

CHAPTER 7

EXPLORING WTP THROUGH THE THEORY OF PLANNED BEHAVIOR

To help understand more about individuals' reasoning and motivations for their willingness to pay for the flood control and environmental improvement projects, some additional variables were integrated into the study. One set of variables were derived from one of the most widely used and successful models designed to predict human behavior, Ajzen's (1988) Theory of Planned Behavior. Another set of variables, applied to the environmental path only, represent individuals' environmental perspectives and include the environmental Awareness of Consequences scale.

Theory of Planned Behavior Applied to WTP

The Theory of Planned Behavior (see Figure 7.1) proposes that a behavior (**B**) will be predicted by behavioral intention (**BI**). Behavioral intention, in turn, is determined by three variables: attitude toward the behavior (**AAct**), which is the person's positive or negative evaluation of performing the particular behavior, subjective norms (**SN**), which is the person's perception of social normative pressures, that is, that relevant others believe he or she should (or should not) perform the particular behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and perceived behavioral control (**PBC**), which is the perceived ease of performing the behavior, reflecting past experience as well as anticipated impediments and obstacles (Ajzen, 1988). The main equation is:

$$B \sim BI = f[(AAct)w_1 + (SN)w_2 + (PBC)w_3] \quad (7.1)$$

For some behaviors, attitude (AAct) may be a more important factor than perceived norms (SN) or personal control (PBC), and for other behaviors, one of the other factors might be more influential. Thus, the weights for each component may vary, and are empirically derived (usually as standardized regression coefficients) in tests of the theory. Overall, people are expected to be more likely to perform a given behavior when they evaluate their performance of it positively, consider it easy to do, and when they believe that others important to them want them to perform the behavior.

The theory also states that attitudes toward performing a behavior are determined by salient behavioral beliefs a person has about the behavior and that subjective norms are determined by the motivation to comply with the perceived desires of others important to the person. While the latter are illustrated ("Normative Belief Structure") in Figure 7.1, this study will not be concerned with them.. However, what will be termed "Cognitive Structure" — the set of beliefs a person has about a risk-related behavior and his or her evaluation of the outcomes of the behavior — is very important to the study. Communication about flood risks or environmental quality issues is more likely to affect the content and stability of cognitions, such as outcome beliefs, than behaviors. Behaviors might be affected only indirectly affected through the chain of influences shown in the figure.

Cognitive Structure

Fishbein and Ajzen (1975) note that salient beliefs (**b**) are those a person retrieves from memory and are "considered" when deciding how to behave in a given situation. Beliefs are formed from personal experience, from information a person receives from some source, such as the mass media, and from inferences a person draws from other beliefs. In the Fishbein and Ajzen formulation, a behavioral belief associates performance of the behavior with a certain outcome (*e.g.*, someone may believe that "taking a vacation trip" will "make me relax") or with some attribute related to performing the behavior (*e.g.*, that the trip "will be costly"). The strength of a behavioral belief is usually measured on a scale that indicates how likely it is that a particular outcome or attribute will be associated with performing the behavior, as perceived by the person completing the scale. Scale values typically range from -3 (very unlikely) to +3 (very likely).

Using an expectancy-value formulation, each behavioral belief is multiplied by a measure of evaluation (**e**) of the outcome or attribute. The valence of an evaluation is commonly measured on a semantic differential scale ranging from -3 for "bad" to +3 for "good" (*e.g.*, a person would indicate on the scale whether, for him

or her, doing something to relax would be bad or good or somewhere in between). The resulting product term is usually referred to as a belief-evaluation compound (**b_ie_i**). The compound yields positive values when the person perceives that good outcomes (attributes) are likely to result from performing the behavior, or that bad outcomes (attributes) are unlikely to result. It yields negative values when the person perceives that bad outcomes (attributes) are likely or that good outcomes (attributes) are unlikely. Compounds for all beliefs are then summed to produce a measure of cognitive structure (also known as "indirect attitude") designed to predict attitude toward the behavior (AA_{ct}):

$$A \propto \sum_{i=1}^n b_i e_i \tag{7.2}$$

Research Applying TPB to WTP

Meta analyses conducted of the Theory of Planned Behavior and its precursor Theory of Reasoned Action (Fishbein and Ajzen, 1975), and their applications over myriads of studies involving a wide variety of behaviors, indicate that these models on the average account for 40-50% of the variance in BI and 19-38% of the variance in actual behavior (Sutton, 1998).

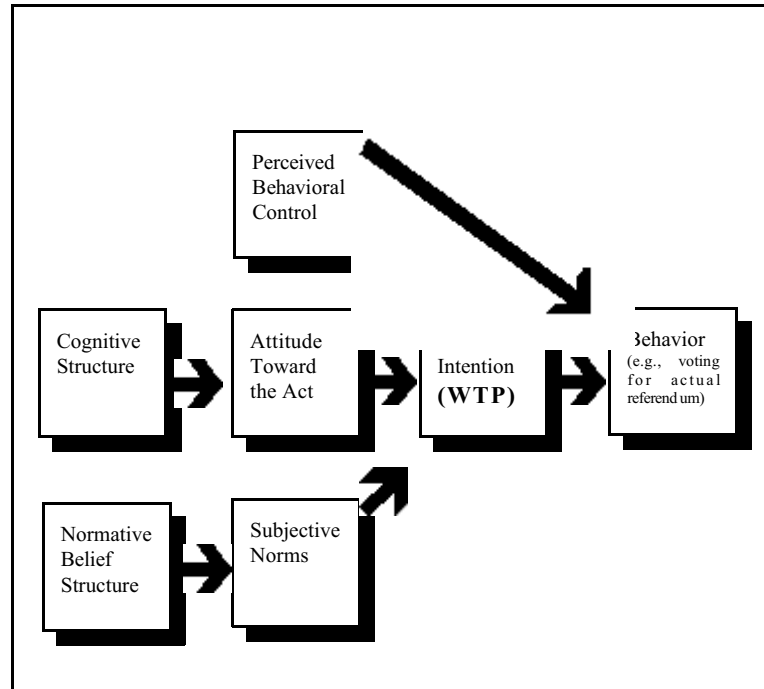


Figure 7.1 Components of Theory of Planned Behavior as Applied to Willingness to Pay

In their application of Theory of Planned Behavior to Willingness to Pay, Ajzen and Driver (1992) found, in a study of students' WTP for a leisure activity, that the basic decision of whether or not to pay for a public good was based on superficial, heuristic cognitive rules of thumb (e.g., one's affective response, general ethical considerations related in general to paying a user fee), but when respondents had to evaluate the amount they would have to pay, they did apply more substantive considerations. In the latter case, the TPB predictor variables of subjective norms and perceived behavioral control did relate to the amount the students were willing to pay. In a later laboratory experiment examining college students' willingness to pay for a public good (construction of a campus movie theater) and a private good (a personal noise filter), Ajzen, Brown and Rosenthal (1996) found further empirical support for application of TPB to public good and private good WTP judgments. They also determined that WTP was affected by the quality of arguments used to describe the good, in particular when the good was personally relevant to the subject and the argument was strong. When the good was less relevant to the subject, altruistic motives positively affected WTP for the public good (but not the private). They concluded that WTP estimates can be profoundly affected by the information provided in Contingent Valuation surveys, especially when the good is of low personal relevance to the individual. In those cases, individuals might either fail to process even the detailed information provided them and/or base their WTP judgments on heuristic judgments about the quality of the arguments themselves. They propose that such information bias is more likely to occur when respondents in CV surveys are not very knowledgeable about the good, which is a likely scenario, they say, in most CV surveys.

Providing a subset of respondents with a leaflet containing relevant information did not, however, appear to affect WTP in a mail survey of 600 adults in Finland who were being asked about support for forest regeneration policy. In this study, Pouta and Rekola (2001) found, consistent with the Theory of Planned Behavior, that both attitudes and PBC affected WTP, and that beliefs about forest regeneration policy affected attitudes. In another mail survey applying the Theory of Reasoned Action (which does not have a PBC component) to WTP for an environmental good (water quality), Luzar and Cosse (1998) found that attitudes and subjective norms predicted WTP over and above a set of demographic variables. The effect was stronger, however, when the good was more personally relevant to the individual.

Thus, it would appear that the Theory of Planned Behavior can be applied, and successfully, to studies of Willingness to Pay for the kind of environmental improvement and flood control projects examined in this study, as long as that is done with awareness of potential information and information-processing biases. Certainly the personal relevance of the good to the respondent will be an important consideration, so controls are included for exposure to flood risk (in the flood path) and visits to the river/creek area for recreation (in the environmental path). While respondents in the survey are given extensive descriptions of the projects and their benefits, it will also be essential to consider prior exposure they may have had to information about the local flooding problem and about threats to their local river or creek. Since most of this exposure will probably occur through attention to relevant information in the news, that factor will be taken into account in the study.

In general, the expectation is that variables from the Theory of Planned Behavior will account individually, and as a block, for variance in WTP, and that the relationships will be positive.

Environmental Perspectives Applied to TPB and WTP

WTP studies until fairly recently have neglected the psychological foundations of WTP and have instead focused rather narrowly on demographic correlates (Ajzen and Driver 1992; Kotchen and Reiling 2000). Because respondents are unaccustomed to evaluating the monetary value of public goods, such as urban watershed restoration projects, and generally lack the same information and experience they would have for private goods purchased in the market place, in formulating WTP responses respondents tend to use intuitive feelings about the public good, according to recent research findings (Ajzen and Driver 1992). In particular,

in their judgements about WTP respondents tend to express their basic moral values toward public goods as well as what they believe others they respect think they should pay (subjective norms). Respondents also consider whether they have the ability (behavioral control) to actually make required payments for the public good in their WTP responses. In short, as opposed to a highly quantitative cost-benefits analysis of public goods, WTP respondents rely more on intuition, feelings, and fundamental values in formulating their responses. Recent work has found that environmental attitudes and WTP for environmental improvement are often correlated with basic ethical beliefs about the environment (Stevens et al. 1991; Spash and Hanley 1995; Spash 1997; Kotchen and Reiling 2000).

