate results for each of the theoretical components measured in the mail questionnaire is presented in Table 4.4 below. The modal survey response for every component was zero (unsure).

Study Sample

The project's sample was obtained from Survey Sample, Inc. of Fairfield, CT. Based on the 2001 U.S. Census Bureau estimate of the adult population in the county (N = 38,195),

Table 4.4: Summary of Univariate Results for Theory Components

Variable	# Items	Alpha	Range of Survey Scores	Mean	S. D.	N
Intentions	5	0.68	+15.00 to -15.00	3.43	5.50	416
Attitudes	5	0.94	+15.00 to -15.00	5.66	6.93	410
Subjective Norm	1		+3.00 to -3.00	0.40	1.12	420
Perceived Control	1		+3 to -3	0.33	1.83	425
Behavioral Beliefs	7	0.76	+63.00 to -45.00	13.0	17.8	428
Normative Beliefs	3	0.54	+63.00 to -45.00	3.69	14.1	416
Control Beliefs	3	0.67	+9.00 to -9.00	0.99	3.98	425

approximately three hundred returned and completed questionnaires from eligible respondents was necessary to achieve a ninety-five percent confidence interval and a minimum 0.05 sampling error. Thus, any additional questionnaires received above a final sample size of three hundred would increase the confidence levels of the study. Using conservative estimates about the percentage of eligible respondents, response rates, and usable questionnaires, approximately eleven hundred questionnaires were mailed to a random sample of adult residents living in Cumberland County. The assumptions used to calculate the initial sample size ($n = 1100$) of Cumberland County, Tennessee residents, 18 years or older, are presented in Table 4.5.

The response rate statistics for the mail questionnaire are presented in Table 4.6 below. Eighty-nine (89) potential respondents were eliminated from the sample because they were deceased or ineligible because they were not Cumberland County residents or 18 years or older. Of the remaining questionnaires received by potential respondents, five hundred and six (506) were not returned and seventy-two (72) blank or incomplete questionnaires were received. Finally, four hundred and thirty-three ($n = 433$) questionnaires, representing a 42.8% response rate, were returned and completed by eligible respondents. This final sample size has a sampling error of 4.8 percent. The original questionnaire responses were coded and entered by HDL personnel into a digital data file using the Statistical Package for the Social Sciences, 11.0 (SPSS). The survey responses were then examined for errors and recoded by the project's primary investigator into bipolar scales with values ranging from +3 to -3 with zero serving as a midpoint.

Table 4.5: Estimated Assumptions for Calculating Sample Size

Assumption		Total
Returned, completed, & usable surveys	300	300
80% of sample eligible	(300 / .80)	375
40% survey return rate	(375 / .40)	938
90% usable surveys	(938 / .90)	1042
Total Initial Sample Size		1100

Table 4.6: Questionnaire Response Rate Statistics

N	Mail Sampling Results	%
1100	Questionnaires mailed	100.0
89	Deceased, Non-deliverable, or Non-resident respondents	8.1
1011	Questionnaires received by potential respondents	100.0
506	Unreturned questionnaires	50.0
72	Blank and incomplete questionnaires returned	7.1
433	Questionnaires completed and returned by eligible respondents	42.8

Summary

This study tests the utility of the Theory of Planned Behavior, an attitude-behavior theory, for predicting people's willingness to express support (i.e. intentions) for building a dam to meet future water supply needs. It is based on the survey responses from an initial random sample of 1,100 residents, age 18 or older, of Cumberland County, Tennessee. Focus groups were conducted with community leaders (n = 20) to obtain a fairly representative sample of residents' views about water supply issues facing the county and behavioral and normative beliefs salient to their preferred option (i.e. building a new dam) for meeting the county's water supply needs. These results were used to refine the design, layout, and structure of a mail questionnaire containing eighty-five questions that was mailed to potential respondents in the fall of 2002. Most of the theory's variables were gauged using index measures (Intentions, Attitudes, Behavioral Beliefs, Normative Beliefs, Control Beliefs). Only respondents' subjective norms and perceived control were assessed with single item measures. Four hundred and thirty-three (433) questionnaires, representing a 42.8% response rate, were returned and completed by eligible respondents. Following Ajzen and Fishbein's (1980) guidelines for testing the theory, the survey responses were used to assess the linkages hypothesized by the Theory of Planned Behavior. First, bivariate correlation analyses were performed on each postulated linkage to identify significant relationships between variables in the theory. Every variable with a significant relationship to the dependent variable in question (e.g. intentions) was subsequently included in a multivariate linear regression analysis employing a stepwise elimination method to identify its significant predictors. Finally, partial correlation coefficients were obtained for each variable included in the regression model to identify the independent effect of each variable on the dependent variable while controlling for the effects of the other variables included in the regression analysis. The results of these analyses for each hypothesized relationship in the theory are presented in the following chapter.

Chapter V: Findings & Results

This chapter presents the results of correlational and multiple linear regression analyses performed on the linkages postulated by the Theory of Planned Behavior. The primary purpose of the study is to assess the utility of the theory to predict and understand people's expressions of support (i.e. intentions or commitment) for building a dam from the survey responses of a random sample of Cumberland County, Tennessee residents. The chapter begins by exploring the relationships between the study's primary dependent variable, people's willingness to support building a dam (i.e. intentions), and its three antecedent variables (i.e. attitudes, subjective norm, and perceived control). The linkage between each of these predictors of intentions and their corresponding underlying beliefs (e.g. attitudes and behavioral beliefs) is then examined. A two-step procedure was employed for assessing each of the proposed linkages by the theory. First, bivariate correlational analysis was performed to identify significant relationships among the components of the theory. Each variable with a significant relationship to the specified dependent variable (e.g. intentions) was then included in a multiple linear regression model employing a stepwise elimination method. In addition, partial correlation coefficients for each variable included in each regression analysis were also obtained to identify the independent effect of each predictor on a specified dependent variable while controlling for the effects of other variables included in the regression model. All bivariate, partial, and regression analyses utilized a listwise comparison procedure to reduce bias from missing values. Chapter V concludes with a summary of the study's overall findings.

The Theory of Planned Behavior postulates people's intentions to perform a behavior are related to their overall attitudes and subjective norms regarding it. In addition, people's perception of personal control (i.e. perceived behavioral control) should also be significantly related to intentions in situations where the ability to successfully perform a behavior is limited by internal or external factors such as required skills and opportunity (i.e. non-volitional actions). Table 5.1 below presents the one-tailed bivariate correlation coefficients for all of the theory's components. Each of the variables was related to other components in the theory at the highest level of significance ($p < 0.001$). Intentions are strongly related to attitudes ($r = 0.747$) and subjective norm ($r = 0.646$), while perceived control ($r = 0.361$) is less, though significantly, related to intentions. Behavioral beliefs are most strongly related to attitudes ($r = 0.648$), as are normative beliefs with subjective norm ($r = 0.479$). Control beliefs are moderately, though

Table 5.1: Bivariate Correlation Coefficients

	Intentions	Attitudes	Subjective Norms	Perceived Control	Behavioral Beliefs	Normative Beliefs	Control Beliefs
Attitudes	.747***						
Subjective Norm	.646***	.619***					
Perceived Control	.361***	.384***	.299***				
Behavioral Beliefs	.550***	.648***	.521***	.358***			
Normative Beliefs	.392***	.415***	.479***	.220***	.345***		
Control Beliefs	.280***	.318***	.349***	.363***	.387***	.252***	

Listwise comparison (n = 385) with 1-tailed test. Significance level: ***(p < .001).

significantly, related ($r = 0.363$) to perceived control. The following sections present the detailed results for each of the relationships hypothesized between the components of the theory.

Intentions to Support Building a Dam

According to the theory, expressions of support (i.e. intentions) for constructing a dam should be significantly related to corresponding measures of attitudes towards building a dam, subjective norm, and perceived behavioral control. The Pearson correlation coefficients for a one-tailed test presented in Table 5.2 below show that respondents' attitudes towards building a new dam (Attitudes), perceptions of a general social pressure to support it (Subjective Norm), beliefs about the consequences of building it (Behavioral Beliefs), beliefs about whether significant referents think they should support its construction (Normative Beliefs), perceptions of personal control (Perceived Control), and beliefs about the necessary skills, information, and opportunity to successfully support it (Control Beliefs) are all significantly related to expressions of support for building a dam (Intentions).

Overall, these findings indicate that residents who more positively evaluate building a dam (Attitudes), more strongly perceive a general social pressure to support building it (Subjective Norm), believe more strongly that more positive than negative outcomes will result from its construction (Behavioral Beliefs), more strongly believe that specific important others think they should support it (Normative Beliefs), hold stronger beliefs about the degree of personal control for successfully expressing their support (Perceived Control), and believe more strongly that they possess the necessary information, skills, and opportunity to express

Table 5.2: Intentions – Bivariate Correlation Coefficients

Variable	Coefficient
Attitudes	.747***
Subjective Norm	.646***
Behavioral Beliefs	.550***
Normative Beliefs	.392***
Perceived Control	.361***
Control Beliefs	.280***

Listwise comparison (n = 379) with 1-tailed test. Significance level: ***($p < .001$).

their opinion (Control Beliefs) are also willing to express their support for its construction (Intentions).

Each of the variables found significantly related to intentions was then included in a multivariate linear regression analysis for predicting intentions employing a step-wise elimination method. As hypothesized by the theory, attitudes toward the behavior, subjective norm, and perceived control exhibit the strongest relationships with people's willingness to express support (i.e. intentions) for building a dam than other variables included in the regression model. The results presented in Table 5.3 below demonstrate that attitudes towards building a dam and subjective norm each exhibit independent effects (i.e. partial correlation) on intentions at the highest level of significance. Attitudes toward building a dam have a stronger influence than subjective norms on intentions based on their respective partial correlation coefficients. Although perceived control, behavioral beliefs, and control beliefs were related to intentions in the bivariate correlation analysis, these relationships were not sustained in the presence of the effects of attitudes toward building a dam and subjective norm on intentions.

The theory postulates that people's intentions to perform non-volitional behaviors are a function of attitudes, subjective norms, and perceived control. The results of the multivariate regression analysis confirm the hypothesized linkages for attitudes and subjective norms with intentions at the highest level of significance. In addition, these two predictors explain sixty-one percent of the variance in the willingness of respondents to express their support for building a dam (i.e. intentions). While the linkage between perceived control and intentions was not confirmed, it approached significance ($p = 0.059$) to be included in the model. Finally, as suggested by the theory, behavioral, normative, and control beliefs were not found to explain any variance in intentions.

The results indicate that residents' attitudes about constructing a dam and perceptions of a generalized social pressure to support it from significant referents are strong predictors of

Table 5.3: Intentions – Multiple Regression Results

Variable	Partial Correlation	Beta	T Values	R Square
Attitudes	.579	.563	13.9***	0.558
Subjective Norm	.351	.298	7.34***	0.613
(Perceived Control)	.096	.065	1.892	
(Behavioral Belief)	.066	.055	1.289	
(Normative Beliefs)	.029	.021	.574	
(Control Beliefs)	-.004	-.003	-.085	

n = 384. Significance level: ***($p < .001$).

people's expressions of support (i.e. intentions or commitment). This means that residents who more favorably evaluate constructing a dam and perceive a stronger pressure from important others to support building it are more likely to express their support for building a dam than their counterparts. While perceived control was found significantly related to intentions in the bivariate correlation analysis, it did not emerge as a significant predictor of intentions as hypothesized by the theory. This suggests either that residents' believe that specific actions for expressing their support for building a dam are within their personal control (i.e. the behaviors are volitional and control beliefs are not salient), or that the study results may be underestimating the strength of the relationship between perceived control and intentions.

Attitudes Toward Building a New Dam

The Theory of Planned Behavior not only provides a framework for identifying what people feel and believe (i.e. affective and cognitive expressions of environmental concern) about building a dam (e.g. attitudes, subjective norm, perceived control), but it also enables a deeper understanding of the underlying determinants (e.g. behavioral beliefs, normative beliefs, control beliefs) of people's behavioral intentions (i.e. conative expressions of concern). People's attitudes towards a behavior are assumed to be a function of underlying behavioral beliefs (Ajzen and Fishbein, 1980). Those who believe more strongly that more positive than negative outcomes will result from the construction of dam (Behavioral Beliefs) are more likely to positively evaluate it (Attitudes). Thus, behavioral beliefs should be strongly related to attitudes. The results of a one-tailed bivariate correlation, analyzed with the theory's remaining variables, are shown in Table 5.4. They confirm that behavioral beliefs are strongly and significantly related to attitudes toward building a dam ($r = 0.647$, $p < 0.01$). Thus, residents who positively evaluate building a dam also believe its construction is more likely to lead to more positive

Table 5.4: Attitudes – Bivariate Correlation Coefficients

Variable	Coefficient
Behavioral Beliefs	.647***
Subjective Norm	.617***
Normative Beliefs	.415***
Perceived Control	.381***
Control Beliefs	.312***

Listwise comparison (n = 391) with 1-tailed test. Significance level: ***(p < .001).