The public has increasingly expressed environmental sentiments in opinion surveys in recent years, and a significant portion of the public believes that nature is valuable in its own right apart from human material interests (Dunlap 1991; Kempton et al. 1995). In other words, some portion of society is willing to support environmental improvements even if humans fail to be beneficiaries in any material sense. Because of the apparent importance of psychological variables in the determination of WTP, Ajzen's Theory of Planned Behavior is adopted here as a framework for evaluating the impact of environmental attitudes and ethical values on WTP for urban watershed restoration projects. Determining the extent to which environmental values affects WTP is a primary goal of this research. Economists usually argue that economic variables are critical in economic decision making. The basic idea to be examined empirically is that psychological variables, environmental attitudes, and ethical values are more important than strictly economic phenomenon in public goods decisions making.

Biocentric Ethic

Environmental values are a special form of basic views about how things should be in the world and about what humans should do to make the world a better place. Environmental values can be anthropocentric (i.e. human centered) or they can be biocentric (Rolston 1981; Callicott 1985; Norton 1995). In the case of anthropocentric values, environmental improvement should be undertaken for the material benefit of people only. For biocentric environmental values, ecological improvement should be undertaken for the sake of nature itself apart from any material human benefit. From a biocentric view, the ecological restoration of a watershed, for example, should be undertaken if it benefits the species present whether or not there is any concrete material benefits to human beings. This means that individuals with biocentric values would support ecological restoration even if neither they or anyone else experience added material benefits such as improve recreation opportunities, higher market values for adjacent property, or cleaner drinking water now or in the future.

The role that biocentric values play in determining support for environmental conservation measures has yet to be addressed very extensively by empirical research on environmental attitudes. Spash (1997) finds that biocentric ethical values have a positive effect on attitudes towards environmental protection. Recent survey research work suggests that biocentric as opposed to anthropocentric environmental values are relatively widely held (Kempton et al. 1995). Presumably, those who hold biocentric ethical values would offer a greater level of support for environmental protection than those who hold strictly anthropocentric values, other things equal. Someone who desires environmental conservation both for its human material benefits and for nature itself would be expected to be more likely to make sacrifices for environmental improvement than someone who supports environmental conservation for material human benefits alone. If in fact biocentric survey respondents believe that species in urban waterways have an absolute right to exist, and if they believe that ecological improvement to urban watersheds will protect such species, then they may well be willing to pay whatever they can afford without sacrificing their other moral obligations. This would be the case for lexicographic preference orderings for ethical goods. Under such an ordering, more of the ethical good would always be preferred to less no matter the consequences for income so long as income doesn't fall below the level required to meet other ethical obligations (Booth 1994). Spash and Haney (1995)

indeed find evidence of lexicographic preferences in a study of attitudes toward biodiversity preservation. While survey research indicates that many are biocentrists (Kempton et al. 1995), their relative willingness to undertake economic sacrifice in the form of WTP for their principles has yet to be addressed in WTP studies. This can be accomplished by incorporating an attitudinal measure representing a biocentric ethic into a study that employs the Theory of Planned Behavior to examine willingness to pay for an ecological restoration project. Specifically, a general attitude that the health of urban rivers should be improved for the sake of nature itself should represent a deeper, biocentric ethic held by the respondent.

Duty-Oriented Ethic

A second dimension of ethical decision making is the expression of a sense of duty toward either human individuals or nature itself. The idea of a duty-oriented ethic originates with Kant (Liddell 1970). He argues that we as human individuals have a duty to avoid harm to others and to assist them in achieving their happiness when we are able. The concept of duty could be strictly anthropocentric, or it could extend in a biocentric fashion to the environment itself (Booth 1994). While the question of whether ethical behavior is or ought to be duty-oriented is a subject of debate among philosophers, the goal here is to examine empirically whether the idea of duty in fact enters into decision making about urban river restoration. Specifically, a general attitude that taxpayers have a duty to share in the cost of improving the health of urban rivers should represent a deeper, duty-oriented ethic held by the respondent. The concept of a duty-oriented ethic apparently has yet to be incorporated into empirical research in any significant way.

Consequently, a proposition to be examined empirically is whether attitudes representing biocentric and duty-oriented ethics have a positive impact on specific beliefs about WTP to restore urban watersheds and therefore on WTP itself. The path through which such basic environmental values might influence beliefs and WTP is expected to be through Cognitive Structure, the set of beliefs and evaluations individuals have regarding paying for an environmental good. Environmental values are basic core beliefs while cognitive structure is a measure of more specific beliefs about the behavioral intention, WTP. Simply put, core beliefs and values are hypothesized to affect specific beliefs and values (cognitive structure) about some behavioral intention.

Awareness of Consequences

Analysts have sought to capture environmental attitudes through the development of scales composed of a variety of survey questions asking about various dimensions of environmental issues. Kotchen and Reiling (2000) find that one of these scales, the New Environmental Paradigm, is a statistically significant determinant of species protection for wildlife in the state of Maine. Tarrant and Cordell (1997) compared the predictive ability of the five most commonly used environmental attitudes scales. Two scales that have exhibited acceptable levels of reliability and contain questions that seem most appropriate for evaluating urban watersheds, the Awareness of Consequences scale (AC) and the New Environmental Paradigm (NEP), were pretested on 67 students. Since the AC scale predicted environmental behavior somewhat more reliably than the NEP scale, the former was chosen for use in this study. Because of space constraints, a slightly shortened version of the AC scale was included in the final version of the questionnaire (see Methods section).

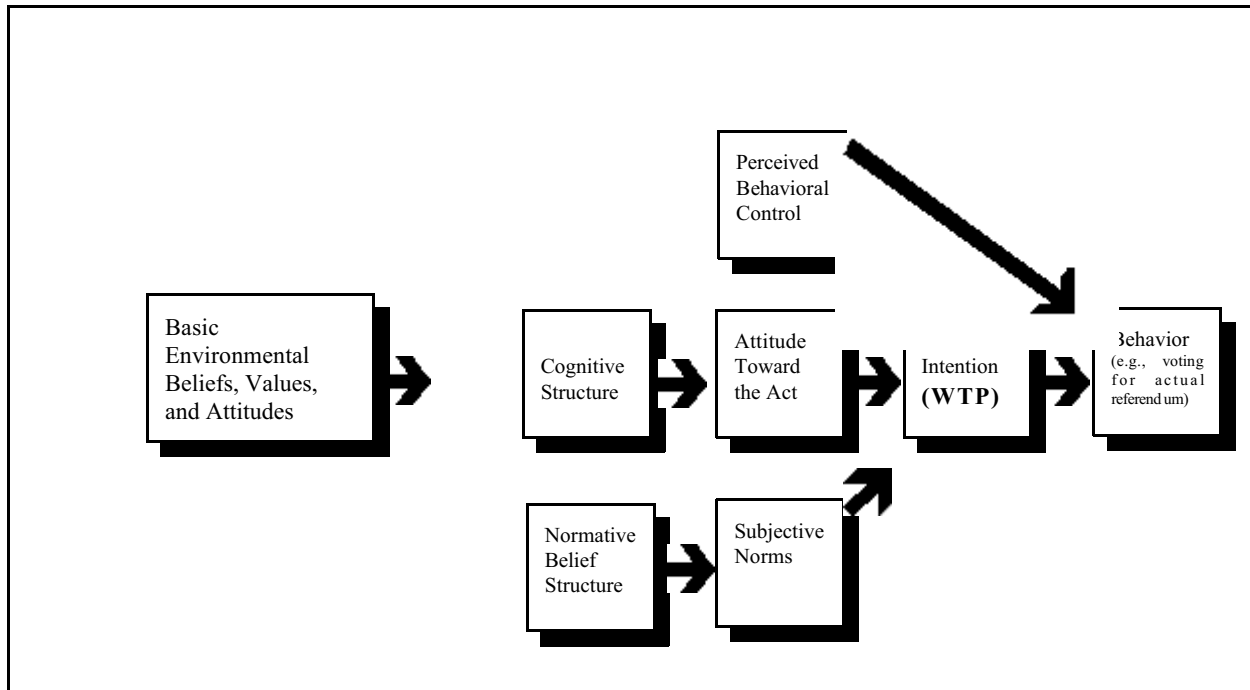


Figure 7.2 Environmental Perspectives Applied to Theory of Planned Behavior and WTP

The AC scale does not distinguish between biocentric and anthropocentric environmental values, nor does it capture other dimensions of ethical behavior, such as having a sense of duty toward environmental improvements. Instead, it represents beliefs individuals may hold about the effects of humanity on the ecosystem, and vice versa. Consequently, additional questions were included in the survey that more fully capture these details of moral behavior, specifically, ethically based attitudes toward improvements of urban rivers. The proposition to be examined empirically is that cognitive structure is not only affected by the Awareness of Consequences scale (AC), but also by scores on questions that reflect a biocentric attitude and a sense of duty to the environment. These three variables combined will be referred to in the analysis as “Environmental Perspectives.”

Method

The following items were included in both waves of the telephone survey questionnaire to operationalize the Environmental Perspectives and Theory of Planned Behavior variables applied to WTP. The Environmental Perspectives questions were included only in the environmental path of questioning. Throughout the interview, presentation of the various items in a set were rotated from a random starting point to minimize order and response bias effects in the interview.

Environmental Perspectives Measures

Three variables were employed to represent environmental perspectives: Biocentric attitude, duty-oriented attitude (“taxpayer’s duty”), and the Awareness of Consequences scale. In the interviews, respondents were first read the following introduction before being asked to respond to 5-point, Likert-scaled items representing these concepts: “The following are statements that some people have made about the natural environment and the ecosystem. For each one, please tell me whether you strongly agree, agree, feel neutral, disagree, or strongly disagree.” Higher scale values were assigned to greater agreement.

Biocentric attitude was assessed by asking respondents to respond to the statement “The health of urban rivers should be improved for the sake of nature itself.” The item has marginal reliability, with a T1-T2 test-retest correlation of $r=.32$ ($p \leq .001$), $\alpha=.51$, $n=278$, in the panel. The **Duty-oriented attitude** was measured by the following item: “Taxpayers have a duty to share in the cost of improving the health of urban rivers.” The item has marginal reliability, with a T1-T2 test-retest correlation of $r=.30$ ($p \leq .001$), $\alpha=.46$, $n=278$, in the panel. Thus, relationships these items have with other measures may be suppressed.

An abbreviated **Awareness of Consequences (AC)** summated scale was used after pretesting with students revealed the most useful items to be included in the survey. For the survey, the scale included the following items: “The balance of nature is delicate and easily upset,” “The effects of pollution on public health are worse than we realize,” “A clean environment provides me with better opportunities for recreation,” “Pollution generated here harms people all over the earth,” “Over the next several decades, thousands of species will become extinct,” and “Laws to protect the environment limit my choices and personal freedom” (the final item being reverse-coded for analysis). The abbreviated AC scale has moderately good internal consistency reliability (T1 $\alpha=.65$, T2 $\alpha=.66$) and fairly good T1-T2 test-retest reliability ($r=.66$, $p \leq .001$, $n=278$).

Descriptive statistics for the Environmental Perspectives variables are shown in Table 7.1.

Theory of Planned Behavior Measures

Operationalizing the Theory of Planned Behavior measures in a telephone survey context, rather than using a paper-and-pencil or mailed questionnaire format, required changes in the usual scaling techniques used for TPB studies. TPB measures are usually operationalized on 7-point, bipolar scales (e.g., “good-bad” for an evaluation measure, “likely-unlikely” for a behavioral belief measure, etc.) which subjects or respondents can see before them as they mark a response. Pretesting found that attempting to use 7-point, bipolar scales of this or a similar type in a telephone interview was at best clumsy and would likely produce considerable measurement error. Instead, five-point, agree-disagree Likert scales were used, with respondents replying on the scale of strongly agree, agree, feel neutral, disagree, or strongly disagree.

The following are operationalizations of key TPB measures used in the survey:

Behavioral Intention (BI) is measured as Willingness to Pay (WTP). The BI_{WTP} measure had a substantial amount of positive skewness, owing primarily to a comparatively large portion of low and zero scores and also a few high. Logarithmic transformation ($\log_{10}(BI_{WTP}+1)$) was used to minimize skewness to prepare the data for multivariate analysis (Tabachnick and Fidell, 2001). Results are indicated in Table 7.2.

Table 7.1. Descriptive Statistics of Environmental Perspectives Variables

	First Wave (T1)		Second Wave (T2)	
	Mean (1-5)	S	Mean (1-5)	S
Biocentric Attitude: The health of urban rivers should be improved for the sake of nature itself.	3.84	.87	3.87	.78
Duty-Oriented Attitude: Taxpayers have a duty to share in the cost of improving the health of urban rivers.	3.77	.83	3.88	.71
AWARENESS OF CONSEQUENCES:				
The balance of nature is delicate and easily upset.	3.94	.84	3.93	.81
The effects of pollution on public health are worse than we realize.	3.93	.87	3.84	.83
A clean environment provides me with better opportunities for recreation.	4.20	.65	4.15	.56
Pollution generated here harms people all over the earth	3.79	.91	3.80	.88
Over the next several decades, thousands of species will become extinct.	3.59	.99	3.64	.90
Laws to protect the environment limit my choices and personal freedom (original, unreversed code).	3.05	1.03	2.81	1.04
AC Scale	3.73	.54	3.76	.51
N	441		406	
Scale: (5) strongly agree, (4) agree, (3) feel neutral, don't know, (2) disagree, (1) strongly disagree. Missing data replaced with scale means.				

Table 7.2. Correction of Skewness in Behavioral Intention Measure (WTP)

INFLATION-ADJUSTED WILLINGNESS TO PAY	Original BI _{WTP}				Post Log (10) Transformation of BI _{WTP}			
	Mean	S (n)	Skewness	Standard Error of Skewness	Mean	S (n)	Skewness	Standard Error of Skewness
<i>PATH:</i>								
<i>Flood:</i>								
First Wave	78.68	109.02 (294)	2.07	.14	1.31	.90 (294)	-.39	.14
Second Wave	81.81	123.89 (276)	3.01	.12	1.38	.86 (276)	-.41	.12
<i>Environmental:</i>								
First Wave	81.81	140.62 (441)	3.29	.15	1.36	.89 (441)	-.57	.15
Second Wave	91.05	130.93 (406)	2.55	.12	1.43	.86 (406)	-.56	.12

Skewness corrected by using log(10) transformation of (BI_{WTP} + 1)

Subjective Norms (SN), the person’s perception of social normative pressures regarding performing or not performing the behavior in question, were assessed with the item: “Most people who are important to me would think that I should give money to [prevent an increase in flood risk] [improve the health of the river].” The item has moderate test-retest reliability ($r=.45, p \leq .001, \alpha=.62, n=278$). A companion item designed to assess the extent to which the respondent would comply with these important others’ expectations (by multiplying scores on -2 to +2 scales) diminished the variance accounted for by the single item alone, and so was not employed in the analysis.

Perceived Behavioral Control (PBC), the perceived ease of performing the behavior, in this case, paying for a project designed to lower flood risks and/or improve ecological health, was operationalized in the questionnaire with the following three items: “If I wanted to, I could easily give the amount of money specified”; “I have personal control over whether or not I would give the amount of money I specified”; and “Whether or not I would give money is completely up to me.” Attempts to index the three items into a single summated scale were thwarted due to poor internal-consistency reliability, a problem which might be due to the referendum nature of the WTP question (i.e., the PBC attributes of control and ease become separate issues when voting for a referendum and later after a real-world referendum would be passed, thus either confusing respondents or adding uncontrolled dimensions to their underlying judgments). The “ease” item performed the best in terms of accounting for variance in initial analyses, and so became the item representing PBC in this analysis. The item has moderate test-retest reliability ($r=.48, p \leq .001, \alpha=.64, n=278$).

Attitude toward the Act (AACT), a person’s positive or negative general evaluation of performing the particular behavior, in this case, paying for river restoration projects designed to hold the line on flood risks or improve a river’s (creek’s) ecological health, was measured by a summated scale (averaging items) based on responses to the following five, Likert-scaled items introduced with the stem “My providing money for the project described to me would be....”: (1) A good thing to do; (2) Unpleasant for me (reverse coded); (3) Beneficial for me; (4) A useless thing to do (reverse coded); and (5) A rewarding thing to do. These attitudinal dimensions are based on Ajzen’s typical formulation and were chosen based on the results of questionnaire pretesting. Internal consistency reliability is fairly good (T1 alpha=.78, T2 alpha= .75) as is its test-retest reliability ($r=.61$, $p \leq .001$, $n=278$).

Descriptive statistics for the TPB variables above (except WTP) are shown in Table 7.3.

Table 7.3. Descriptive Statistics of Subjective Norms, Perceived Behavioral Control and Attitude Toward the Act

	First Wave (T1)		Second Wave (T2)	
	Mean (1-5)	S	Mean (1-5)	S
Subjective Norms: Most people who are important to me would think that I should give money to [prevent an increase in flood risk] [improve the health of the river].	3.00	1.01	3.06	.99
Perceived Behavioral Control: If I wanted to, I could easily give the amount of money specified.	3.56	.99	3.60	.96
ATTITUDE TOWARD THE ACT: <i>My providing money for the project described to me would be....</i>				
A good thing to do.	3.88	.65	3.94	.56
Unpleasant for me (original, unreversed code).	1.27	.76	1.24	.74
Beneficial for me.	3.34	.88	3.40	.87
A useless thing to do (original, unreversed code).	1.17	.79	1.17	.78
A rewarding thing to do.	3.68	.72	3.71	.73
AACT:	3.69	.56	3.73	.53
N		735		682
Scale: (5) strongly agree, (4) agree, (3) feel neutral, don’t know, (2) disagree, (1) strongly disagree. Missing data replaced with scale means.				

Cognitive Structure includes the salient beliefs about the outcomes of a behavior (e.g., paying money for the proposed project) that a person retrieves from memory and are “considered” when deciding how to behave in a given situation. A major objective of the focus group studies in Phase I of the project was to identify which beliefs are most common when people think about their WTP for flood risk reduction or ecological improvements. Psychometrically, it was a critical task to identify the most common beliefs

because this will ultimately impact the amount of variance accounted for in behavioral intention to pay for such projects. The following nine **beliefs (b_i)** resulted, to which respondents replied using the same five-point, agree-disagree, Likert scale described above:

“My providing money for the project described to me...”

- “Would be personally expensive for me”;
- “Would make me feel like I am doing something for the environment”;
- “Would probably help support a long term solution”;
- “Would add significantly to my taxes”;
- “Would probably help future generations”;
- “Would make me feel like I am doing something for the community”;
- “Would probably help to hold the line against flooding” (flood path only);
- “Would probably help people who live in the flood plain” (flood path only);
- “Would probably help improve the health of the [river] [creek]” (ecological path only).

Each response was coded such that -2 = strongly disagree, -1 = disagree, 0 = feel neutral or don't know, 1 = agree, 2 = strongly agree.

In formulating the measure of cognitive structure, each belief is multiplied times the respondent's good-versus-bad **evaluation (e_i)** of the outcome to produce a **belief-evaluation compound (b_ie_i)**. Thus, each of the above beliefs about outcomes had a companion item in the questionnaire which tapped the values the respondent put on the outcome. For example, respondents used the same Likert scale to indicate whether “My doing something for the environment would be good” (codes such that -2 = strongly disagree, -1 = disagree, 0 = feel neutral or don't know, 1 = agree, 2 = strongly agree) and “My helping people who live in the flood plain would be bad” (the latter item reverse-coded so that -2 = strongly agree, -1 = agree, 0 = feel neutral or don't know, 1 = disagree, 2 = strongly disagree). The resulting compounds yield positive values when respondents believe the behavior will likely produce outcomes they believe are good or unlikely to produce outcomes they believe are bad. It yields negative values when respondents believe the behavior will likely produce outcomes they believe are bad or unlikely to produce outcomes they believe are good.