Table 5.5: Attitudes – Multiple Regression Results

Variable	Partial Correlation	Beta	T Values	R Square
Behavioral Beliefs	.441	.403	9.643***	.419
Subjective Norm	.356	.327	7.479***	.526
Perceived Control	.159	.118	3.163**	.539
Normative Beliefs	.118	.092	2.325*	.545
(Control Beliefs)	-.033	-.025	-.648	

n = 390. Significance levels: *(p < .05) **(p < .01) ***(p < .001).

consequences (i.e. it lowers the cost of water, helps the economy grow, provides new recreation and tourism opportunities, etc.) than negative ones (i.e. it would degrade the habitats of wild animals and fish or the natural environment for future generations).

Other variables such as Subjective Norm, Normative Beliefs, Perceived Control, and Control Beliefs are also related to attitudes. This indicates that residents who perceive a generalized social pressure from important others to support constructing a dam (Subjective Norm), believe significant referents think they should support it (Normative Beliefs), have stronger beliefs that is not difficult to express their support for building a dam (Perceived Control), and believe they possess the necessary skills, information, and opportunity to successfully perform actions expressing their support (Control Beliefs) also hold more positive attitudes towards building a dam than their counterparts.

The theory postulates that people's salient behavioral beliefs about a behavior should predict their overall attitudes towards the behavior. The results of the multiple regression analysis presented in Table 5.5 confirm the hypothesized linkage between behavioral beliefs and attitudes towards constructing a dam. The results show behavioral beliefs are the strongest predictor of attitudes towards building a dam (Beta = 0.403) at the highest level of significance, explaining about forty-two percent of the variance in people's attitudes towards the behavior. In

addition, based on the partial correlation coefficients, behavioral beliefs have the greatest influence on attitudes towards building a dam after controlling for the effects of other variables included in the regression model. Overall, knowledge about residents' beliefs about the positive and negative consequences of constructing a dam yields a fair degree of insight into why they hold their expressed attitudes towards building it.

In addition to behavioral beliefs, residents' corresponding subjective norm, perceived control, and normative beliefs were also found to explain portions of the variance in respondents' attitudes towards constructing a dam. Knowledge about people's subjective norm improves the prediction of attitudes towards building a dam by increasing the R square approximately eleven percent. The remaining two variables exhibit weaker relationships at lower significance levels. Finally, the significant relationship observed between control beliefs and attitudes towards building a dam was not sustained in the presence of the independent effects of the other remaining variables.

Subjective Norm

The theory postulates that subjective norms are a function of underlying normative beliefs. Thus, people who believe more strongly that specific significant referents think they should support building a dam and who are more strongly motivated to comply with their wishes should also perceive a stronger generalized social pressure to support its construction. The results in Table 5.6 confirm that normative beliefs are significantly related to subjective norms. Thus, residents who believe that various important others (i.e. family members, close friends, or neighbors) think they should support the construction of a dam and are motivated to comply with their wishes (Normative Beliefs) also perceive a stronger generalized social pressure (Subjective Norm) to support building it compared to their counterparts.

However, people's attitudes towards the behavior and behavioral beliefs are more strongly related to subjective norm than normative beliefs. In addition, control beliefs and

Table 5.6: Subjective Norm – Bivariate Correlation Coefficients

Variable	Coefficient
Attitudes	.617***
Behavioral Beliefs	.522***
Normative Beliefs	.481***
Control Beliefs	.345***
Perceived Control	.304***

Listwise comparison (n = 391) with 1-tailed test. Significance level: ***(p < .001).

Table 5.7: Subjective Norms – Multiple Regression Results

Variable	Partial Correlation	Beta	T Values	R Square
Attitudes	.365	.389	7.702***	.381
Normative Beliefs	.287	.243	5.884***	.442
Behavioral Beliefs	.144	.144	2.852**	.460
Control Beliefs	.136	.109	2.698**	.470
(Perceived Control)	.020	.016	.386	

n = 390. Significance levels: **($p < .01$) ***($p < .001$).

perceived control are also related. Consequently, this suggests that residents who more favorably evaluate constructing a dam (Attitudes); believe more strongly that more positive than negative consequences will result from building it (Behavioral Beliefs), more strongly believe they possess the necessary skills, information, and opportunity to express their support (Control Beliefs); and hold stronger beliefs about the degree of personal control regarding expressing their support (Perceived Control) also perceive greater overall social pressure from important others (Subjective Norm) to support building a dam than their counterparts.

Since each of the previous variables was significantly related to subjective norms, they were all included in a stepwise elimination multiple regression model for predicting subjective norms. According to the theory, normative beliefs should predict people's subjective norms. As shown in Table 5.7, this linkage is confirmed at the highest level of significance. The results also show that attitudes towards building a dam are more important (see Beta values) and have a stronger relationship (see partial correlation coefficient) than normative beliefs for predicting subjective norms. This means that residents who more favorably evaluate building a dam (Attitudes), and residents who believe more strongly that specific people important to them (i.e. family, friends, and neighbors) think they should support its construction and are more motivated to comply with the wishes of specific referents (Normative Beliefs) are more likely to feel a stronger generalized social pressure to support building a dam (Subjective Norm) than their counterparts.

In addition, behavioral and control beliefs were also identified as predictors of subjective norms, though they each explain less than two percent of its variance. Finally, the results demonstrate that the previously significant relationship between perceived control and subjective norm is not sustained in the presence of the independent effects of the other variables. Overall,

knowledge about residents' normative beliefs provides some insight about residents' perceptions of generalized social pressure to support building a dam.

Perceived Control

While perceived behavioral control was significantly related to intentions in the bivariate correlational analysis performed on the hypothesized linkage in the theory, it did not emerge as significant predictor in the multiple regression model for predicting intentions; however, it did approach significance ($p = .059$). The weak relationship observed between perceived control and intentions may be due to unidentified methodological factors or as the theory stipulates, when people believe that particular behaviors (i.e. actions for expressing support for building a dam) are under their volitional control then control beliefs will not add to the prediction of intentions. Regardless, the theory hypothesizes that there is a relationship between perceived control and underlying control beliefs. It postulates that people's beliefs about whether they possess the necessary information, skills, and opportunity to successfully attain a specific behavioral goal (i.e. control beliefs) should be predictive of people's subjective assessment of the difficulty of actually performing the behavior (i.e. perceived control).

As one observes in Table 5.8, the bivariate correlational analysis reveals that control beliefs are significantly related to perceived control, as are the other remaining variables of the theory. However, attitudes towards building a dam exhibit a slightly stronger relationship to perceived control than control beliefs. This means that residents who positively evaluate building a dam (Attitudes) and who believe they possess the necessary skills, information, and opportunity to express their support for it (Control Beliefs) also believe they possess a greater degree of personal control to successfully express their support for its construction (Personal Control).

In addition, the results show that behavioral beliefs, subjective norms, and normative beliefs are also related to perceived control. This indicates that residents who believe more positive rather than negative consequences will result from constructing a dam (Behavioral

Table 5.8: Perceived Control – Bivariate Correlation Coefficients

Variable	Coefficient
Attitudes	.381***
Control Beliefs	.358***
Behavioral Beliefs	.356***
Subjective Norm	.304***
Normative Beliefs	.220***

Listwise comparison ($n = 391$) with 1-tailed test. Significance level: ***($p < .001$).

Beliefs), perceive a stronger generalized social pressure to support it (Subjective Norm), and believe that specific significant referent think they should support it (Normative Beliefs) also express a greater degree of personal control over expressing their support for building a dam (Perceived Control) than their counterparts.

The theory hypothesizes that control beliefs should be the primary predictor of perceived control. All of the variables found with a significant relationship to perceived control were included in a stepwise elimination multiple regression model for predicting perceived control. The findings presented in Table 5.9 demonstrate that control beliefs explain a portion of the variance in perceived control at the highest level of significance. People’s attitudes towards building a dam are slightly more important in predicting respondents’ perceived control based on the partial correlation coefficients and weighted beta values. However, the relationships are weaker than expected with both variables explaining only twenty percent of the variation in perceived control. These findings demonstrate that residents who more favorably evaluate building a dam (Attitudes) and who more strongly believe they possess the necessary skills, information, and opportunity to successfully express their support (Control Beliefs) are more likely to believe they have a greater degree of personal control (Perceived Control) over behaviors for expressing their support for constructing a dam than their counterparts.

As postulated by the theory, the other three remaining variables (Behavioral Beliefs, Subjective Norm, Normative Beliefs) exhibiting significant relationships with perceived control did not retain their significance in the multiple regression analysis. The independent effects of each of the other variables on perceived control waned in the presence of the effects of attitudes towards the behavior and control beliefs on perceived control. These findings present mixed results regarding the linkage between control beliefs and perceived control. On the one hand, they confirm the hypothesized relationship between control beliefs and perceived control at the

Table 5.9: Perceived Control – Multiple Regression Results

Variable	Partial Correlation	Beta	T Values	R Square
Attitudes	.303	.298	6.265***	.143
Control Beliefs	.272	.265	5.573***	.204
(Behavioral Beliefs)	.093	.113	1.846	
(Subjective Norm)	.043	.049	.838	
(Normative Beliefs)	.039	.039	.7742	

n = 390. Significance level: ***(p < .001).

highest level of significance. On the other hand, the observed relationship was weaker than expected and people's attitudes were identified as a slightly more important predictor of perceived control. It is possible the study results underestimate the strength of this relationship or that methodological factors are dampening its significance. Further discussion is given to this possibility in the following chapter.

Summary

The primary purpose of this study was to test the utility of the Theory of Planned Behavior for predicting and understanding people's expressions of support (i.e. intentions or commitment) for building a dam using the survey responses from a random sample of Cumberland County residents, age 18 and older. The theory stipulates that people's attitudes towards a behavior, corresponding subjective norms, and perceived control are each significant predictors of their intentions to perform a given behavior. Residents' attitudes towards building a dam (Attitudes) and their overall perception that important others thought they should support its construction (Subjective Norm) are significant ($p < 0.001$) predictors of their willingness to support it (Intentions). These two predictors explain approximately sixty-one percent of the variation in residents' expressions of support (i.e. intentions), with attitudes towards building a dam being more important (Beta = .563). While the study findings confirmed the hypothesized relationship between attitudes towards a behavior and subjective norms with intentions, the linkage between perceived control and intentions was not confirmed though it did approach significance ($p = .059$). It is possible that, as the theory suggests, residents believe behaviors for expressing their support for building a dam are under their volitional control, rendering control beliefs non-salient to their willingness to express their support (i.e. intentions). Another possibility is that the degree that residents believe it is difficult to perform these actions (i.e. the behavior is non-volitional) is underestimated by the study findings. Overall, the study findings demonstrate that residents who more favorably evaluate the construction of a dam (Attitudes) and perceive a stronger generalized social pressure to support it (Subjective Norm) are more willing to express their support for building a dam to meet water supply needs.

The theory also suggests a deeper understanding of the factors influencing people's expressions of support (i.e. intentions) can be obtained by examining the underlying beliefs for each of the predictors of people's intentions. The study findings confirm that residents' behavioral beliefs are the most important predictor of their attitudes towards building a dam at the highest level of significance (Beta = .418, $p < .001$), explaining about forty-two percent of the

variation in attitudes. The linkages between normative beliefs and subjective norm, and between control beliefs and perceived control were confirmed, but with mixed results. Residents' normative beliefs about whether specific significant referents thought they should support its construction (Normative Beliefs) were a highly significant predictor (Beta = .243, $p = .001$) of their generalized social pressure (Subjective Norm) to support it. However, attitudes were a more important (Beta = .389) variable for predicting subjective norms. Similarly, while residents' control beliefs, i.e. beliefs about whether they possess the necessary skills, information, and opportunity to successfully express their support for constructing a dam, are a highly significant (Beta = .265, $p < .001$) predictor of their perceived control, people's attitudes towards building a dam were slightly more important (Beta = .298). Overall, identifying the beliefs underlying residents' attitudes, subjective norm, and perceived control yields a deeper understanding of the factors influencing their expressions of support for its construction. The study's overall findings for the linkages postulated by the Theory of Planned Behavior are presented in Figure 5.1 on the following page. R represents the multiple correlation between people's expressions of support for building a dam (i.e. intentions) and both attitudes towards building a dam and the related subjective norm, while w denotes the weighted influence of each antecedent variable separately on intentions. The r_k values refer to the partial correlation coefficients between corresponding pairs of variable in the theory. These represent the independent effect of a given variable on the corresponding dependent variable while controlling for the effects of other variables.