A separate measure of belief **salience** was operationalized by asking the respondent how important each belief was to his or her WTP decision, using a scale of 0 (not important) to 10 (extremely important). Respondents were given the following stem, “In deciding how much money you would be willing to provide to [prevent an increase in flood risk] [improve the health of the (river) (creek)], how important was it to you whether the money might or might not...”, and then given various beliefs, such as “...Be personally expensive for you” and “Help people who live in the flood plain.”

Descriptive statistics and further explanation of the Cognitive Structure variables is contained in the Results section.

Topical News Attention

An index of attention to topical news was derived from questions asking respondents how much attention they paid, on a scale of 0 (none) to 10 (a lot), to news about Menomonee River Flooding (if the respondent was in the flood path) or about threats to the health of the river creek (if the respondent was in the environmental path) in newspapers, on television, on the radio, and via conversations among friends, co-workers, or family members (see Table 7.4). Those who had indicated, in response to previous questions,

that they do not expose themselves to newspapers or news in a given medium, or don't discuss these topics with others, were given a score of zero for topical attention. Scores were summed across media. Scale reliability is quite good (T1 alpha=.80, T2 alpha=.82, T1-T2 r=.64).

Table 7.4. Descriptive Statistics of Topical News Attention Variables

	First Wave (T1)		Second Wave (T2)	
	Mean (0-10)	S	Mean (0-10)	S
ATTENTION TO TOPIC-SPECIFIC INFORMATION IN:				
Newspapers	5.19	3.17	5.46	3.05
Television News	5.26	3.18	5.51	3.16
Radio News	4.14	3.50	4.51	3.45
Discussions with friends, co-workers, family members	4.33	3.51	4.58	3.56
Topical News Attention Index:	4.73	2.70	5.01	2.62
N		735		682

Scale: (0) None to (10) A lot.

Results

In this chapter, relevant elements of Ajzen's (1988) Theory of Planned Behavior (TPB) are brought to bear to help explain respondents' Willingness to Pay (WTP) for the flood control and ecological improvement projects described in this report. Specifically, WTP is defined as Ajzen's "Behavioral Intention" (BI) variable in this formulation. In the process of exploring these and other psychological variables which might affect WTP, the analysis will also explore the role of attention to news accounts of flood control and of threats to the ecological health of the waterways being studied. In examining WTP for ecological improvements, the analysis will also examine the role played by respondents' environmental perspectives (i.e., Awareness of Consequences, biocentric ethic, and taxpayers' duty).

As noted previously, Ajzen's theory proposes that actual behavior (**B**) is predicted by Behavioral Intention (**BI**), which in turn is predicted by Perceived Behavioral Control (**PBC**), Subjective Norms (**SN**), and Attitude Toward the Act (**AAct**). PBC can also affect B directly. Of course, the nature of this study does not allow the examination of actual behavior. This analysis will, however, examine carefully the important precursor to AAAct, specifically, a set of behavioral beliefs and their outcome evaluations which is sometimes referred to as "indirect attitude" or, as it is being termed in this analysis, "*cognitive structure*" (**CS**). Although CS is seen as working through AAAct to affect BI in Ajzen's formulation, for the sake of parsimony and diagnostic power this analysis will examine directly the relationships of CS (and its component beliefs) to BI, as well as to attention to relevant news.

The analysis will: **(1)** first examine respondents' behavioral beliefs (and related variables) in regard to paying for the projects; **(2)** determine their factor structures; **(3)** examine the zero-order relationships among the major components in the TPB as applied to WTP in this study; **(4)** examine through multiple regression the

role that study-related, physical, demographic, attitudinal (including environmental perspective, where relevant), media-related, and TPB variables may play in respondents' WTP for the projects; and (5) examine the relationships of the components of cognitive structure to WTP and attention to topical news accounts.

Beliefs About Paying for Projects

Tables 7.5 and 7.6 show the results of the set of closed-ended questions respondents in the Flood and Environmental paths were asked regarding what they considered when stating what they would be willing to pay for the specific projects. The questions were derived, with the assistance of focus group research, to operationalize the building blocks of the cognitive structure component of TPB. In the tables, behavioral beliefs (b_i), outcome evaluations (e_i), and their product terms (the $b_i \cdot e_i$ compounds) are derived directly from Ajzen's model. The compounds are later to be combined to form the measures of cognitive structure. Saliences represent an auxiliary measure designed to determine directly how important each behavioral belief had been in respondents' judgments about the maximum WTP amount they specified. Two beliefs ("*...hold the line against flooding*" and "*...help people in the flood plain*"), as noted, are relevant only to the flood path, and one ("*...help improve the health of the river*") is relevant only to the environmental path. All of the others were asked of respondents in both paths.

Belief Salience

Generally, respondents displayed the same rank-order of what they thought to be important considerations in Wave 1 (Table 7.5) and Wave 2 (Table 7.6), although there are some small differences based on whether they were posed questions about the flood control project or the environmental project. As compared to flood path respondents, those in the environmental path (in both years) considered "*helping future generations*" and "*doing something for the environment*" as more important to their WTP decisions (see footnotes in these two tables for details).

Overall, however, it appears that residents' perceptions of the actual efficacy of the project in bringing about its physical goals ("*...help improve the health of the river*" in the environment path, and "*...help hold the line against flooding*" in the flood path) were among the most important considerations, especially if they produced enduring benefits ("*...help support a long term solution*" and "*...help future generations*"). Notably, less salient to flood path respondents was consideration of whether the flood control project might help people who live in the flood plain. Similarly, respondents in both paths in both years on the average rated only as moderately important (*i.e.*, roughly around the middle of the 0-10 scale of importance) the economic considerations of whether the project would be personally expensive and whether it would add significantly to one's taxes. (This result should not be interpreted as meaning that these two economic factors are unimportant, however. Focus group results and questionnaire pretesting were designed to produce a set of relatively salient beliefs to pose to respondents, and conversely to weed out those beliefs which were expected to be generally unimportant to respondents. The fact that all of the salience means fall above 5.0 on the 0-10 scale reflects the fruit of this pretesting.)

Table 7.5. Descriptive Statistics of Behavioral Beliefs Regarding Willingness to Pay (WTP) as Behavioral Intention (BI): First Wave

	Listed in order of belief salience							
	Salience (0-10) ¹		Behavioral Belief (b _i) (-2 to +2) ²		Outcome Evaluation (e _i) (-2 to +2) ³		Belief * Evaluation Compound (b _i *e _i) (-4 to +4) ⁴	
	Mean	S (n)	Mean	S (n)	Mean	S (n)	Mean	S (n)
My providing money for the project described to me:								
Would probably help improve the health of the [river][creek]. <i>(Environment Path only).</i>	7.05	3.18 (441)	.84	.69 (441)	.98	.54 (441)	1.03	.91 (441)
Would probably help support a long term solution.	6.81	3.05 (735)	.71	.78 (735)	.90	.62 (735)	.87	.95 (735)
Would probably help future generations.	6.55	3.14 (735)	.93	.67 (735)	.98	.54 (735)	1.11	.93 (735)
Would probably help to hold the line against flooding. <i>(Flood Path only.)</i>	6.41	3.15 (294)	.60	.81 (294)	.88	.58 (294)	.77	.83 (294)
Would make me feel like I am doing something for the environment.	5.89	3.27 (735)	.76	.77 (735)	.96	.51 (735)	.92	.96 (735)
Would make me feel like I am doing something for the community.	5.86	3.15 (735)	.73	.71 (735)	.89	.54 (735)	.85	.81 (735)
Would be personally expensive for me.	5.62	3.40 (735)	-.02	1.03 (735)	-.09	.97 (735)	-.14	1.08 (735)
Would probably help people who live in the flood plain. <i>(Flood Path only.)</i>	5.43	3.32 (294)	.81	.69 (294)	.84	.63 (294)	.78	.93 (294)
Would add significantly to my taxes.	5.36	3.35 (735)	.00	1.01 (735)	-.38	.95 (735)	-.20	1.12 (735)

1) Respondent (R) rated each belief according to how important it was to his/her decision about how much money to provide money for the project, with the scale ranging from 0=not important to 10=extremely important. Significant (p≤.05) mean differences by path: “Help future generations” [Env. 6.81 (S=3.05) > Flood 6.15 (S=3.22)]; “Doing..for environment” [Env. 6.09 (S=3.18) > Flood 5.60 (S=3.40)].

2) Translated from 5-point, Likert-type scaling. Ratings on the negative end of the scale would represent R believing the outcome is unlikely (i.e., disagreeing that the outcome is likely) while ratings on the positive end of the scale indicates that R believes that the outcome is likely. A rating of zero indicates neutrality or “don’t know” responses. Significant (p≤.05) mean differences by path: “Doing..for environment” [Env. 0.85 (S=0.71) > Flood 0.64 (S=0.64)]; “Doing...for community” [Env. 0.78 (S=0.68) > Flood 0.67 (S=0.75)].

3) Translated from 5-point, Likert-type scaling. Ratings on the negative end of the scale would represent R believing the outcome is bad (or disagreeing that the outcome is good) while ratings on the positive end of the scale indicates that R believes that the outcome is good (or disagreeing that it is bad). A rating of zero indicates neutrality or “don’t know” responses.

4) Behavioral belief (b) score multiplied times outcome evaluation (e) score. Positive b*e scores represent R believing that good outcomes are likely and/or bad outcomes unlikely. Negative b*e scores represent R believing that bad outcomes are likely and/or good outcomes unlikely. Significant (p≤.05) mean differences by path: “Long term solution” [Env. 0.93 (S=0.98) > Flood 0.76 (S=0.88)]; “Help future generations” [Env. 1.17 (S=0.99) > Flood 1.02 (S=0.83)]; “Doing...for environment” [Env. 1.01 (S=0.97) > Flood 0.79 (S=0.92)].

Table 7.6. Descriptive Statistics of Behavioral Beliefs Regarding Willingness to Pay (WTP) as Behavioral Intention (BI): Second Wave

	Listed in order of belief salience							
	Salience (0-10) ¹		Behavioral Belief (b _i) (-2 to +2) ²		Outcome Evaluation (e _i) (-2 to +2) ³		Belief * Evaluation Compound (b _i *e _i) (-4 to +4) ⁴	
	Mean	S (n)	Mean	S (n)	Mean	S (n)	Mean	S (n)
My providing money for the project described to me:								
Would probably help Improve the health of the [river][creek]. (<i>Environment Path only</i>).	7.25	2.79 (406)	.93	.63 (406)	1.02	.49 (406)	1.10	.97 (406)
Would probably help support a long term solution.	6.97	2.81 (682)	.77	.75 (682)	.97	.55 (682)	.97	.97 (682)
Would probably help future generations.	6.78	2.95 (682)	.96	.63 (682)	1.04	.48 (682)	1.18	.97 (682)
Would probably help to hold the line against flooding. (<i>Flood Path only</i>).	6.53	2.86 (276)	.64	.80 (276)	.95	.52 (276)	.77	.98 (276)
Would make me feel like I am doing something for the environment.	6.18	2.93 (682)	.76	.80 (682)	1.00	.46 (682)	.95	1.00 (682)
Would make me feel like I am doing something for the community.	6.11	2.87 (682)	.82	.70 (682)	.96	.51 (682)	.96	.91 (682)
Would be personally expensive for me.	5.90	3.19 (682)	-.07	1.03 (682)	-.12	.96 (682)	-.21	1.09 (682)
Would probably help people who live in the flood plain. (<i>Flood Path only</i>).	5.76	3.12 (276)	.82	.68 (276)	.90	.58 (276)	.85	.99 (276)
Would add significantly to my taxes.	5.41	3.22 (682)	-.02	1.01 (682)	-.36	.94 (682)	-.26	1.09 (682)

1) Respondent (R) rated each factor according to how important it was to his/her decision about how much money to provide money for the project, with the scale ranging from 0=not important to 10=extremely important. Significant (p ≤ .05) mean differences by path: “Help future generations” [Env. 7.05 (S=2.91) > Flood 6.39 (S=2.97)]; “Doing...for environment” [Env. 6.44 (S=2.82) > Flood 5.80 (S=3.05)].

2) Translated from 5-point, Likert-type scaling. Ratings on the negative end of the scale would represent R believing the outcome is unlikely (i.e., disagreeing that the outcome is likely) while ratings on the positive end of the scale indicates that R believes that the outcome is likely. A rating of zero indicates neutrality or “don’t know” responses. Significant (p ≤ .05) mean differences by path: “Doing...for environment” [Env. 0.85 (S=0.70) > Flood 0.62 (S=0.90)].

3) Translated from 5-point, Likert-type scaling. Ratings on the negative end of the scale would represent R believing the outcome is bad (or disagreeing that the outcome is good) while ratings on the positive end of the scale indicates that R believes that the outcome is good (or disagreeing that it is bad). A rating of zero indicates neutrality or “don’t know” responses. Significant (p ≤ .05) mean differences by path: “Expensive” [Env. -.019 (S=0.95) > Flood -.02 (S=0.97)].

4) Behavioral belief (b) score multiplied times outcome evaluation (e) score. Positive b*e scores represent R believing that good outcomes are likely and/or bad outcomes unlikely. Negative b*e scores represent R believing that bad outcomes are likely and/or good outcomes unlikely. Significant (p ≤ .05) mean differences by path: “Help future generations” [Env. 1.25 (S=1.00) > Flood 1.07 (S=0.90)]; “Doing...for environment” [Env. 1.05 (S=0.97) > Flood 0.81 (S=1.03)].

Behavioral Beliefs and Evaluations

The results in Tables 7.5 and 7.6 also indicate that respondents in both paths of questioning tend to believe that their providing money for the projects described to them would, in particular, probably help future generations (see the column of behavioral beliefs), and in general they were favorably disposed toward that particular outcome (see the column of outcome evaluations). The resulting belief-evaluation compounds (means of 1.11 for Wave 1, and 1.18 for Wave 2) are among the strongest in these tables, although strength is higher in both years among those in the environmental path than among those in the flood path (see footnotes in tables for details).

As compared to respondents in the flood path, respondents in the environmental path seem to believe that the project posed to them is more likely to reach its physical goal, based on comparisons between environmental path respondents' beliefs that their money for the environmental project "would probably help improve the health" of the river/creek and flood path respondents' beliefs that their money for the flood project would "help to hold the line against flooding" in both years [Wave 1, $t_{55,47} = 4.24$, $p < .001$; Wave 2, $t_{49,96} = 4.99$, $p < .001$]. Given approximately equal positive valences given these outcomes, the net result is a significantly more heavily weighted compound for beliefs about the efficacy of the environmental project as compared to the flood project [Wave 1, $t_{733} = 4.00$, $p < .001$; Wave 2, $t_{680} = 4.44$, $p < .001$].

As might be expected, respondents have somewhat negative views of the economic cost dimensions in both waves (in terms of personal expense and additional taxes), although not overwhelmingly so. In particular they tend to have a somewhat negative evaluation of a cost that would add significantly to their taxes (means of -.38 in Wave 1 and -.36 in Wave 2). Of course, the corresponding belief-evaluation compound results might suggest that residents may weigh more heavily the positively-valenced efficacy of the project and long-term benefits to future generations (and some other benefits, for that matter) than they would the negatively-valenced 20-year costs. However, such results should be read cautiously given the fact that the interviews were conducted in relatively good economic times (at least pre-recession of 2001) and that respondents were, on balance, apparently not very sure about whether the projects would indeed be expensive or add significantly to taxes (see column of behavioral beliefs). If referenda such as these were ever to be placed on a ballot, that kind of uncertainty would probably disappear, strengthening beliefs about additional tax burdens and affordability which, when multiplied times the negative valence of their outcome evaluations, might make residents that much more cautious, especially if economic times are tougher.

While the above results provide a public-opinion type view of various perceptions held by residents in the two sampled watersheds, they simply represent a snapshot of levels of salience, belief, and evaluation. As noted in the Theory of Planned Behavior, these variables actively work in an ecosystem of other variables to potentially affect individuals' willingness to pay for the kinds of projects explored in this study. It is toward those dynamics that this analysis now turns its attention.

Cognitive Structure

Normally, belief-evaluation compounds are summed to produce a measure of cognitive structure. Such an approach assumes that a unidimensional scale will be produced from the component compounds. To determine whether unidimensionality underlies the set of belief-evaluation compounds, four oblique-rotation factor analyses were conducted of the compounds in the flood path and in the environmental path from data from Wave 1 (T1) and Wave 2 (T2). While most items are the same across paths, two beliefs ("*...hold the line against flooding*" and "*...help people in the floodplain*"), as noted earlier, are relevant only to the flood

path, and one (“...*help improve the health of the river*”) is relevant only to the environmental path. Thus, analyses of the flood path and of the environment path were conducted separately. Results are shown in Table 7.7 and Table 7.8.

In each case, two factors emerged, remarkably similar across waves and paths in that the same items appear as loaded substantially on a given factor even though their rankings and loadings might differ from one analysis to another. The first factor in each case is comprised of “**Non-Economic**” belief-evaluation compounds, primarily representing various benefits that might accrue to the community and to the individual (the latter primarily intangible) from money provided to the project. The second factor is comprised of the two “**Economic**” compounds, representing the monetary costs involved (additional tax burden and affordability). The first factor has stronger reliability (Cronbach’s alphas ranging from .81 to .90) and the second has weaker, basically borderline reliability (.50-.51). Lower reliability might limit the strength of the associations that the second factor might have with other variables.

Oblique rotations were used since the researchers did not presume that the dimensions which might emerge would, or should, necessarily be uncorrelated. (In only one case, the flood path factor analysis from Wave 1, is there anything but a negligible correlation between the factors.) However, analyses of the same sets of variables using principal components procedure and Varimax (orthogonal) rotation revealed basically the same two factors in each case.

Thus, cognitive structure for Willingness to Pay for the flood control and ecological improvement projects in this study appears to be multidimensional, including a “non-economic” dimension of assorted benefits and an “economic” dimension related to monetary costs. Further analysis will proceed accordingly, using the obliquely-rotated factors.

Relationships Among TPB Components

To set the stage for a multiple regression examination of relationship of the cognitive structure factors and selected other TPB variables to Willingness to Pay as “Behavioral Intention,” an examination will be conducted of the bivariate relationships among various components of the Theory of Planned Behavior, including Attitude Toward the Act (**AAct**). Among the variables in this study, TPB would predict that Behavioral Intention (**BI**), in the form of Willingness to Pay (**WTP**), will correlate with Perceived Behavioral Control (**PBC**), Subjective Norms (**SN**), and Attitude Toward the Act (**AAct**), with AAAct also correlating with Cognitive Structure (**CS**).

As illustrated in Table 7.9, across paths there are statistically significant (all $p \leq .001$), positive correlations between BI (WTP) and Perceived Behavioral Control (T1 $r = .16$, T2 $r = .28$), Subjective Norms (T1 $r = .36$, T2 $r = .39$), and especially Attitude Toward the Act (T1 $r = .52$, T2 $r = .48$), which are fairly consistent in magnitude across both waves of the survey. These results are also fairly consistent when broken down by path and by wave (Table 7.10), with the exception of PBC which is comparatively weak in magnitude and is not statistically significant in the first wave survey in the flood path. It is possible that respondents had some difficulty responding to the PBC measure in this study due to the nature of the referendum WTP question. Respondents would have a choice in reality on how to vote on the referendum but would have no control when it comes to paying an imposed amount if such a referendum were to pass.