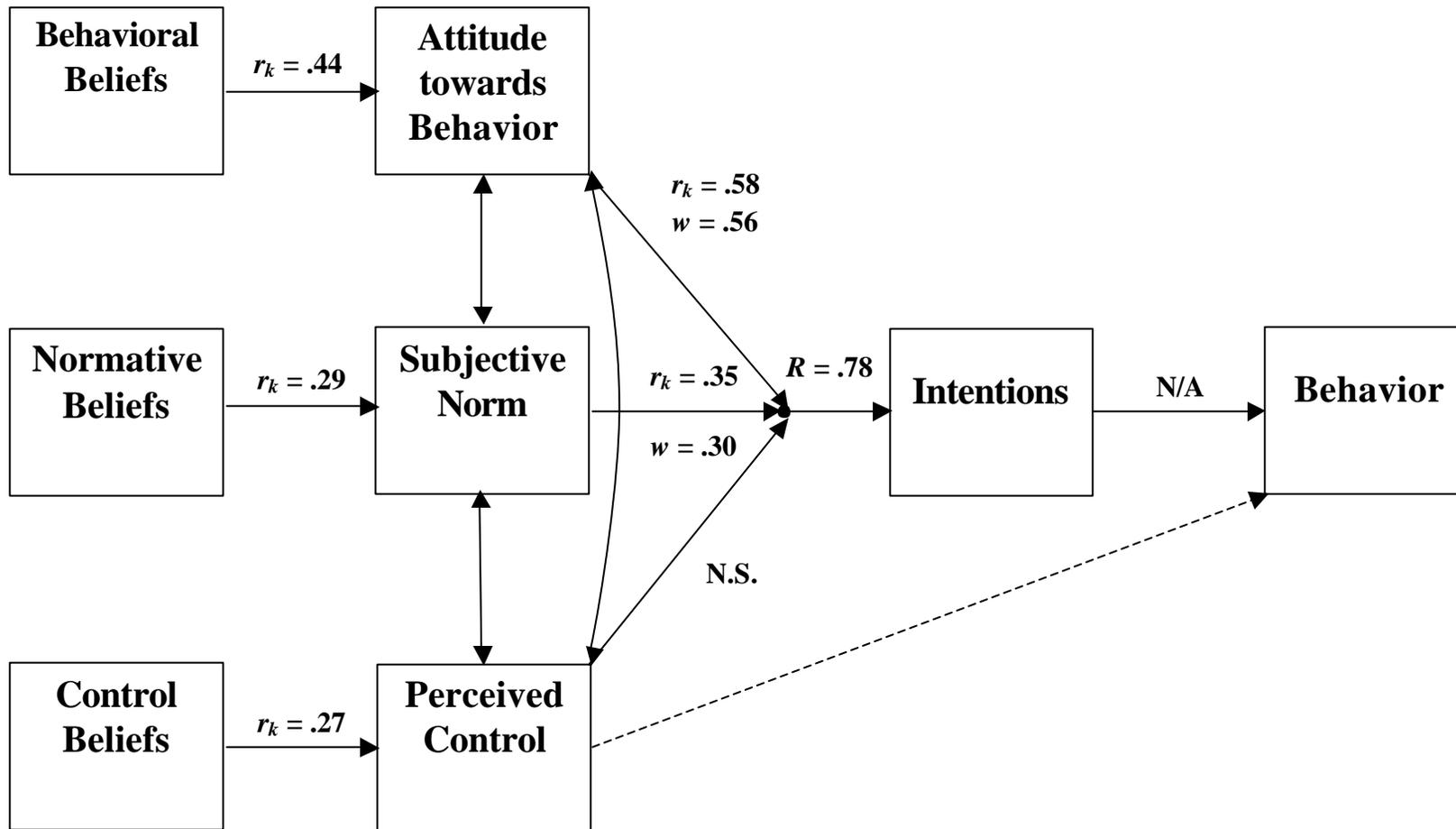


Figure 5.1: Factors Influencing Intentions to Support Building a New Dam

Note: Arrows indicate direction of influence (Ajzen, 1991)

Chapter VI: Discussion

Chapter VI outlines the theoretical and practical implications of examining public support for environmental policy with the heuristic framework employed by this study. First, it explores how this framework, based on attitude theory, helps understand the social-psychological determinants of public support for environmental policy. Then, it examines the correspondence between Ajzen's (1985) Theory of Planned Behavior (TPB) and Dunlap and Jones' (2002) recent conceptualization of environmental concern based on attitude theory. This is followed with a discussion of the study's implications for researchers of environmental concern and policy, and the practical policy implications of the study for citizens and decision-makers trying to meet water supply needs in Cumberland County, Tennessee. The chapter concludes after noting the limitations of the study and avenues for future research.

Overview

This study examined the social-psychological factors affecting public support for environmental policy. It did so by integrating Dunlap and Jones' (2002) multi-dimensional conceptualization of environmental concern with the attitude-behavioral theories of Ajzen (1985) and Fishbein (Ajzen and Fishbein, 1980). This framework was then applied to understand and predict expressions of public support (i.e. intentions or commitment) for building a dam to meet water supply needs in Cumberland County, Tennessee. Two focus groups were used to identify salient behavioral and normative beliefs and evaluate the design of a survey questionnaire. The theoretical linkages postulated in the Theory of Planned Behavior and the Theory of Reasoned Action were then empirically tested using the survey responses of 433 randomly selected adult residents. The hypothesized relationships between the components of the theory were then examined using bivariate and partial correlation analyses, in conjunction with multiple linear regression analyses.

Theoretical Implications

The results of this study show that knowledge of people's attitudes and subjective norm can be used to make accurate predictions of their level of support for building a dam to meet water supply needs in Cumberland County. Another noteworthy finding is that information about people's attitudes towards building a dam explains fifty-six percent of the variance in their willingness to express their support (i.e. intentions or commitment). Together, with knowledge about someone's perception of the overall social pressure to support building a dam, they enable

accurate predictions of a person's willingness to support its construction ($R^2 = .613$, $p < .001$). As in past research, the influence of a person's attitudes and subjective norm was not equal and would likely vary when examining public support for either a different alternative for meeting water supply needs or another environmental policy altogether. In this study, the results show people's attitudinal structures are more important than their normative structures in understanding their expressions of support for building a dam. Overall, the multiple correlation coefficient ($R = .78$) between both components and intentions is above average (.67) compared to meta-analyses performed on past studies (Sheppard, Hartwick, and Warshaw, 1988; van de Putte, 1991). Thus, the study findings strongly confirm the linkages postulated between behavioral intentions and two of its antecedent variables, attitudes toward a behavior and subjective norm. A person who more favorably evaluates building a dam and more strongly believes important others think they should support it is more willing to express their support for its construction.

In situations where people believe there are obstacles to performing a behavior or where people believe they need certain resources to successfully perform it (i.e. non-volitional behaviors), TPB asserts that perceived behavioral control should independently influence intentions to perform the action. In other words, the less personal control people believe they possess over the performance or non-performance of an action, the less willing they should be to attempt it. Thus, people who believe more strongly that it is *difficult* (i.e. perceived control) to express their support for building a dam should express a *weaker* commitment (i.e. intentions) for its construction. The results of the study did not demonstrate that people's beliefs about the degree of personal control they had over behaviors for expressing their support independently added to the prediction of intentions, though the relationship did approach significance ($p = .059$). This suggests that people believe specific behaviors for expressing their support (e.g. discussing it with others, attending a public meeting, contacting a public official) are within their volitional control and thus control beliefs may not be salient to people's willingness to express their support for building a dam. Consequently, the findings indicate that Fishbein's (1975) Theory of Reasoned Action may be sufficient for predicting a person's expressions of support (i.e. intentions or commitment) for building a dam.

If behaviors for expressing support are more volitional, Ajzen's Theory of Planned Behavior (1985) asserts that the more closely people's perceptions of personal control correspond to their actual control over particular actions, the more perceived control should improve the prediction of people's actual behavior in conjunction with intentions. Assuming the necessary correspondence between measures of actual behaviors for expressing support for the construction

of a dam and people's perception of personal control, the theory suggests that people who more strongly believe it is easy to express their support should be more likely to actually express their support. However, an important note about the linkage between perceived control and intentions in this study is that it was the third strongest variable in the multiple regression analysis for predicting people's expressions of support (i.e. intentions). In addition, it approached significance at a .059 significance level. Examining the frequency distribution revealed that forty-three percent of residents believed they have some degree of personal control over expressing their support, while thirty-two percent did not. A histogram shows that the responses of people believing they have greater personal control cluster at scores of a higher magnitude (+2 and +3) than for those people believing they have less control (-1 and -2). Thus, it is possible that the study findings overestimate the degree to which people believe behaviors for expressing support for the construction of a dam are within the volitional control of residents.

The Theory of Planned Behavior further postulates that for a deeper understanding of the social-psychological determinants of people's intentions, one should examine the relationship between people's attitude towards the behavior, subjective norms, and perceived control and their respective antecedent beliefs. The theory assumes that people's behavioral beliefs (i.e. beliefs about the likelihood specific outcomes will occur and the subjective evaluation of each one occurring) should predict their attitude toward the corresponding behavior. Thus, people who believe more positive (e.g. help the economy) rather than negative (e.g. degrade the environment) outcomes will result from building a dam should hold more positive attitudes towards its construction. The findings of the study confirmed this theoretical linkage. People's beliefs about the positive and negative consequences of building a dam and their evaluation of those outcomes were strongly related ($r = .65, p < .001$) with their attitudes towards the behavior. In addition, behavioral beliefs were the strongest predictor of attitudes, explaining forty-two percent its variance. Thus, knowledge about a person's salient behavioral beliefs regarding the possible outcomes of an alternative for meeting supply needs, and their evaluation of those outcomes, should provide important insight into how people will evaluate it. These findings, in conjunction with those for the relationship between people's attitudes towards building a dam and their expressions of support for it (i.e. intentions), suggest that people's affective and cognitive expressions of environmental concern are important for understanding their conative expressions (i.e. public support) for building a dam to meet water supply needs.

The study findings also confirm the theoretical linkage between people's normative beliefs and subjective norm. TPB posits that people who more strongly believe specific

important others (e.g. close friends, family members, neighbors) think they should support building a dam and who are motivated to comply with those important others, should also perceive a stronger overall social pressure to support its construction. In this study, people's beliefs about whether specific important others thought respondents should support building a dam and their motivation to comply with their wishes were predictive at the highest level of significance ($p < .001$) of people's perceptions of an overall social pressure to support it. However, the relationship between people's normative beliefs and subjective norm was weaker than expected. Attitudes towards building a dam were more important for predicting people's overall perceptions of social pressure to support it.

Finally, the theory postulates that people's beliefs about the resources necessary to successfully perform a behavior and people's perceptions of the potential obstacles to performing it (i.e. control belief) influence their perception of personal control over a behavior (i.e. perceived control). Those who more strongly believe they possess the necessary resources and that there are few obstacles to the successful performance of the behavior should express a stronger degree of personal control over the behavior. The study findings confirmed this linkage at the highest level of significance ($p < .001$). People who more strongly believed they had the necessary skills, information, and opportunity to express their support for building a dam were more likely to also believe that it would not be difficult to express their support. However, as with the relationship between normative beliefs and subjective norm, attitudes towards building a dam rather than control beliefs were a more important predictor of people's perceived control. In addition, together they explain a fifth ($R^2 = .20$) of the variation in perceived control.

The marginally non-significant ($p = .059$) relationship observed in this study between people's expressions of support (i.e. intentions) and perceived control, and the minimal variance accounted for by their control beliefs are possibly due to methodological reasons. While Ajzen (1985) gives many examples of the types of internal (e.g. information) and external factors (e.g. opportunity) that may constrain a person's effort to perform a behavior, the theory employs only one variable to represent their cumulative influence on intentions. Others suggest this single variable should be separated into two separate components for gauging a person's "perceived personal control" and "perceived environmental constraints" (Jones, 1990:78). This study attempted to gauge both types of possible constraints in the three-item index measure for control beliefs by asking residents whether they felt they had the necessary skills (internal), information, and opportunity (both external). It is possible a more refined measure of people's perceptions of control over specific actions expressing their support for building a dam would reveal a stronger

relationship between perceived control and intentions. Another possibility is that a slight change in the behavioral target for items measuring a person's perceived control and control beliefs also dampened the relationship between perceived control and intentions. Items measuring these variables included the phrasing "express support or opposition" compared to the target "express support" used for the indicators of other variables. This change was made to make the survey instrument more neutral to potential respondents. It is plausible this inordinately affected the correspondence between measures for the two variables.

The results of the study clearly indicate that attitudes towards building a dam and salient behavioral beliefs are important for understanding people's expressions of public support for constructing a dam. The findings suggest that these attitudes also interact to varying degrees with people's overall perceptions of social pressure to support building a dam and their perceptions of personal control over specific behaviors for expressing that support. This observed interaction between attitudes and subjective norms echoes past research (e.g. Netemeyer, Burton, Johnston, 1991). In more recent figures depicting the theoretical framework of the theory, Ajzen (1991) illustrates the potential interaction between attitudes towards a behavior, subjective norm, and perceived control. It is possible that a person's attitudes towards supporting the construction of an impoundment in some way also tap an aspect of the normative pressure a person feels about performing behaviors for expressing it.

The interaction effect of people's attitudes towards building a dam with their subjective norm for supporting it was examined by multiplying their respective values together to yield a new variable. This new variable was significantly correlated with intentions ($r = .37$), attitudes towards building a dam ($r = .64$), and subjective norm ($r = .33$) at the highest level of significance. It was then included, in various combinations, with attitudes towards building a dam and subjective norm in linear multiple regression models for predicting people's expressions of support (i.e. intentions). Overall, the interaction effect does not add to the prediction of intentions in the presence of the normal predictors postulated by the theory. It only reached significance when included in a multiple regression model solely with attitudes towards building a dam, and then only explained an additional two percent of the variance in intentions ($R^2 = .59$).

Past research normally demonstrates a stronger relationship between a person's subjective norm and normative beliefs (e.g. Ajzen and Fishbein, 1980). One possible explanation for the weaker relationship observed in this study is the non-normal distribution of responses for the variables gauging people's perceptions of social pressure. Reviewing the frequencies and histogram of the responses for the single-item subjective norm measure shows that sixty-seven

percent of the responses were restricted to the unsure (0) category. This occurred despite the addition of numeric placeholders in the response scale to prevent the constriction of responses observed by others (Jones, 1990). Likewise, while responses for the three-item normative belief index ran the gamut from +63 to -45, the modal response was also unsure (0) with a high response frequency of seventy percent.

This may result from a methodological issue. Some suggest that measures for gauging the components of normative beliefs (i.e. normative referents and referent motivation) should not be multiplied together into a single variable (Vallerand, Pelletier, Deshaies, Cuerrier, and Mongeau, 1992). Rather, the relationship between each sub-component should each be examined separately with a person's normative beliefs. There are also other possibilities. One is that normative pressures from specific important others in more personal relationships may not influence residents' perceptions of overall social pressure to support building a dam. Another is that social pressure from other specific referents (e.g. local elected officials, utility officials, environmentalists) may in fact be more salient to the random sample of residents completing the mail survey, despite the nearly nonexistent motivation to comply with these referents observed in the focus groups conducted prior to it. Measures for significant others in more personal relationships with respondents (family members, close friends, neighbors) were retained in the questionnaire since prior studies show people are more likely to comply with them (Bowman and Fishbein, 1978:339).

In summary, the findings of the study confirmed the fundamental structure of Ajzen and Fishbein's Theory of Reasoned Action (1975) and Ajzen's Theory of Planned Behavior (1985). They also demonstrate that knowledge about people's attitudes towards an environmental policy and people's overall social pressure to support it help understand their expressions of public support for the policy. In the case of meeting water supply needs, the study findings also show that knowledge about people's underlying beliefs, particularly beliefs about the likelihood of specific outcomes of a policy and the evaluation of those outcomes each occurring (i.e. behavioral beliefs), enable a deeper understanding of why people are more or less willing to express support for an alternative such as building a dam. Finally, applying Ajzen's (1985) theoretical model of people's attitudes and behavior to examine public support for environmental policy enables integrating this framework with Dunlap and Jones' (2002) multi-dimensional conceptualization of environmental concern.

Correspondence Between Environmental Concern & Theory of Planned Behavior

The second purpose of the study was to integrate Dunlap and Jones (2002) multi-dimensional conceptualization of environmental concern with Ajzen's (1985) Theory of Planned Behavior and examine the correspondence between them. Dunlap and Jones (2002) suggest that people may express their environmental concern through affective, cognitive, conative, and behavioral expressions. Table 6.1 presents how these different dimensions of environmental concern can be operationalized and applied in a relevant manner to an environmental policy issue. For example, instead of examining people's expressions of support for building a dam to meet water supply needs, this study could have explored the social-psychological determinants of people's expressions of *opposition*. As indicated in the table, a person's environmental concern, operationalized as opposition to building a dam, could be expressed in a number of different ways. Rather than relying on a single indicator (i.e. people's affective expressions of concern), employing this multi-dimensional approach reveals the nuances of their environmental concern. It does not provide, however, a theoretical framework for how these different aspects of concern relate to one another. Understanding how these various dimensions may relate to people's behavioral expressions of concern might be useful for encouraging pro-environmental behaviors or garnering public support for environmental policy.

The bridge to understanding how different expressions of environmental concern relate to one another is buttressed by the theoretical framework of attitude theory. If the same affective, cognitive, conative, and behavioral components are discernable in a model of people's

Table 6.1: Expressions of Environmental Concern About Building a Dam

Expression	Sample indicators of concern
Affective	Building a dam is bad, harmful, negative Degrading the environment and habitat of fish and animals is undesirable
Cognitive	Building a dam will degrade the environment and habitat of fish and animals Overall, people important to me don't think I should support building a dam My close friends think I should not support building a dam It is not difficult to express my opposition to building a dam
Conative	I am willing to vote for an official who opposes building a dam I am willing to contact a public official to express my opposition I am willing to attend a public meeting to oppose building a dam
Behavioral	I voted for a public official who opposes building a dam I contacted a public official to express my opposition I attended a public meeting to oppose building a dam

attitudes and behavior, then it is possible to structure the different dimensions of environmental concern. Ajzen's (1985) Theory of Planned Behavior provides this theoretical structure. For example, the theory distinguishes between people's actual behavior (i.e. behavioral expressions), commitments to support or oppose an environmental policy (i.e. conative expressions), evaluations of a policy (i.e. affective expressions), and their beliefs about it (i.e. cognitive expressions). Figure 6.1 on the following page illustrates how it is possible to integrate the multiple dimensions of environmental concern with a theoretical model of people's attitudes and behavior such as TPB.

Employing this integrated framework provides researchers with a theoretical justification that postulates how these dimensions relate to one another and proffers several theoretical implications for researchers of environmental concern and attitude theorists. The first is to note how the different theoretical components of TPB correspond to the various dimensions, or zones, of environmental concern. Actual performance of a behavior clearly represents a behavioral expression of concern. When examining a policy-relevant question such as public opposition building a dam, people's commitments to express their opposition is a conative expression of their environmental concern. The remaining theoretical components of TPB correspond to affective and cognitive expressions of concern. At first glance this may appear not to differentiate these two dimensions. However, various components of the attitude-behavior theory actually provide a basis for distinguishing which aspects of these expressions of environmental concern impact conative and behavioral expressions and how. For example, the framework suggests that people's overall evaluations (i.e. affective expression) of building a dam and their overall belief about whether important others think they should oppose it (i.e. cognitive expression) will both likely influence their expressions of opposition (i.e. conative expression). Finally, the dashed lines between the theoretical components demarcating the different zones of environmental concern indicate that there is no clearly discernable moment for when people's conative expressions are transformed into behavioral expressions.

A second theoretical implication of this integrated framework implies a hierarchy among the different expressions of environmental concern. As the figure illustrates, actual behavior and behavioral expressions of concern are located at the top of the figure. Assuming people's actual behavior (i.e. behavioral expression) is most important because of its direct impact on the natural environment, TPB provides a structure for how the other expressions of concern relate to one another. A person's conative expressions predicate their behavioral expressions. And their cognitive and affective expressions underlie their conative ones. This does not imply that

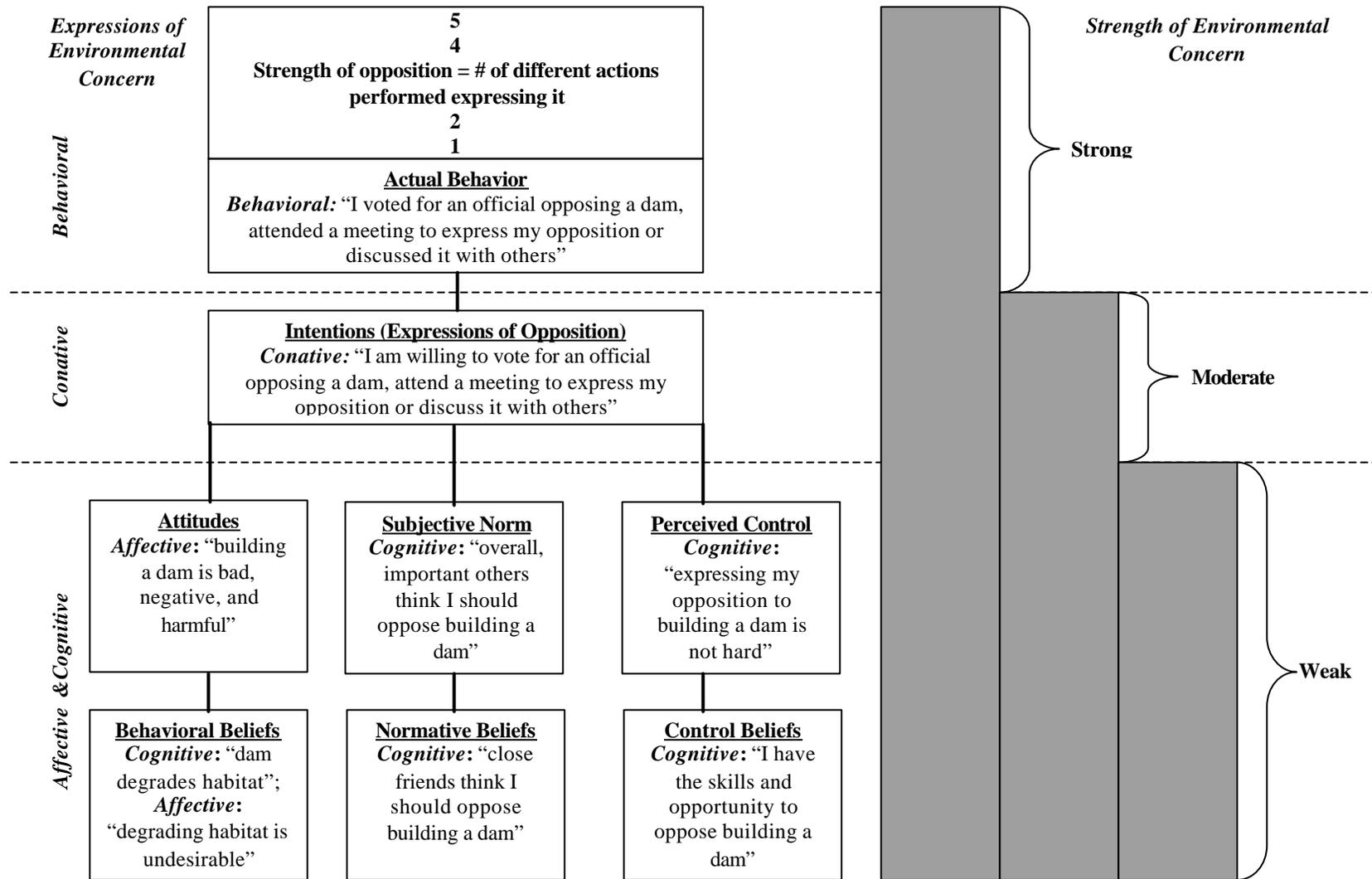


Figure 6.1: Integrating Environmental Concern & the Theory of Planned Behavior for Water Resource Policy

people's affective and cognitive expressions are not important. On the contrary, from the perspective of attitude-behavior theory, they are equally, if not more important since they represent the foundational influences on people's behavioral expressions.

When applying this integrated framework to a policy-relevant problem like public opposition to building a dam to meet water supply needs, a third implication emerges. Employing this integrated approach and applying it to a policy-relevant topic provides a means to theoretically gauge the strength and depth of people's environmental concern. This is based on the assumption that the greater a person's concern for the environment, the more it will be manifested through different expressions. As shown on the right side of the figure, weak environmental concern is limited to affective (i.e. evaluations) and cognitive (i.e. beliefs) expressions. People with more moderate levels of concern will also exhibit conative (i.e. commitments) expressions. Those with strong environmental concern will ultimately express it through their behavioral (i.e. actions) expressions.

Finally, if a study uses multiple indicators to assess the different behaviors people may use to express their opposition (e.g. willingness to vote, attend a public meeting, contact public officials) it is also possible to gauge the intensity of public opposition. In other words, even among people with strong environmental concern, there is variation. This is illustrated in the figure by the column symbolizing the behavioral component of TPB. The numbers in the box represent different behaviors a person could perform to express their opposition. Assuming that people with greater environmental concern would be more willing to express their opposition in a greater number of ways, then the more behaviors they actually use to express their opposition, the more intense and stronger their concern. Employing this approach to gauging public support or opposition for environmental policy may yield markedly different results than those studies employing single indicators of one expression of environmental concern (i.e. willingness to vote).

Thus, there is correspondence between Dunlap and Jones' (2002) multi-dimensional conceptualization and Ajzen and Fishbein's theories of Reasoned Action (Ajzen and Fishbein, 1980) and Planned Behavior (1985). This correspondence facilitates their integration into a heuristic framework useful for understanding and predicting public support for environmental policy. Employing this integrated approach not only serves as a theoretical framework for understanding how different expressions of a person's environmental concern relate to one another, but it also can provide practical results for policy-makers.

Policy Implications

Expressing support for an environmental policy means different things to different people. For some, it is a willingness to vote for an official who supports building a dam to meet water supply needs. For others, it is a commitment to pay a higher rate for water in order to implement an alternative for meeting water supply needs that is less disruptive of the natural environment. For still others, it means installing low-flush toilets, but leaving the faucet running while brushing their teeth or shaving. Clearly, public support or opposition and people's related environmental concerns are complex. Consequently, an integrated approach for understanding it may yield practical lessons for environmental policy-makers, water resource managers, and decision-makers and citizens working to meet water supply needs in Cumberland County.

Environmental & Water Supply Policy

One implication for environmental policy-making is that people's beliefs about the possible outcomes of a given policy will likely influence their attitudes about supporting it. In addition, attitudes are possibly the strongest and most important predictor of behaviors for expressing their support of it. This demonstrates the importance of policy-makers understanding the costs, benefits, and risks the public may associate with a policy. For example, if only slightly more than half (54%) of local residents believe building a new dam will meet Cumberland County's future water supply needs, local officials cannot implement it with broad-based public support. To garner support, policy-makers must understand people's beliefs about the possible consequences of a policy. To do this, policy-makers must first identify these beliefs and through public education and outreach programs identify those most salient for a given policy.