Table 7.7. Factor Analysis of Belief-Evaluation Compounds: Flood Path

<i>Oblique-Rotated Factor Loadings</i>		
First Wave		
My providing money for the project described to me:	Factor	
	Non- Economic	Economic
Would make me feel like I am doing something for the community.	.76	.17
Would probably help future generations.	.73	.02
Would probably help to hold the line against flooding.	.69	.12
Would probably help support a long term solution.	.65	.08
Would make me feel like I am doing something for the environment.	.60	.13
Would probably help people who live in the flood plain..	.49	.00
Would add significantly to my taxes.	-.02	.67
Would be personally expensive for me.	.17	.54
Eigenvalue	3.19	1.35
% of variance	39.82	16.85
Reliability (Cronbach's Alpha)	.81	.51
N=294		
Factor Correlation .20		
Second Wave		
My providing money for the project described to me:	Factor	
	Non- Economic	Economic
Would probably help future generations.	.82	-.10
Would make me feel like I am doing something for the community.	.78	-.06
Would probably help support a long term solution.	.74	.03
Would make me feel like I am doing something for the environment.	.72	-.11
Would probably help to hold the line against flooding.	.70	.04
Would probably help people who live in the flood plain.	.57	.09
Would be personally expensive for me.	.06	.64
Would add significantly to my taxes.	-.06	.42
Eigenvalue	3.61	1.29
% of variance	45.17	16.13
Reliability (Cronbach's Alpha)	.86	.50
N=276		
Factor Correlation -.02		
Extraction Method: Principal Axis Factoring.		
Rotation Method: Oblimin with Kaiser Normalization.		

Table 7.8. Factor Analysis of Belief-Evaluation Compounds: Environment Path

<i>Oblique-Rotated Factor Loadings</i>		
First Wave		
My providing money for the project described to me:	Factor	
	Non-Economic	Economic
Would make me feel like I am doing something for the environment.	.85	-.06
Would help improve the health of the [river][creek].	.79	-.02
Would probably help future generations.	.79	-.02
Would make me feel like I am doing something for the community.	.79	-.08
Would probably help support a long term solution.	.78	-.05
Would add significantly to my taxes.	-.05	.67
Would be personally expensive for me.	-.02	.57
Eigenvalue	3.56	1.38
% of variance	50.90	19.74
Reliability (Cronbach's Alpha)	.90	.51
N=441		
Factor Correlation -.07		
First Wave		
My providing money for the project described to me:	Factor	
	Non-Economic	Economic
Would make me feel like I am doing something for the environment.	.83	-.04
Would help improve the health of the [river][creek].	.80	-.04
Would probably help support a long term solution.	.79	.00
Would probably help future generations.	.78	-.15
Would make me feel like I am doing something for the community.	.77	.00
Would add significantly to my taxes.	-.02	.65
Would be personally expensive for me.	-.04	.53
Eigenvalue	3.51	1.35
% of variance	50.23	19.30
Reliability (Cronbach's Alpha)	.89	.50
N=406		
Factor Correlation -.05		
Extraction Method: Principal Axis Factoring.		
Rotation Method: Oblimin with Kaiser Normalization.		

Table 7.9. Zero-Order Correlations Among Components of Theory of Planned Behavior: Flood and Environmental Paths Combined

<i>Pearson Product-Moment Correlations</i>						
Wave 1: Upper Triangle (N=735) Wave 2: Lower Triangle (N=682)	PBC: Perceived Behavioral Control	SN: Subjective Norms	Cognitive Structure Factor: Non- Economic	Cognitive Structure Factor: Economic	AAct: Attitude Toward the Act	BI (Behavioral Intention): Willingness to Pay
PBC: Perceived Behavioral Control		.15c	.14c	.10b	.17c	.16c
SN: Subjective Norms	.17c		.34c	.07	.38c	.36c
Cognitive Structure Factor: Non- Economic	.13c	.31c		.03	.59c	.46c
Cognitive Structure Factor: Economic	.21c	.09a	-.04		.12c	.17c
AAct: Attitude Toward the Act	.21c	.40c	.58c	.09a		.52c
BI (Behavioral Intention): Willingness to Pay	.28c	.39c	.40c	.16c	.48c	

Significance Key: (a) p ≤ .05 (b) p ≤ .01 (c) p ≤ .001

Table 7.10. Zero-Order Correlations Among Components of Theory of Planned Behavior by Path

<i>Pearson Product-Moment Correlations</i>						
Flood Path						
Wave 1: Upper Triangle (N=294) Wave 2: Lower Triangle (N=276)	PBC: Perceived Behavioral Control	SN: Subjective Norms	Cognitive Structure Factor: Non- Economic	Cognitive Structure Factor: Economic	AAct: Attitude Toward the Act	BI (Behavioral Intention): Willingness to Pay
PBC: Perceived Behavioral Control		.09	.03	.17b	.16b	.09
SN: Subjective Norms	.15b		.28c	.24c	.31c	.36c
Cognitive Structure Factor: Non- Economic	.05	.33c		.20c	.53c	.51c
Cognitive Structure Factor: Economic	.19b	.16b	-.02		.25c	.18b

Wave 1: Upper Triangle (N=294) Wave 2: Lower Triangle (N=276)	PBC: Perceived Behavioral Control	SN: Subjective Norms	Cognitive Structure Factor: Non- Economic	Cognitive Structure Factor: Economic	AAct: Attitude Toward the Act	BI (Behavioral Intention): Willingness to Pay
AAct: Attitude Toward the Act	.23c	.39c	.54c	.20c		.51c
BI (Behavioral Intention): Willingness to Pay	.26c	.37c	.44c	.18b	.52c	
Environmental Path						
Wave 1: Upper Triangle (N=441) Wave 2: Lower Triangle (N=406)	PBC: Perceived Behavioral Control	SN: Subjective Norms	Cognitive Structure Factor: Non- Economic	Cognitive Structure Factor: Economic	AAct: Attitude Toward the Act	BI (Behavioral Intention): Willingness to Pay
PBC: Perceived Behavioral Control		.19c	.21c	.05	.18c	.21c
SN: Subjective Norms	.19c		.37c	-.04	.40c	.36c
Cognitive Structure Factor: Non- Economic	.19c	.30c		-.07	.65c	.43c
Cognitive Structure Factor: Economic	.23c	.04	-.05		.03	.16c
AAct: Attitude Toward the Act	.22c	.39c	.64c	.02		.53c
BI (Behavioral Intention): Willingness to Pay	.30c	.39c	.37c	.15b	.46c	
<i>Significance Key: (a) p ≤ .05 (b) p ≤ .01 (c) p ≤ .001</i>						

Of central interest is the relationship of Cognitive Structure to Willingness to Pay, which will be explored more fully later through controlled relationships. The zero-order relationships that the CS factors have with BI (WTP) are positive and statistically significant in all comparisons across paths and waves (Table 7.10). The relationship of the non-economic CS factor with BI (averaging $r=.44$, with the highest being $r=.51$ in the T1 flood path) tends to be stronger than the relationship of the economic CS factor with BI (averaging $r=.17$, with the highest being $r=.18$ in both waves of the flood path). The relationship of the non-economic CS factor to AAct (averaging $r=.59$, with the highest relationships of $r=.64$ and $r=.65$ in the environmental path) is stronger than its relationship to BI in three of the four comparisons, a pattern consistent with the TPB model. The only exception is in the T1 flood path, where the two coefficients are of about equal magnitude (BI $r=.51$; AAct $r=.53$). However, the relationship of the economic CS factor with AAct does not consistently follow the same pattern, since the correlations are non-significant and near-zero in the environmental path.

In general, it seems that the non-economic CS factor is strongly associated with positive attitudes that respondents have with their providing money for the flood control project and especially the environmental improvement project. The non-economic factor is also associated with positive WTP attitudes that respondents have, but only in regard to the flood control project. Although these results need to be tempered by the lower reliability of the economic CS scale, they suggest that the non-economic CS factor would not

be affecting WTP attitudes in the environmental path whereas they seem, at least based on zero-order coefficient, to be related to WTP more directly in the environmental path. For the sake of parsimony as well as the need to examine the relationships of the various belief-evaluation compounds, further analysis will use the cognitive structure factors as direct “predictors” of WTP in lieu of the AAct measure. The result will be conservative in that it will probably underestimate the variance accounted for in WTP by the TPB variables.

Regression: Psychological Correlates of WTP

Hierarchical multiple regression analyses were conducted to examine, with controls, the relationships of cognitive structure and other TPB variables (PBC and SN) with Willingness to Pay as Behavioral Intention (BI) both in the flood path (Table 7.11) and in the environmental path (Table 7.12). The analyses also examine the potential predictors of the two cognitive structure factors representing non-economic and economic dimensions. The regression analyses also examine the relationships to WTP and to cognitive structure factors of respondents’ attention to topical news accounts (i.e., news about Menomonee River flooding, for those in the flood path, or news about threats to the health of the river/creek, for those in the environmental path). As part of the regression in the environmental path, the analysis also examines the relationship of the three environmental perspectives variables to cognitive structure and willingness to pay for the environmental improvement project.

Structure of Regression

Included in each regression are blocks of relevant control variables, entered in the following order: (1) **Study-related** variables; (2) Variables representing the **physical** location of the respondent relative to the river or creek; (3) **Demographic** variables; and (4) **Political attitudes**.

Study-related variables are those variables which stem from the interviewing situation itself which might affect results, and therefore should be controlled. The three most salient study-related variables in this study are T2 sensitization (whether or not the respondent had also been interviewed in the first wave might affect responses at least by making the respondent more alert to the issues after the T1 interviews), the “real starting point” randomly-generated dollar amount provided respondents in the WTP question, and the respondent giving a protest vote in response to the WTP question.

Physical variables differ by path. Three variables representing local flood risk employed in this spot in the flood path. In the environmental path, four variables were used: whether the respondent is in the Menomonee River or in the Oak Creek watershed; the biological measure of the habitat quality of the river/creek area closest to the respondent’s residence; the actual geographic distance of the respondent’s residence to the river/creek; and the self-reported frequency of visits the respondent makes to the river/creek for recreational purposes.