The integrated framework employed in this study gives policy-makers a framework for identifying the overall intensity of public support and discerning how different dimensions of people's environmental concern influence it. It suggests their affective and cognitive dimensions influence a person's willingness to support or oppose (conative dimension) a policy, and subsequently their actual actions expressing it (behavioral dimension). If policy-makers need to build public support, then they need a deeper understanding of the affective and cognitive influences on it. For example, to change people's commitments to support one alternative or another for meeting water supply needs, people's attitudes toward them will likely need to change. To change people's attitudes towards supporting a given method, their behavioral beliefs will likely need to change through increased education and understanding. Consequently, if decision-makers desire to implement policy reflecting the people's environmental concern and

based on public support, then this concern must be measured according to the different ways it can be expressed.

Acknowledging this fact advances efforts to more effectively manage natural resources using a social ecological approach like collaborative management. For virtually every type of natural resource, it is now recognized that aspects of the social system exert important influences on natural systems and knowledge about them (e.g. Blattner and Ingram, 2001; Machlis, Force, and Burch, 1997). This growing awareness led to efforts to develop and implement effective tools and practices for understanding how social factors impede effective management (Wondolleck and Yaffee, 2000). The benefit of the approach employed in this study is that it provides a useful, low-cost tool for understanding public support and its underlying social-psychological determinants. This study was conducted for less than ten thousand dollars, a marginal fraction of the expenses incurred for comparative efforts.

Finally, environmental policy-makers continually grapple with the question of when to involve the public in the decision-making process (Thomas, 1995). Following the approach employed in this study might change how policy-makers integrate public involvement in environmental decision-making. Rather than assuming what the public needs to know about a policy, policy-makers could first explore the beliefs about a policy's positive and negative outcomes held by a representative sample of the people living in an affected area. The results of a "social impact assessment" for a policy might identify issues likely to arise when communicating with the public. This sort of information can make involving the public in the decision-making process more efficient by enabling decision-makers to anticipate potential problems in advance.

Having identified the positive and negative outcomes the public associates with a policy, policy-makers are better prepared to communicate with the public. For example, thirty-nine percent of Cumberland County residents believe it unlikely that building a dam will lower their water costs. If local officials believe constructing a dam is the most cost effective way for water users to meet the county's future water supply needs, they may have to persuade residents that this is indeed the case. Knowing this in advance, policy-makers can provide not only the requisite technical information about a policy, but also directly address the public's beliefs about the consequences of implementing a policy. Providing information targeted toward a person's salient beliefs can lead to changes in their attitude and thus intentions to support an environmental policy and behaviors for expressing it (Bright, Manfredo, Fishbein and Bath, 1993).

There are also important lessons from this research for meeting future water supply needs. One is that the traditional approach for managing water resources does not accommodate the aspects of understanding and communicating with the public discussed above. Historically, water supply decision-makers have not bothered to assess the public's beliefs about the outcomes of a policy, instead offering compensation to affected or opposing parties. For example, in the scenario described in Chapter II about the structural solution for mitigating flooding damage to farmers, the traditional strategy typically focuses on engineering aspects of the policy and providing financial remunerations for submerged landowners. It is possible that conducting a social impact assessment simultaneously or immediately following standard technical and engineering needs studies would provide guidance on how to implement the most politically acceptable policy. In the case of Cumberland County, residents prefer a political strategy, i.e. having the local water utilities work together, above any specific option (e.g. building a dam, conserving water, building a pipeline) for meeting future supply needs. Consequently, simply asking for a person's evaluation of one alternative for meeting supply needs may badly misjudge the complexities of public support. While a person may express favorable attitudes towards supporting the construction of a dam, this does not automatically translate into actions expressing that support. This study found people's attitudes were highly predictive of their expressions of support; however, it also determined that overall there was weak public support for building a dam. Thus, it may be that when decision-makers speak of the urgent necessity to implement a particular method for meeting water supply needs they are not necessarily reflecting public opinion.

Another implication for U.S. water policy is that as the decision-making process becomes more democratic, the pressure on policy-makers to allocate water for competing in- and off-stream needs and social and environmental benefits will increase. This implies that it will be necessary to employ a different measure for determining which social values should guide supply planning. Traditional planning avoided these potential conflicts by restricting the values guiding water resource management to ones shared by those participating in the decision-making process: those of utilitarian and economic efficiency. However, including a larger number of groups and individuals with different values and views about the outcomes and impact of a policy on the environment increases the likelihood of conflict among participants. In addition, it suggests careful thought must be given to how a democratic decision-making process is structured. Is a fifty-one percent majority or consensus needed among participants to implement a given policy? Future U.S. water policy decisions should be based on more objective and shared ethical criteria

than whether a majority of participants will benefit from its implementation. A potential new ethical framework for adjudicating between allocations for competing uses for water is one based on values such as equity and intrinsic worth (Feldman, 1995).

Finally, realizing that people’s willingness to support a potential water policy proposal is linked to their attitudes and beliefs about its positive and negative outcomes sheds new light on past water policy disputes and may illuminate the path for averting future conflicts. The unwillingness of participants in the policy-making process to support a particular policy may not necessarily be overcome by providing more technical or engineering information about its impact on the environment. Rather, opposition to a policy may stem from beliefs about the likelihood of specific negative outcomes unrelated to the technical information provided. This suggests that implementing future policy may depend equally on better understanding the ecological characteristics of water resources and the social influences on their management.

Meeting Cumberland County’s Water Supply Needs

Besides implications for environmental and water supply policy, there are specific lessons for citizens and policy-makers working to reach accord in meeting Cumberland County’s future water supply needs. One is that residents’ support for meeting the county’s future water needs possesses more nuances than whether someone supports or opposes building a new dam. Survey responses to questions (see Appendix B: Questions 10 – 17) asking about a person’s willingness to support each of the different alternatives for meeting the supply needs of the county are presented in Table 6.2 below. When asked separately if they were likely or unlikely to support each of the seven different options, people expressed a willingness to support building a new dam (70%), raising a dam (61%), and conserving water by reducing consumption, using it more efficiently, or recycling it (52%). However, the greatest percentage of residents expressed

Table 6.2: Public Support for Options to Meet Water Supply Needs

Option	Likely (Percent)	Unsure (Percent)	Unlikely (Percent)	Mean	Mode	S.D.	Var.
Utilities work together	84	11	5	1.86	2	1.31	1.72
Build new dam	70	21	8	1.33	2	1.49	2.23
Raise dam	61	27	12	.95	2	1.44	2.09
Conserve	52	22	25	.37	2	1.70	2.89
Harvest water	47	28	25	.28	0	1.61	2.60
Build pipeline	34	27	39	-.33	0	1.75	3.06
Drill groundwater	23	38	39	-.48	0	1.60	2.56
No action	12	15	74	-1.63	-3	1.64	2.69

Values for response categories are rounded to the nearest whole percent

support for having the city and county utilities work together to meet the county’s future water supply needs (84%). This public preference was duplicated when people were asked what they believed was the best option for meeting the county’s supply needs. The highest percentage of responses (35%) was again for having the utilities work together. It appears that people are most supportive of establishing a political strategy for meeting the county’s future supply needs.

There are also implications for how local decision-makers manage the county’s water resources. County residents (70%) overwhelmingly believe that implementing one alternative is not sufficient for meeting the county’s future supply needs (see Appendix B: Question 19). In addition, forty-six percent are unsure or believe it unlikely that building a new dam will meet its water supply needs. Seventy-four percent of residents do not support the option of doing nothing to meet the water supply needs of the county. This suggests there is broad public support for implementing a combination of options and changing the county’s historical management approach.

The results also emphasize the value of increasing the amount of information available to the public. People’s uncertainties about supporting different alternatives may change as they learn more about each alternative and its associated costs, benefits, and risks. The information people feel is available may also influence their satisfaction with the management of local water resources. Survey responses for measures of a person’s awareness and satisfaction are presented in Table 6.3. Seventy-two percent of residents are aware of water supply issues in the county. While a majority (42%) are satisfied with how the its water resources are being managed, more people are unsure or dissatisfied with available information about what is being done to meet supply needs (65%) and the costs and benefits of various alternatives (79%). In addition, of the indicators used to assess residents’ beliefs about the barriers preventing them from successfully expressing their support for building a dam (enough information, necessary skills, opportunity),

Table 6.3: Resident Awareness and Satisfaction About Water Supply Issues

	Yes	Unsure	No	Mean	Mode	S.D.	Var.
	(Percent)						
Aware of water supply issues	72	11	17	.90	1	1.53	2.34
Satisfied with management of water	42	35	23	.26	0	1.48	2.19
Satisfied with information about meeting supply needs	35	28	37	-.14	0	1.48	2.18
Satisfied with information about options’ costs & benefits	21	33	46	-.61	0	1.42	2.02

Values for response categories are rounded to the nearest whole percent

they indicated not having enough information as the greatest constraint. Its mean score was negative compared to the other two measures. Clearly, the public is interested in learning more about the various methods for meeting the county's future water supply needs.

Residents' interest in learning more about the alternatives for meeting the county's future supply needs is an opportunity for decision-makers and non-governmental organizations alike to build public support. In this study, a person's beliefs about the consequences of an alternative are the strongest influence on attitudes towards supporting the construction of a dam. Attitudes were the most important predictor of someone's willingness to support a dam. Consequently, residents are more likely to change their intentions to support a policy if their beliefs about its consequences change. However, these beliefs are linked to available information about different alternatives for meeting water supply needs. Traditionally, the public learns about the possible impacts of a given water policy proposal from policy-makers and agency officials. In Cumberland County, residents believe that actions for expressing their support are within their personal control, but express uncertainty when faced with unfamiliar methods for meeting water supply needs. This suggests that those interested in changing people's commitment to a given alternative should provide information targeted to residents' beliefs (Bright, Manfredo, Fishbein and Bath, 1993). If other participants in the decision-making process such as non-governmental organizations seek to garner public support for alternatives unfamiliar to the public, they must provide additional information through educational outreach.

Finally, there are no significant differences between the views of residential water users from the city of Crossville's utility district and the other four districts in the county on these issues. A dummy variable was created for denoting whether a respondent was a city or county water user. The new water user variable was then cross-tabulated against each of the measures of a person's awareness of county water supply issues, satisfaction with available information, and commitment to support each of the alternatives for meeting the county's future supply needs. City and county water users expressed similar degrees of awareness and satisfaction. They also indicated comparable commitments to support having utilities work together and for each of the alternatives. The two suggestions most preferred by city and county residents alike were to have utilities work together (city – 38%, county – 35%) and build a new dam (city – 37%, county – 30%). More people in county utility districts (13%) versus the city (7%) were unsure of what was the best option for meeting the supply needs of the county. Finally, they both overwhelmingly agree that implementing one method was not sufficient, with county users expressing slightly more uncertainty.

A word of caution must be given to policy-makers seeking to translate theoretical findings such as those obtained by this study into feasible policy actions. Policy-makers must be sensitive to some inherent limitations when utilizing this approach to understanding public support (or opposition) for meeting water supply needs. One is that this study did not assess the relationship between a person's willingness to perform actions expressing support (i.e. intentions) for building a new dam and measures of their actual behavior. This could be accomplished using a follow-up survey asking residents to report the frequency of performing various actions during the previous six months. This was unfortunately beyond the scope of this project.

Regardless, the theory asserts that people's intentions are highly predictive of their corresponding behavior. However, the strength of this relationship wanes under certain conditions. For accurate prediction of a person's expressions of support (i.e. intentions or commitment) and actual behavior, two conditions must be met. First, all of the variables of TPB must correspond in target, action, time, and social context. Second, when predicting behavior, people's perceived control and intentions must remain stable and not change from when their intentions are measured to when their actual behavior is assessed. The more these conditions are violated, the lower the predictive utility of the theory (Ajzen, 1996:389). Thus, people's favorable attitudes and commitment to supporting a policy will likely change over time, especially when a generic proposal becomes specific action (i.e. a change target and social context). Consequently, public support for building a dam *in the county* may be different than for building it *on a specific stream*.

A final caveat stems from possible sample bias in the study's focus group and survey questionnaire responses. The specific outcomes incorporated into the survey questionnaire were generated from focus groups conducted prior to implementing the survey. Despite efforts to obtain a sample representative of the county population, the participants were disproportionately older. Consequently, the beliefs about advantages and disadvantages associated with building a new dam incorporated in the survey questionnaire may disproportionately reflect the views of older residents. Younger residents may hold different beliefs about its costs and benefits. For example, overall, younger people typically have a stronger environmental concern and would be less willing to express support for building a dam to meet water supply needs. In addition, the survey responses also reflect the views of older citizens. About forty-nine percent of the survey respondents were age 65 or older compared to approximately twenty-six percent of the population. Survey research shows that this age group is more likely to respond to mail questionnaires (Salant and Dillman, 1994). Future applications of this method for assessing

public support for meeting future water supply needs should examine how it varies among different segments of society.

Future Research

There are several theoretical and policy-relevant avenues for future research from this study. One direction is to further examine the effect of people's normative structures on index measures comprised of multiple behavior indicators that represent a broad conceptual behavioral category such as "support." Do normative pressures vary when a person considers expressing their support through different actions? When a person responds to survey measures of their subjective norm and normative beliefs, are they referencing beliefs about the behavioral category or specific actions such as voting? In addition, does the influence of people's attitudinal and normative structures vary on expressions of public support for different natural resource policies? Are normative pressures more salient for other environmental policies? Another direction is to assess the relationship between people's expressions of support for building a dam and their actual performance of those actions. Finally, future research should explore whether people's perceptions of personal control vary among different behaviors for expressing support (or opposition) and whether perceived control becomes a significant predictor of expressions of support (i.e. intentions) for different environmental policies.

Future policy-relevant directions of future research should explore how people compare alternatives for meeting water supply needs. High levels of public support for some methods, but not others, do not mean people are not willing to support alternatives. Residents express enough uncertainty (21% to 38%) about different methods for meeting Cumberland County's future water supply needs that decision-makers should be cautious when making management decisions based on perceptions of public support. Low commitment to support an alternative is likely related to people's information and knowledge about it and the consequences they associate with it. To what extent are people more willing to support a method for meeting water supply needs (e.g. build a dam, conserve, harvesting water, etc.) because they are more familiar with it? How would public support (or opposition) change if people believed the same outcomes associated with one method might also result from an alternative? This illustrates the importance of decision-makers understanding more clearly what residents believe are the costs, benefits, and risks of different policies proposed for meeting water supply needs, and where they are proposed to be implemented, versus simply gauging the level of public support for one alternative.

Summary

In summary, the findings of the study confirmed the fundamental structure of Ajzen and Fishbein's Theories of Reasoned Action (1975) and Planned Behavior (1985). The results demonstrate that knowledge about people's attitudes towards building a dam and overall social pressure to support it can be used to predict and understand people's expressions of public support for its construction. In addition, the study findings also show that knowledge about people's underlying beliefs, particularly beliefs about the likelihood of specific outcomes of a policy and the evaluation of those outcomes each occurring (i.e. behavioral beliefs), enable a deeper understanding of why people are more or less willing to express support for an alternative such as building a dam. Despite variation in the degree that residents feel actions for expressing their support to build a new dam are under their personal control, perceived control was not found to add to the prediction of intentions. This suggests the Theory of Reasoned Action may be sufficient for predicting people's expressions of support for building a dam.

In addition, there is correspondence between Dunlap and Jones' (2002) multi-dimensional conceptualization of environmental concern and Ajzen and Fishbein's theories of Reasoned Action (Ajzen and Fishbein, 1980) and Planned Behavior (1985). This correspondence facilitates their integration into a heuristic framework useful for understanding and predicting public support for environmental policy. Overall, the results of the study demonstrate that this integrated framework based on attitude theory can be applied to a policy-relevant question (i.e. public support for building a dam to meet water supply needs) of interest to local decision-makers and empirically tested using the survey responses of local area residents. Employing this integrated framework of environmental concern and the Theory of Planned Behavior also demonstrates that people's affective and cognitive expressions of concern are important influences on their conative expressions (i.e. willingness to express support for building a dam) of environmental concern.

Ultimately, citizens and decision-makers alike in a democratic society must decide what social and environmental amenities are most important (i.e. a normative distinction) when trying to meet future water supply needs. This is fundamentally a question of people's values, not the technical difference between one method or another.

Water supply planning is more than a technical exercise. It also requires fundamental choices between competing uses. Balancing the use of water among different ends is fundamentally a political problem rather than technical one because balancing water uses involves judgments about what is an acceptable water use, what is an acceptable risk of future water supply shortages, and what is an acceptable physical and biological condition for a given river.

Conflict in water supply planning arises when disagreements occur about how water supplies should be shared among these competing uses. Furthermore, conflict can be very heated because participants in the water supply planning process hold deeply felt personal values and commitments.” (Stephenson, K, Cox, W., Cartwright, L., and Conner, J. 2002:1)

In the past, much time, resources, and energy was devoted to the technical and engineering aspects of meeting water supply needs. The challenge to resolving water supply disputes is no longer identifying how to move water from where it is, to where it is needed, when it is needed there. It lies now in better understanding the cultural and social-psychological bridges and barriers to deciding how to meet the needs of society and protect the environment. It is time to apply this same zeal to understanding the social dynamics impacting water resources.

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Appendices

Appendix A: Focus Group Recruitment Interview Script

Focus Group Participant Recruitment

Day of interview _____

Time of interview _____

Enter name of person _____
First and last name

Enter Work Telephone Number _____

Enter Home Telephone Number _____

Enter Home Address _____

Interviewer Use Only:

Call Answer

- Home
 Not Home
 Call Back

No Answer

- No Answer
 Machine

[Interviewer: **If an answering machine comes on, leave the following message:**

Hi, my name is _____ and I am a graduate student calling from the University of Tennessee for a research project asking community leaders living in Cumberland County for help with a future study on water supply issues facing your area. I'm sorry I missed you. If you are interested in helping us with this research, please call **Dr. Robert Jones at (865) 974-7017** and leave a message expressing your interest. Thank you.]

Hello may I speak with _____
First and last name

1. **YES** —> Thank you.

2. **No** —> Okay. Is there a more convenient time I can call back? _____

Hi, my name is _____ and I am a graduate student calling from the University of Tennessee for a research project asking community leaders living in Cumberland County for help with a future study on water supply issues facing your area. This research is on the views of residents about the County's water resources and water supply needs. As you may know, the County may face possible water shortages in the future and many suggestions have been made on how to meet the County's supply needs. Your views will help improve a mail questionnaire to be mailed at a later date and your responses will be kept confidential.

[Interviewer: If the respondent is hesitant or uncertain of his/her ability to contribute, offer to provide the phone number of **Dr. Robert Jones, (865) 974-7017** to address any concerns.]

We are calling people we have identified as community leaders in Cumberland County to try and gather **about 10 other** leaders in a small group setting to share their views on this topic. The meeting will include refreshments and will take about two hours. In appreciation of your time, you will be given \$25 cash for your participation in **one** of the community leader meetings.

The two meetings are **Thursday, October 10, from 6.30 to 8.30 at the Cumberland Mountain State Park** and **Monday, October 14, from 7 to 9 at the Community Room downstairs at the Art Circle Library** in Crossville.

This call is to see if you are interested in attending **one** of the community leader meetings.

Q1. Are you interested in attending one of these meetings?

1. **YES** —> Great, we really appreciate your help.
2. **No** —> Well, thank you for your time. [End interview]

Q2. Which meeting are you interested in attending?

1. **Thursday**, October 10, from 6.30 to 8.30 at the Cumberland Mountain State Park
2. **Monday**, October 14, from 7 to 9 at the Community Room downstairs at the Art Circle Library in Crossville

Before I confirm your home address, I need to verify that you are a current resident, 18 years or older, of Cumberland County, Tennessee.

Q3. Are you a current resident of Cumberland County, Tennessee?

1. **YES** —> Great.
2. **No** —> I'm sorry. For research purposes, only current Cumberland County residents are eligible to participate in the meeting. Thank you for your time. [End interview]

Q4. Are you 18 years or older?

1. **YES** —> Okay.
2. **No** —> I'm sorry. For research purposes, only current Cumberland County residents are eligible to participate in the meeting. Thank you for your time. [End interview]

Q5. Now I need to confirm your name, phone number and home address.
[Interviewer: See information on the top of this sheet and make any corrections]

Q6. Thank you for your willingness to volunteer your time. Do you have any questions?

Let me give you my phone number in case you have any questions. It is **(865) 974-8346**. If have trouble reaching me you can also contact **Dr. Robert Jones at (865) 974-7017**. Again, thanks a lot for your help on this important study.

[Interviewer: Hang up.]

Dear

Thank you for your accepting our offer to participate in a Cumberland County Water Resources Community Leader meeting. This letter is to remind you that you chose to attend the meeting to be held on:

Monday, October 14 from 7:00 to 9:00 p.m. at the Art Circle Library, in the Community Room.

As you may remember, the University of Tennessee is conducting research on residents' views about Cumberland County's water resources. To improve our project, we are conducting community leader meetings in Cumberland County. These meetings will gather together about ten community leaders who will be asked to share their views on the County's water resources and current and future water supply needs. These views will then be used to improve a mail questionnaire to be mailed to County residents at a future date.

The meeting will include refreshments and take about two hours, and you will be given \$25.00 for participating. Enclosed are directions to the library.

If you have any questions about this research or the community leader meetings, please call Aaron Routhe at (865) 974-8346. Again, thank you very much for willingness to volunteer your time to this important study.

Cordially,

Aaron S. Routhe
Research Investigator

Dr. Robert Emmet Jones
Research Investigator

PARTICIPANT RECONFIRMATION QUESTIONNAIRE

THURSDAY’S COMMUNITY LEADER MEETING

Day of interview _____
Time of interview _____
Enter name of person _____
First and last name
Enter Work Telephone Number _____
Enter Home Telephone Number _____

<u>Interviewer Use Only:</u> Call Answer ___ Home ___ Not Home ___ Call Back No Answer ___ No Answer ___ Machine

Hello may I speak with _____
First and last name

Hello my name is _____ and I am calling from the University of Tennessee. You recently chose to participate in a community leader meeting on Cumberland County’s water resources and water supply needs.

This call is to remind you that this meeting will take place **Thursday, October 10, from 6.30 to 8.30** in the evening.

Q1. Are you still planning to attend this meeting?

- 1. **YES** —> Great, we really appreciate your help.
- 2. **No** —> Well, thank you for your time. [End interview]

Thursday’s meeting will take place in **Room B at the Cumberland Mountain State Park from 6.30 to 8.30** in the evening.

Q2. Do you have any questions?

Again, thanks a lot for your help on this important study.

Appendix B: Focus Group Survey

CUMBERLAND COUNTY COMMUNITY LEADER SURVEY

Introduction

The purpose of this survey is to gather your personal opinions about some possible methods for meeting the County's water supply needs. The questions are open-ended and intended to give you a maximum amount of freedom in responding to them. There are no "right" or "wrong" responses to the questions because we are interested in your honest feelings about them.

Background

Below are seven (7) possible methods for Cumberland County to meet its water supply needs. They are listed in alphabetical order with a brief description for each. Please review them and go on to the following page.

Build a Dam. By this we mean building a new dam in the County to flood and fill a lake reservoir behind it.

Build a Pipeline. By this we mean building a pipeline from an existing lake reservoir along highway and county roads.

Conserve Water. By this we mean reducing the loss of water from delivery pipes, reducing consumption, using it more efficiently, and recycling it.

Drill for Groundwater. By this we mean drilling to locate groundwater sources outside the County.

No Action. By this we mean that public officials will not change existing policies or implement new policies for meeting the County's water supply needs.

Raise a Dam's Height. By this we mean raising the height of an existing County dam to increase its storage capacity.

Water Harvesting. By this we mean pumping water from a stream during high flow events like storms and storing it for future use.

QUESTIONS

1. Which method for meeting the County's water supply needs do you **MOST STRONGLY PREFER**?
2. What do you believe are the **DISADVANTAGES** of this method?
3. What do you believe are the **ADVANTAGES** of this method?
4. Is there anything else you **ASSOCIATE** with this method? If so, please explain.
5. Please identify any groups or individuals you think would **APPROVE** of this method?
6. Please identify any groups or people you think would **DISAPPROVE** of this method?
7. What group or person's opinions about this method **MATTER TO YOU**? Please list them and circle the group or person whose opinions matter **MOST** to you.

Appendix C: Mail Questionnaire Instruments

October 7, 2002

Dear

In a few days you will be receiving a request in the mail to fill out a brief questionnaire for an important research project being conducted by The University of Tennessee.

This study is seeking your views on water supply issues facing residents living in Cumberland County, Tennessee. The results from this study will be published in a Master's thesis and a report from the University of Tennessee.

We are contacting you ahead of time because it is our experience that people like to know in advance that they will be contacted. This study is important because it will help your local city and county officials better understand your opinions about the county's water supply, and if they are meeting your expectations about managing the county's water resources.

Thank you in advance for volunteering your time to complete the survey. It is only with the generous help of people like you that our study will be successful. If you have any questions or comments, we would be happy to talk with you. You can call us at (865) 974-8346 or mail us at the address on the letterhead.

Sincerely,

Aaron S. Routhe, Master's Candidate
Research Investigator

Dr. Robert Emmet Jones
Research Investigator

October 14, 2002

Dear

I am writing to ask for your help in a study of residents' views on water supply issues in Cumberland County, Tennessee. We are contacting a random sample of current residents in the county to ask for their opinions about the County's water resources and its current and future water supply needs.

This study will help public officials better understand what people think about the county's water resources and how they should meet the county's water supply needs. The University of Tennessee will publish the study's results in a report that you may obtain if you wish.

Any answers you give are completely confidential and will not be connected to you in any way. Results of the study will only be published as summaries of peoples' answers. This survey is also voluntary. However, you can improve the accuracy of our research by taking a few minutes to share your views about Cumberland County's water resources. Your return of the questionnaire will constitute your informed consent to participate. If for some reason, you prefer not to respond, please let us know by returning the blank questionnaire in the enclosed business return envelope.

If you have any questions or comments about this study, we would be happy to talk with you. You can call us at (865) 974-8346 or mail us at the address on the letterhead.

Thank you very much for volunteering your time to help the University of Tennessee with this important study.

Sincerely,

Aaron S. Routhe, Master's Candidate
Research Investigator

Dr. Robert Emmet Jones
Research Investigator

P.S. If by some chance we made a mistake and you are not a resident of Cumberland County, please note that on the survey cover and return it blank. Thank you.