Demographic variables include educational attainment (e.g., grade school, some high school, high school graduate or G.E.D, some college/technical school, college graduate, graduate degree), inflation-adjusted income (log-transformed to overcome positive skewness), being an ethnic/racial minority group member, living in a single-family home, being the owner of the dwelling, being married (or cohabitating), the number of children under age 18 living in the household, the number of years living in the metropolitan area, and the likelihood of moving from the area in the next two years. Longevity in the metropolitan area might affect individuals’ feelings of community and therefore a sense of commitment which could affect WTP for environmental or flood control projects. Plans to move away might affect the pertinence of a local 20-year payment project to the individual. **Political** attitudes are represented by a scale of self-reported political

liberalism-conservatism, with conservatism on the higher end of the scale and liberalism on the lower end.

In the flood path, attention to topical news is added as the next block, and the TPB variables as the final block. In the environmental path, the block of environmental perspectives variables is entered after political attitudes and prior to the topical news attention block. In regressing cognitive structure variables, only PBC and SN are included in the final block of TPB variables.

Partial standardized regression coefficients (betas) will be used to examine the relative magnitude of relationships between each independent (“predictor”) variable and each of the dependent variables. This approach is used to allow direct comparisons among the coefficients generated for each independent variable, regardless of that variable’s scale of measurement, but will not be used to produce a prediction formula for the dependent variable.

Results

Narrative of results will concentrate on repeated/replicated patterns among variables of primary interest in this part of the analysis.

In general, the four regressions of BI(WTP) account for a respectable 40-48% (adjusted R^2) of the variance in Willingness to Pay for the flood control project or for the environmental improvement project. The most consistent, and usually among the strongest, correlates with WTP are the Theory of Planned Behavior variables, which account for 6-7% of the variance in WTP for the environmental project (Table 7.12), 8% of the variance in WTP for the flood control project in the second wave, and 18% of the variance in WTP for the flood control project in the first wave (Table 7.11). Specifically, both Subjective Norms and the non-economic Cognitive Structure factor correlate positively and significantly (all $p \leq .001$ except where noted) with BI(WTP) in all four comparisons [betas for non-economic CS: Flood path T1 (.33), T2 (.24); Environmental path T1 (.18), T2 (.14, $p \leq .01$); betas for SN: Flood path T1 (.22), T2 (.15, $p \leq .01$); Environmental path T1 (.14, $p \leq .05$), T2 (.18)]. Only in the environment path do the CS economic factor (T1 beta=.14, $p \leq .05$) and PBC (T2 beta=.13, $p \leq .01$) show any significant relationships with WTP. As noted previously, these PBC and non-economic CS relationships might be suppressed by uncontrolled variables representing some economic or study-related conditions. Since the variance accounted for by the TPB variables falls below the 40-50% reported as common in the meta-analysis of TPB studies, it is possible that the necessary measurement scheme (using Likert-type scaling in a telephone survey context) might have suppressed measurement reliabilities and therefore covariation among variables. Nonetheless, it appears that the Theory of Planned Behavior can be a significant tool to help explain Willingness to Pay for environmental and flood control projects such as these.

Other consistent relationships with WTP across paths and waves are the protest votes (negative, as expected, in all four comparisons) and attention to topical news (positive in all four comparisons). Sensitization does not appear to have affected any of the results in the tables. Commitment to the area, as operationaized via the number of years the respondent has lived in the metropolitan area and his/her plans to move in the near future, did not seem to systematically (repeatedly) affect WTP (only sporadic relationships are found in regard to WTP and cognitive structure, and only in the environmental path).

Table 7.11. Regression of Cognitive Structure and Willingness to Pay on Background, Media, and Select Theory of Planned Behavior Variables (Flood Path, Both Waves)

Standardized Regression Coefficients (betas)		First Wave (T1)			Second Wave (T2)		
Block	Variable	Cognitive Structure (CS) Factors		BI: WTP	Cognitive Structure (CS) Factors		BI: WTP
		Non-Economic	Economic		Non-Economic	Economic	
Study-Related	Sensitization (T2)				-.07	-.03	.06
	Random WTP Poser (Real Starting Point)	-.05	-.08	.09	-.01	-.02	.07
	Protest Vote	-.19c	.01	-.24c	-.17c	-.07	-.30c
	ΔR^2	(.04b)	(.01)	(.11c)	(.06c)	(.02)	(.20c)
Physical (risk)	Within 100-year flood plain	.00	.06	.06	.05	-.04	-.04
	Within 101-1000 year flood plain	.09	-.12	.06	.03	-.19	.08
	Int: 1000 yr. Flood plain x recurrence	-.02	.15	-.09	-.09	.21	-.02
	ΔR^2	(.01)	(.02)	(.02)	(.01)	(.01)	(.00)
Demographic	Lives upstream	-.12a	-.06	-.03	-.02	-.09	-.01
	Formal Education	-.09	-.10	.07	.09	.11	.10
	Income	.12	.03	.15a	.10	-.06	.11
	Minority	-.01	.06	-.03	.21c	-.07	-.08
	Single-family home	.01	-.07	-.06	.04	-.11	-.07
	Owns dwelling	-.03	.00	.14a	.01	.08	.10
	Married, cohabitates	-.10	.10	-.08	-.10	-.01	.06
	Years living in metro area	.04	-.06	.07	.09	.00	-.08
	Plans to move away	.02	.05	.06	-.03	.05	.00
	Number of children in home	-.02	.06	.07	.02	.04	-.15c
ΔR^2	(.03)	(.04)	(.08b)	(.06a)	(.07a)	(.15c)	
Political Attitudes	Political Conservatism	-.08	.05	-.10a	-.10	-.06	-.03
	ΔR^2	(.01)	(.00)	(.01a)	(.02b)	(.00)	(.01)
Media	Attention to Topical News	.30c	.10	.12a	.36c	.02	.18c
	ΔR^2	(.10c)	(.02a)	(.07c)	(.13c)	(.00)	(.08c)
Theory of Planned Behavior	Perceived Behavioral Control	.00	.14a	.01	-.09	.12	.05
	Subjective Norms	.22c	.21c	.22c	.24c	.12	.15b
	CS: Non-Economic Factor			.33c			.24c
	CS: Economic Factor			.04			.07
ΔR^2	(.05c)	(.06c)	(.18c)	(.05b)	(.03a)	(.08c)	
Multiple R		.48c	.37c	.68c	.59c	.37b	.72c
Adjusted R ²		.17	.08	.42	.29	.07	.48
N		294	294	294	276	276	276

Significance Key: (a) p ≤ .05 (b) p ≤ .01 (c) p ≤ .001.

Table 7.12. Regression of Cognitive Structure and Willingness to Pay on Background, Media, and Select Theory of Planned Behavior Variables (Environment Path, Both Waves)

Standardized Regression Coefficients (betas)		First Wave (T1)			Second Wave (T2)		
Block	Variable	Cognitive Structure (CS) Factors		BI: WTP	Cognitive Structure (CS) Factors		BI: WTP
		Non-Economic	Economic		Non-Economic	Economic	
Study-Related	Sensitization (T2)				.07	.04	-.02
	Random WTP Poser (Real Starting Point)	-.01	.06	.01	.02	.08	.02
	Protest Vote	-.09a	-.02	-.27c	-.06	-.20c	-.26c
	ΔR^2	(.02a)	(.01)	(.11c)	(.03a)	(.05c)	(.11c)
Physical	Menomonee River Watershed	.02	.01	-.01	.07	-.04	-.05
	Local River/Creek Natural Habitat Quality	-.04	.04	.05	-.11	.15a	.04
	Actual Distance to River/Creek	.03	.00	.07	.01	.04	.01
	Recreational River Visits	.01	.07	.11a	.04	.10	.06
	ΔR^2	(.05c)	(.01)	(.08c)	(.05c)	(.02)	(.07c)
Demographic	Formal Education	.12a	-.01	.11a	.04	.07	.14b
	Income	.03	-.15a	.13c	.06	.07	.05
	Minority	.00	-.02	-.02	.02	.00	-.02
	Single-family home	-.02	-.05	-.07	.04	-.05	-.09
	Owns dwelling	.04	.00	.07	-.06	-.07	.05
	Married, cohabitates	-.07	.03	.01	.03	-.07	.01
	Years living in metro area	.06	-.15a	-.10a	.00	.05	-.05
	Plans to move away	.00	.02	.00	-.10a	.05	-.02
	Number of children in home	.04	.05	.00	.01	.06	.05
ΔR^2	(.04a)	(.03)	(.11b)	(.03)	(.03)	(.07c)	
Political Attitudes	Political Conservatism	-.03	-.10a	-.02	.01	.09	-.05
	ΔR^2	(.03a)	(.10)	(.02c)	(.01a)	(.01)	(.02c)
Environmental Perspectives	Awareness of Consequences Scale	.20c	-.05	.07	.24c	-.02	.04
	Taxpayer Duty Attitude	.10a	.16b	.09a	.02	.10	.15b
	Biocentric Attitude	.11a	-.08	.03	.02	-.05	-.01
ΔR^2	(.13c)	(.02a)	(.06c)	(.09c)	(.01)	(.07c)	
Media	Attention to Topical News	.19c	-.04	.11a	.12b	-.08	.13b
	ΔR^2	(.03c)	(.00)	(.02b)	(.02b)	(.00)	(.03c)
Theory of Planned Behavior	Perceived Behavioral Control	.13b	.10	.02	.08	.20c	.13b
	Subjective Norms	.18c	-.08	.14c	.19c	-.02	.18c
	CS: Non-Economic Factor			.18c			.14b
	CS: Economic Factor			.14c			.01
ΔR^2	(.05c)	(.01)	(.06c)	(.04c)	(.03c)	(.07c)	
Multiple R		.60c	.29a	.67c	.50c	.40c	.66c
Adjusted R ²		.31	.04	.42	.20	.11	.40

Standardized Regression Coefficients (betas)		First Wave (T1)			Second Wave (T2)		
Block	Variable	Cognitive Structure (CS) Factors		BI: WTP	Cognitive Structure (CS) Factors		BI: WTP
		Non-Economic	Economic		Non-Economic	Economic	
N		441	441	441	406	406	406

Significance Key: (a) $p \leq .05$ (b) $p \leq .01$ (c) $p \leq .001$.