October 17, 2002

Last week a questionnaire about Cumberland County's water resources was mailed to you. Your name was randomly drawn from a list of all Cumberland County residents.

If you already completed and returned the questionnaire, please accept our sincere thanks. If not, please do so today. We especially appreciate your help because it is only by asking people like you to share your views that we can accurately understand what people think about the county's water resources.

If you did not receive a questionnaire, or if it was misplaced, please call (865) 974-8346 or e-mail (arouthe@utk.edu) and I will get you another one in the mail today.

Aaron Routh, Masters Candidate
Research Investigator

Dr. Robert Emmet Jones
Research Investigator

WASTE MGMT RESEARCH & EDUC INST -206
THE UNIVERSITY OF TENNESSEE
5723 MIDDLEBROOK PIKE
KNOXVILLE TN 37921-9919

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Permit #481**

October 28, 2002

Dear

About three weeks ago we sent you a questionnaire asking for your views about Cumberland County's water resources. To the best of our knowledge, it has not yet been returned, so we still need to ask you for your help.

The comments of people who are residents in the county include a wide variety of opinions about the county's water supply and water resources. Many residents described their thoughts, both positive and negative, on how the County's resources are managed and the future of the County's water supply.

We are writing again because of the importance that your questionnaire has for helping us to get accurate results. Although we sent questionnaires to many people living in the county, it is only by hearing from nearly everyone we mailed surveys to that we can be sure the results are truly representative of all the County's residents.

A few people have written to say they should not have received the questionnaire because they are no longer a resident of Cumberland County. If this is the case with you, please let us know on the cover of the questionnaire and return it in the enclosed business reply envelope so we can delete your name from the mailing list.

In case you are concerned about your privacy, we want to assure you of the confidentiality of your answers. Protecting your privacy is very important to us, as well as the University.

We hope that you fill out and return the questionnaire soon. If for some reason you prefer not to answer it, please let us know by returning a note or blank questionnaire in the enclosed business reply envelope.

Sincerely,

Aaron S. Routhe, Masters Candidate
Research Investigator

Dr. Robert Emmet Jones
Research Investigator

P.S. If you have any questions, please feel free to contact us in Knoxville
at (865) 974-8346.

Water Supply Issues Facing Residents of Cumberland County



A survey conducted by the
Southeast Water Policy Initiative at
The University of Tennessee



THE UNIVERSITY OF TENNESSEE
311 Conference Center Building
Knoxville, TN 37996-4134

Thank you for volunteering to help us with this important study. Several other studies have already identified possible ways Cumberland County can meet its future water supply needs. Our study examines how residents of Cumberland County view these possible water supply options and why they may support or oppose them.

Instructions

In the questionnaire you are about to fill out we ask some questions which will make use of rating scales with seven spaces; please mark the space that **BEST** describes your own personal opinion.

For example, if you were asked to rate the likelihood you would go to work tomorrow and it was '*extremely likely*', you would mark the space as follows:

LIKELY							UNLIKELY
	X						
	extremely	quite	slightly	unsure	slightly	quite	extremely

In making your ratings please remember the following points:

1. Place your marks in the *middle of the spaces* and not on the boundaries.

	X						X
	THIS						NOT THIS

2. Never put more than one mark on a single rating scale.
3. Be sure to answer all items – please do not skip any questions unless instructed.
4. Please return the completed questionnaire in the envelope provided.

This first set of questions asks for your views on different aspects of Cumberland County's water resources. Please make a mark [X] in the space that BEST describes your opinion on each.

1. Overall, how satisfied are you with the WATER QUALITY in Cumberland County?

SATISFIED _____ UNSATISFIED
extremely quite slightly unsure slightly quite extremely

2. Overall, how AWARE are you of water supply issues facing Cumberland County?

AWARE _____ UNAWARE
extremely quite slightly unsure slightly quite extremely

3. Overall, how satisfied are you with HOW Cumberland County's water resources are being managed?

SATISFIED _____ UNSATISFIED
extremely quite slightly unsure slightly quite extremely

4. Overall, how satisfied are you with the information you have about WHAT is being done to meet Cumberland County's water supply needs?

SATISFIED _____ UNSATISFIED
extremely quite slightly unsure slightly quite extremely

5. Overall, how satisfied are you with the information you have about the COSTS AND BENEFITS of different possible options to meet Cumberland County's water supply needs?

SATISFIED _____ UNSATISFIED
extremely quite slightly unsure slightly quite extremely

6. Overall, how satisfied are you with the PRICE you pay for your water?

SATISFIED _____ UNSATISFIED
extremely quite slightly unsure slightly quite extremely

7. If there were one thing you would change about managing the County's water resources, what would it be?

8. How LIKELY is it that Cumberland County CURRENTLY has a water supply problem?

LIKELY

extremely	quite	slightly	unsure	slightly	quite	extremely
-----------	-------	----------	--------	----------	-------	-----------

 UNLIKELY

9. How LIKELY is it that Cumberland County will have a water supply problem in the NEXT FIVE YEARS?

LIKELY

extremely	quite	slightly	unsure	slightly	quite	extremely
-----------	-------	----------	--------	----------	-------	-----------

 UNLIKELY

These next questions ask how willing you are to PERSONALLY SUPPORT suggestions some people have made for meeting Cumberland County's current and future water supply needs.

10. To have ALL (city and county) water utilities in Cumberland County work together to the County's water supply needs.

LIKELY SUPPORT

extremely	quite	slightly	unsure	slightly	quite	extremely
-----------	-------	----------	--------	----------	-------	-----------

 UNLIKELY SUPPORT

11. To build a new dam in the County to flood a lake reservoir behind it.

LIKELY SUPPORT

extremely	quite	slightly	unsure	slightly	quite	extremely
-----------	-------	----------	--------	----------	-------	-----------

 UNLIKELY SUPPORT

12. To build a pipeline from an existing water reservoir outside the County.

LIKELY SUPPORT

extremely	quite	slightly	unsure	slightly	quite	extremely
-----------	-------	----------	--------	----------	-------	-----------

 UNLIKELY SUPPORT

13. To conserve County water by reducing consumption, using it more efficiently, and recycling it.

LIKELY SUPPORT

extremely	quite	slightly	unsure	slightly	quite	extremely
-----------	-------	----------	--------	----------	-------	-----------

 UNLIKELY SUPPORT

14. To drill for groundwater sources outside the County.

LIKELY SUPPORT | _____ | _____ | _____ | _____ | _____ | _____ | UNLIKELY SUPPORT
extremely quite slightly unsure slightly quite extremely

15. To harvest water by pumping it from County streams during storms in order to store it for future use.

LIKELY SUPPORT | _____ | _____ | _____ | _____ | _____ | _____ | UNLIKELY SUPPORT
extremely quite slightly unsure slightly quite extremely

16. To raise the height of one or more existing dams in the County to increase their storage capacity.

LIKELY SUPPORT | _____ | _____ | _____ | _____ | _____ | _____ | UNLIKELY SUPPORT
extremely quite slightly unsure slightly quite extremely

17. To take no action to meet the County's current or future water supply needs.

LIKELY SUPPORT | _____ | _____ | _____ | _____ | _____ | _____ | UNLIKELY SUPPORT
extremely quite slightly unsure slightly quite extremely

18. Looking at suggestions 10 through 17, which do you believe is the BEST option for meeting Cumberland County's water supply needs? (CIRCLE ONE CHOICE)

- Q10. Have utilities work together
- Q11. Build a new dam
- Q12. Build a pipeline
- Q13. Conserve water
- Q14. Drill for groundwater

- Q15. Harvest water
- Q16. Raise existing dam
- Q17. Take no action
- Q00. Don't know

19. In your view, do you think ONLY ONE of the above suggestions is sufficient to meet Cumberland County's water supply needs?

- 1 No
- 2 Yes
- 3 Don't know

Many residents seem more familiar with building a dam than other options. Some may support building a new dam; however, others may oppose it. Thus, we want to examine this water supply option more thoroughly. Please make a mark [X] in the space that most ACCURATELY represents your opinion.

20. I plan on voting for ANY public official who supports building a new dam.

LIKELY _____ UNLIKELY
 extremely quite slightly unsure slightly quite extremely

21. In the next 6 months, I plan to support building a new dam in the County by contacting a public official.

LIKELY _____ UNLIKELY
 extremely quite slightly unsure slightly quite extremely

22. In the next 6 months, I plan on attending a local government meeting to oppose building a new dam in the County.

LIKELY _____ UNLIKELY
 extremely quite slightly unsure slightly quite extremely

23. In the next 6 months, I plan on donating money or time to a group that opposes building a new dam in the County.

LIKELY _____ UNLIKELY
 extremely quite slightly unsure slightly quite extremely

24. In the next 6 months, I plan on talking to neighbors, friends, or relatives about my support for building a new dam in the County.

LIKELY _____ UNLIKELY
 extremely quite slightly unsure slightly quite extremely

25. IN THE PAST I have _____ building a new dam in the County.

SUPPORTED _____ OPPOSED
 extremely quite slightly unsure slightly quite extremely

Please make a mark [X] in the space that BEST describes your OVERALL OPINION about BUILDING A NEW DAM in the County.

Building a new dam in the County is . . .

26. **BAD** _____ | _____ | _____ | _____ | _____ | _____ | _____ **GOOD**
 extremely quite slightly unsure slightly quite extremely

27. **WISE** _____ | _____ | _____ | _____ | _____ | _____ | _____ **FOOLISH**
 extremely quite slightly unsure slightly quite extremely

28. **HARMFUL** _____ | _____ | _____ | _____ | _____ | _____ | _____ **BENEFICIAL**
 extremely quite slightly unsure slightly quite extremely

29. **POSITIVE** _____ | _____ | _____ | _____ | _____ | _____ | _____ **NEGATIVE**
 extremely quite slightly unsure slightly quite extremely

30. **IMPORTANT** _____ | _____ | _____ | _____ | _____ | _____ | _____ **UNIMPORTANT**
 extremely quite slightly unsure slightly quite extremely

These next questions ask you about the LIKELIHOOD that some things may or may not occur as a result of building a new dam in Cumberland County.

31. Building a new dam will degrade the habitats of wild animals and fish in the County.

LIKELY _____ | _____ | _____ | _____ | _____ | _____ | _____ UNLIKELY
 extremely quite slightly unsure slightly quite extremely

32. Building a new dam will lower the cost of water for residents.

LIKELY _____ | _____ | _____ | _____ | _____ | _____ | _____ UNLIKELY
 extremely quite slightly unsure slightly Quite extremely

33. Building a new dam will help the economy grow in the County.

LIKELY _____ | _____ | _____ | _____ | _____ | _____ | _____ UNLIKELY
 extremely quite slightly unsure slightly Quite extremely

34. Building a new dam will provide new recreation and tourism opportunities in the County.

LIKELY _____ | _____ | _____ | _____ | _____ | _____ | _____ UNLIKELY
 extremely quite slightly unsure slightly Quite extremely

35. Building a new dam will degrade the natural environment in the County for future generations.

LIKELY _____ UNLIKELY
extremely quite slightly unsure slightly quite extremely

36. Building a new dam will help water utility companies in the County better serve their customers.

LIKELY _____ UNLIKELY
extremely quite slightly unsure slightly quite extremely

37. Building a new dam will provide enough water to meet the County's current and future water supply needs.

LIKELY _____ UNLIKELY
extremely quite slightly unsure slightly quite extremely

The next set of questions asks you to rate the DESIRABILITY of having these same things above occurring.

38. Degrading the habitat of wild animals and fish in the County is:

DESIRABLE _____ UNDESIRABLE
extremely quite slightly unsure slightly quite extremely

39. Lowering the cost of water for residents is:

DESIRABLE _____ UNDESIRABLE
extremely quite slightly unsure slightly quite extremely

40. Helping the economy grow in the County is:

DESIRABLE _____ UNDESIRABLE
extremely quite slightly unsure slightly quite extremely

41. Providing new recreational opportunities in the County is:

DESIRABLE _____ UNDESIRABLE
extremely quite slightly unsure slightly quite extremely

42. Degrading the natural environment in the County for future generations is:

DESIRABLE _____ UNDESIRABLE
 extremely quite slightly unsure slightly quite extremely

43. Helping water utility companies in the County better serve their customers is:

DESIRABLE _____ UNDESIRABLE
 extremely quite slightly unsure slightly quite extremely

44. Providing enough water to meet the County's current and future water supply needs is:

DESIRABLE _____ UNDESIRABLE
 extremely quite slightly unsure slightly quite extremely

The following questions ask what you believe **OTHER PEOPLE THINK** about building a new dam in the County. If you think a particular group does not care whether you support or oppose building a dam or if you are unsure about their opinion, then place a circle around the number three (3).

45.

Most people who are important to me think

I SHOULD _____ I SHOULD
 NEVER 0 | 1 | 2 | 3 | 4 | 5 | 6 ALWAYS
 SUPPORT building a new dam in the County.

46.

Most members of my family think

I SHOULD _____ I SHOULD
 NEVER 0 | 1 | 2 | 3 | 4 | 5 | 6 ALWAYS
 OPPOSE building a new dam in the County.

47.

My close personal friends think

I SHOULD _____ I SHOULD
 NEVER 0 | 1 | 2 | 3 | 4 | 5 | 6 ALWAYS
 SUPPORT building a new dam in the County.

48.

Most of my neighbors think

I SHOULD _____ I SHOULD
 NEVER 0 | 1 | 2 | 3 | 4 | 5 | 6 ALWAYS
 OPPOSE building a new dam in the County.

Next we'd like to know the **DEGREE** to which you are **MOTIVATED TO COMPLY** with the wishes of these same people. Please **CIRCLE** the number that **BEST** describes your opinion.

49. Overall, I want to do what most people who are important to me think I should do.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

50. Generally speaking, I want to do what most members of my family think I should do.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

51. Generally speaking, I want to do what my close personal friends think I should do.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

52. Generally speaking, I want to do what most of my neighbors think I should do.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

For the next few questions please mark the space that BEST describes your opinion about building a new dam in Cumberland County.

53. Overall, I think it will be hard for me to express my support or opposition to building a new dam in the County.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

54. Generally speaking, I think I have enough information to be able to express my support or opposition to building a new dam in the County.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

55. Generally speaking, I think I have the necessary skills to express my support or opposition to building a new dam in the County.

AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

56. Generally speaking, I think I will have the opportunity to express my support or opposition to building a new dam in the County.

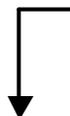
AGREE _____ DISAGREE
extremely quite slightly unsure slightly quite extremely

Now we'd like to learn more about you. Any answers you give are confidential and will ONLY be used for scientific purposes. Please CIRCLE THE NUMBER that best represents your answer.

57. Are you a current resident of Cumberland County, Tennessee?

- 1 No
- 2 Yes
- 3 Don't know

58. Have you lived in Cumberland County, Tennessee all your life?

- 1 No
 - 2 Yes (PLEASE GO TO QUESTION 72, PAGE 13)
 - 3 Don't know
- 

59. What year did you MOST RECENTLY move to Cumberland County, Tennessee _____?

60. Were you born in Cumberland County, Tennessee?

- 1 No
- 2 Yes
- 3 Don't know

61. How many TOTAL years have you lived OUTSIDE of Cumberland County__?

62. How many TOTAL years have you lived IN Cumberland County?

- 1 LESS than 5 years
- 2 5 to 10 years
- 3 10 to 20 years
- 4 20 to 30 years
- 5 MORE than 30 years
- 6 Don't know

Listed below are some reasons why people move to Cumberland County. Place a mark [X] to indicate HOW IMPORTANT each one was when you considered moving to Cumberland County.

63. To be closer to relatives and friends.

IMPORTANT _____ UNIMPORTANT
 extremely | quite | slightly | unsure | slightly | quite | extremely

64. For its culture, people, and way of life.

IMPORTANT _____ UNIMPORTANT
 extremely | quite | slightly | unsure | slightly | quite | extremely

65. For its natural environment.

IMPORTANT _____ UNIMPORTANT
 extremely | quite | slightly | unsure | slightly | quite | extremely

66. For economic OR employment reasons.

IMPORTANT _____ UNIMPORTANT
 extremely | quite | slightly | unsure | slightly | quite | extremely

67. Because it had less urban sprawl and development.

IMPORTANT _____ UNIMPORTANT
 extremely | quite | slightly | unsure | slightly | quite | extremely

68. Which of the following was the MOST IMPORTANT REASON for moving to Cumberland County? (Choose ONE please)

- 1 To be closer to relatives and friends
- 2 For its culture, people, and way of life
- 3 For its natural environment
- 4 For economic OR employment reasons
- 5 Because it had less urban sprawl and development
- 6 Some other reason (Please specify): _____

69. What STATE and COUNTY did you live in RIGHT BEFORE you moved to Cumberland County?

STATE _____ COUNTY _____

70. Which of the following BEST describes where you lived RIGHT BEFORE you moved to Cumberland County?

- 1 On a farm, ranch or in open country
- 2 In a town or a small city with less than 25,000 people
- 3 In a city with between 25,000 and 50,000 people
- 4 In a city with between 50,000 and 250,000 people
- 5 In a metro area with between 250,000 and 500,000 people
- 6 In a metro area with between 500,000 and 1 million people
- 7 In a metro area with more than 1 million people
- 8 Don't know

71. OTHER than Cumberland County, which of the following BEST describes where you lived the MOST?

- 1 On a farm, ranch or in open country
- 2 In a town or a small city with less than 25,000 people
- 3 In a city with between 25,000 and 50,000 people
- 4 In a city with between 50,000 and 250,000 people
- 5 In a metro area with between 250,000 and 500,000 people
- 6 In a metro area with between 500,000 and 1 million people
- 7 In a metro area with more than 1 million people
- 8 Don't know

72. Which of the following BEST describes where you CURRENTLY live within Cumberland County?

- 1 On a farm, ranch or in open country
- 2 In a town or a small city with less than 25,000 people
- 3 In a city with between 25,000 and 50,000 people
- 4 In a city with between 50,000 and 250,000 people
- 5 In a metro area with between 250,000 and 500,000 people
- 6 In a metro area with between 500,000 and 1 million people
- 7 In a metro area with more than 1 million people
- 8 Don't know

73. Where does the water at your CURRENT RESIDENCE in Cumberland County come from? (CIRCLE ALL THAT APPLY)

- 1 A utility district
- 2 A well on my property
- 3 A pond or stream on my property
- 4 Don't know

74. Which utility district is your CURRENT residence LOCATED in?

- 1 Catoosa
- 2 Crab Orchard
- 3 Crossville, INSIDE CITY LIMITS
- 4 Crossville, OUTSIDE CITY LIMITS
- 5 Grandview
- 6 South Cumberland
- 7 West Cumberland
- 8 Don't know

75. Which utility district provides water to your CURRENT residence?

- 1 Catoosa
- 2 Crab Orchard
- 3 Crossville
- 4 Grandview
- 5 South Cumberland
- 6 West Cumberland
- 7 Self-supplied by well
- 8 Don't know

76. On AVERAGE, how much do you pay PER MONTH for water provided by your utility district?

- 1 \$_____ per month
- 2 Don't know

77. In what year were you born? _____

78. What is your gender? 1 Female 2 Male

79. Which of the following categories best describes you?

- 1 Caucasian
- 2 African-American
- 3 Asian
- 4 Hispanic or Latino
- 5 Native American
- 6 Other (Please describe) _____

80. Which of the following categories best represents your highest level of education?

- 1 Less than High School
- 2 Some High School
- 3 High School diploma or GED
- 4 Some college (community, associate, or 4 year)
- 5 College degree
- 6 More than a college degree (Graduate studies or degree)

81. Please circle the category that BEST describes your current or previous employment?

- 1 Agriculture, Forestry, Fisheries, Mining & Construction
- 2 Manufacturing
- 3 Transportation, Communication & other Public Utilities
- 4 Wholesale & Retail Trade
- 5 Finance, Insurance & Real Estate; Business, Repair & other Personal Services (e.g. Motel)
- 6 Entertainment & Recreation Services; Professional (e.g. Education) & Related Services
- 7 Public Administration
- 8 Homemaker
- 9 Other (Please describe) _____

**82. Generally, how SUPPORTIVE are you with the views of the following organizations?
Would you say you are very, somewhat, only a little, or not at all supportive?**

Organization Type	Very	Somewha t	Only a little	Not at all
a. Business.....	1	2	3	4
b. Education	1	2	3	4
c. Environmental	1	2	3	4
d. Farming.....	1	2	3	4
e. Government.....	1	2	3	4
f. Labor.....	1	2	3	4
g. Media.....	1	2	3	4
h. Recreation.....	1	2	3	4
i. Religious	1	2	3	4
j. Any other group.....	1	2	3	4

83. Which of these are you MOST SUPPORTIVE of: _____?

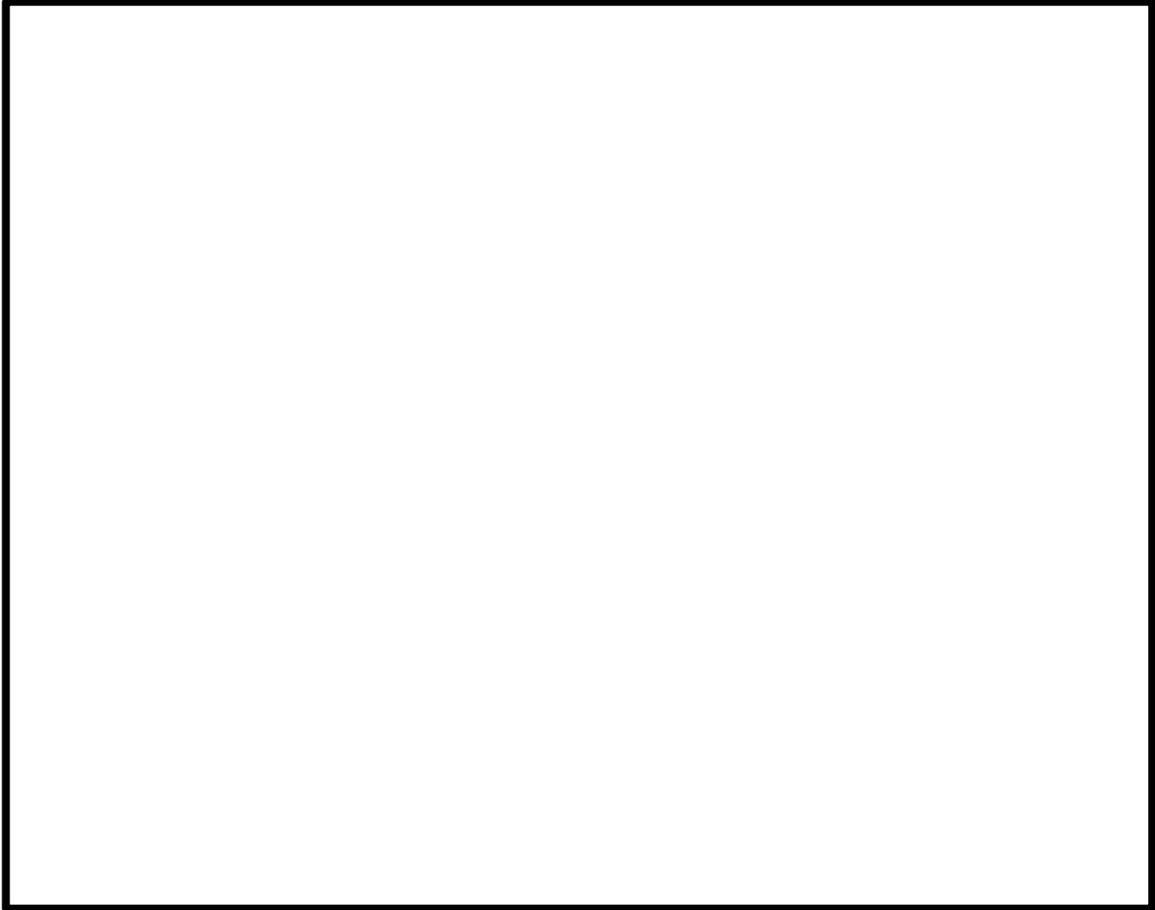
84. Generally speaking, how would you BEST describe your political affiliation?

- 1 Conservative Republican
- 2 Moderate Republican
- 3 Independent
- 4 Moderate Democrat
- 5 Liberal Democrat

85. Generally speaking, what was your household's total annual income before taxes in 2001?

- 1 Less than \$14,999
- 2 \$15,000 - \$24,999
- 3 \$25,000 - \$34,999
- 4 \$35,000 - \$49,999
- 5 \$50,000 - \$74,999
- 6 \$75,000 - \$99,999
- 7 Over \$100,000

Thank you so much for helping on this important study. Your responses will help us better understand public opinion about Cumberland County's water resources and water supply needs. We realize you may have other comments or opinions that you weren't able to express in this survey. We invite you to write ANY comments you have in the space below.

A large, empty rectangular box with a black border, intended for participants to write any comments they have regarding the survey.

Please note that the return of this questionnaire will constitute your informed consent to participate in this study. If you would like to receive a copy of a summary of the survey results, please contact us by phone (1-865-974-8346) or mail at The University of Tennessee, 311 Conference Center Bldg., Knoxville, TN, 37A

Vita

In 1993, Aaron Scott Routhe graduated Valedictorian of his Spaulding High School class in Rochester, New Hampshire. Following graduation he proceeded to Houghton College in western New York where he pursued major studies in ecology with a minor in chemistry. Summers were spent fostering his passion for the natural environment while directing a leadership development program at New England Frontier Camp in the Maine woods. He received his Bachelor of Science degree in environmental biology, graduating magna cum laude, in May of 1997.

After graduation he moved to Dallas, Texas to start a year-round environmental education program for Camp El Har. Once this was established, he turned to establishing an adventure recreation and wilderness-tripping program. For the remaining three years, he taught team building skills to corporate and small groups using outdoor recreational activities such as challenge course, rock climbing, and rappelling in places like the Wichita Mountain Wildlife Refuge near Lawton, Oklahoma.

An interest in social conflict over the management of natural resources spurred him to pursue graduate education in the fall of 2000 at the University of Tennessee, Knoxville begin a master's program in environmental sociology. Aaron worked as a teaching assistant his first year before being offered a research assistantship with the newly established Southeast Water Policy Initiative (www.waterpolicy.org) at the Energy, Environment, and Resource Center of the University. He currently conducts research on the institutional and social-psychological factors contributing to water supply disputes in the Southeast.