Given that cognitive structure, in particular non-economic dimensions, are correlates of WTP, what variables (outside of other TPB variables) correlate consistently with CS factors? Protest votes affect one of the CS factors or another in each wave for each path. Attention to topical news is associated positively and significantly with the non-economic CS factor in all four waves, but not with the economic CS factor. The strongest relationships between attention to topical news and the non-economic CS factor occur in the flood path, where $\beta = .30$ ($p \leq .001$) in the first wave and $\beta = .36$ ($p \leq .001$) in the second. Comparable coefficients in the environmental path are $\beta = .19$ ($p \leq .001$) the first wave and $\beta = .12$ ($p \leq .01$) in the second. Notably, in the flood path, attention to topical news bears the strongest relationships with the non-economic CS factor of any of the variables in the regression, and in both waves.

Since the analysis is fundamentally correlational, it is not possible to discern causal paths from these data. However, most consistent with these results is a scenario in which non-economic “benefit” dimensions of judgment do affect WTP, especially for the flood control project, and these non-economic judgment dimensions seem to be related more strongly to attention to news about the topic than to a variety of real-world, physical conditions. This scenario would also be consistent with the respondents being reliant on direct or indirect exposure to mediated information to gain knowledge about benefits they cannot experience or verify firsthand.

In the environment path (Table 7.12) in particular, the Environment Perspectives variables are fairly active, especially in the first wave. The view that taxpayers have a duty to share in the costs of improving urban rivers does indeed relate positively to WTP in both waves (T1 $\beta = .09$, $p \leq .05$; T2 $\beta = .15$, $p \leq .01$). It is also associated positively with both CS factors in the first wave ($\beta = .10$, $p \leq .01$, for the non-economic; $\beta = .16$, $p \leq .01$, for economic). The Awareness of Consequences (AC) scale is associated positively with the non-economic CS factor in both the first wave ($\beta = .20$, $p \leq .001$) and the second ($\beta = .24$, $p \leq .001$), although it has not direct relationship to WTP as BI. Given that this scale is comprised primarily of general beliefs about humans’ relationships to, and effects on, the environment, its association with the non-economic CS factor, which is also based partially on beliefs about outcomes, is theoretically consistent. It may be that the influence of the AC scale on WTP is indirect through its relationship with the non-economic CS factor. The same may be true of the biocentric attitude scale, which bears a positive relationship with the non-economic CS factor in the first wave only ($\beta = .11$, $p \leq .05$). The environment analysis also indicates that those with higher attainment in formal education are a little more willing to pay more for the environmental project in both waves (T1 $\beta = .11$, $p \leq .05$; T2 $\beta = .14$, $p \leq .01$) and score higher on the non-economic CS factor in the first wave ($\beta = .12$, $p \leq .05$).

The propositions that environmental perspectives will affect cognitive structure are therefore partially supported, at least as far as the replicated relationship between the non-economic cognitive structure factor and the Awareness of Consequences scale. Partial, but somewhat less, support is provided for the proposition that biocentric and duty attitudes affect cognitive structure, since these relationships appeared only in the first wave of the survey. However, the taxpayer duty variable does relate more directly to WTP in both waves.

The relationships of the two attitude items (biocentric and duty) to cognitive structure and WTP might be suppressed because the two items do not represent underlying dimensions of environmental values and ethics to a very valid or reliable extent. Values and ethics would normally be relatively unchanging phenomena in an individual's psychological makeup, or at least would not be expected to change much over the course of a year. However, the T1-T2 test-retest correlation for the biocentric item ($r=.32$) and the duty item ($r=.30$) indicate more variation in responses to these items over time than occurred even in the Awareness of Consequences scale of beliefs ($r=.66$), which one might expect to be more malleable than deeper values would be. Thus, the biocentric and duty items seem to have extraneous variation due either to a change in the underlying phenomenon being measured (values?) or due to measurement error (low reliability). Similarly, the fact that the "duty" item correlated in both waves with BI (Willingness to Pay), while cognitive structure was controlled as part of the regression, indicates that cognitive structure did not truly serve as an intervening variable between this attitude and BI, as it was expected to do. Thus, there may be some other, duty-related behavioral beliefs that should be incorporated directly into the cognitive structure variable to respond more strongly to variance in the "taxpayer duty" attitude.

Cognitive Structure Under a Microscope

To get a better view of the role of cognitive structure in Willingness to Pay, a partial correlation analysis was conducted of the relationship of each of the belief-evaluation compounds with WTP and with topical news attention by each path and wave (Table 7.13). The same set of variables used as controls in the multiple regression are used as controls for the partial coefficients. The purpose is to see whether any of the compounds stand out as predictors, or perhaps don't contribute at all. In particular, compounds that bear strong relationships with WTP and with media attention might be explored further, perhaps in future studies, to determine whether public information efforts designed to enhance support for projects promoting environmental quality enhancement of a resource, or flood control, might emphasize certain positively valenced outcomes in communication efforts with the public and stakeholders.

Results indicate that both of the economically-oriented compounds (re personal expense and taxes) correlate with WTP for the environmental project at T1, but otherwise bear no relationship to WTP. Respondents in general had indicated these dimensions as being less salient to their WTP decisions (Tables 7.5 and 7.6) than most of the others, and that seems to be supported by the relatively low amount of cumulative variance accounted for by these compounds in this analysis. As noted, however, changing economic conditions could impact the role these compounds might play in future studies.

With few exceptions, the various belief-evaluation compounds from the non-economic CS factor (i.e., those not involving expenses and taxes) are associated with WTP in a given path and wave at about the same magnitude and direction. This outcome probably reflects the generally higher self-reported salience of these WTP judgmental dimensions to the respondents. Of all the dimensions, however, the provision of a long-term solution to the problem is among the strongest correlates, if not the strongest correlate, with WTP, thus suggesting the value of long-term solutions to this sample of respondents at the time of the survey. This result is also consistent with the self-reported, relatively high salience for "...*help[ing] support a long term solution*" as a WTP decision factor in Tables 7.5 and 7.6.

In terms of the relationship of environmental perspectives to WTP, it is also quite noteworthy that the respondent's sense of "doing something for the environment" plays a significant role not only in WTP for the environmental improvement project (T1 partial $r=.13$, $p\leq .01$, T2 partial $r=.11$, $p\leq .05$), as might be expected, but also for the flood control project (T1 partial $r=.25$, $p\leq .001$, T2 partial $r=.20$, $p\leq .01$). Thus, it appears that environmental concern might affect not only WTP for a project designed specifically to improve the ecological health of a local river/creek, but also WTP for a flood control project.

Table 7.13. Partial Correlation of Individual Behavioral Belief-Evaluation Compounds regarding Willingness to Pay with WTP and Topical News Attention: Flood and Environmental Paths, Wave 1 (T1) and Wave 2 (T2)

	<i>Partial Correlation Coefficients</i> ¹							
	<u>Topical News Attention</u>				<u>Behavioral Intention: Willingness to Pay</u>			
	<u>Flood Path</u>		<u>Environmental Path</u>		<u>Flood Path</u>		<u>Environmental Path</u>	
Belief-evaluation (b*e) compounds:	T1	T2	T1	T2	T1	T2	T1	T2
<i>My providing money for the project described to me:</i>								
Would be personally expensive for me.	.08	.06	.00	-.02	.10	.07	.18b	.04
Would add significantly to my taxes.	.02	-.06	-.04	-.09	.02	.04	.10a	-.03
Would make me feel like I am doing something for the environment.	.22c	.29c	.17c	.13b	.25c	.20b	.13b	.11a
Would probably help support a long term solution.	.20c	.29c	.14b	.11a	.35c	.20c	.18c	.17c
Would probably help future generations.	.22c	.30c	.16c	.05	.27c	.19b	.10a	.16b
Would make me feel like I am doing something for the community.	.24c	.29c	.18c	.11a	.28c	.19b	.12a	.14b
Would probably help to hold the line against flooding. (<i>Flood Path only.</i>)	.26c	.22c			.23c	.19b		
Would probably help people who live in the flood plain. (<i>Flood Path only.</i>)	.11	.30c			.20c	.19b		
Would probably help improve the health of the [river][creek]. (<i>Environment Path only.</i>)			.12a	.07			.17c	.06
N	294	276	441	406	294	276	441	406

1) All partials are controlled by the following variables: Random base WTP poser, protest vote, formal education, income, minority, single-family home, dwelling owner, married/cohabitating, years living in metro area, plan to move away, number of children at home, political conservatism, perceived behavioral control, and subjective norms. All T2 coefficients are also controlled by sensitization. Flood path coefficients are also controlled by three variables representing flood risk. Environmental path coefficients are also controlled by Environmental Perspectives variables (Awareness of Consequences scale, Duty, and Biocentric Ethic), watershed, frequency of recreational visits to the river/creek, actual distance to river/creek, and the habitat quality of local river/creek.

2) Positive b*e compound scores represent respondent (R) believing that good outcomes are likely and/or bad outcomes unlikely. Negative b*e scores represent R believing that bad outcomes are likely and/or good outcomes unlikely.

Significance Key: (a) p ≤ .05 (b) p ≤ .01 (c) p ≤ .001.

Outside of the lack of relationships between topical news attention and the economic-related compounds, which might represent that individuals can discern their budgetary conditions for themselves rather than rely on media for that information, there are no truly telling patterns of relationships between the individual compounds and topical news attention. Of course, if there were to be strong relationships between news attention and these judgmental dimensions, relevant information (e.g., about long-term solutions to the flooding and environmental quality problems of the rivers) would have to be readily available in mediated communication channels that residents would rely on and attend to. During the time of the study, there was considerable news coverage of the flood control problems and related palliative measures, which might account for the somewhat stronger relationships between topical news attention and non-economic compounds in the flood path as compared to the environment path. It is also possible that variations in news content might have produced the T1-T2 differences in relationships with news attention for a few of the compounds (e.g., helping future generations, helping people in the flood plain, improve the health of the river/creek). Both of these possibilities could be grist for future research in this tradition.

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