Investigation of Dynamic Value Hierarchy in Environmental Issues: The Interaction between Situational Factors and Individual Value Endorsement Level

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ABSTRACT

Unlike the conventional view of value importance hierarchies, the dynamic value importance hierarchy perspective posits that a person's value hierarchy changes with the situation. Despite the important insights this perspective can offer for understanding environmental conflict, few studies have investigated the dynamics of value hierarchy, particularly in environmental issues. Thus, the main purposes of the present investigation are: 1) to provide a clear conceptualization of the dynamics of value importance hierarchy change, which is an interaction between situational factors and individual differences in the level of value endorsement; 2) to systematically investigate the effect of these situational factors; and 3) to examine the nature of the interactions between individual's general value endorsement level and the effect of situational differences.

Two questionnaire surveys of community residents were conducted in Victoria, British Columbia, Canada. Two hundred twenty five (mean age 50.78, 55.9 percent female) and 284 community residents (mean age 49.8, 66.1 percent female) participated in Study 1 and Study 2, respectively. The questionnaire included the Schwartz Value Survey (1992) and scenario questions that described a situation in which two values, protecting the environment and pursuing economic gain, were in conflict in a realistic environmental context. Three (four in Study 2) situational variables, self-interest, social norm, and the immediacy of environmental damage (and the immediacy of economic gain for Study 2) were manipulated to create different situations. Participants were asked to judge the importance of the two conflicting values separately for each manipulated situation. These ratings constituted the situational value importance judgments. The value

ratings for protecting the environment and pursuing economic gain measured in the Schwartz Value Survey were used as general value ratings.

The results of the two studies indicated the following: First, individuals' value importance judgments did vary according to situational differences, with each situational difference exerting a different degree of influence. Immediacy of environmental damage had the strongest influence over one's importance judgment, followed by self-interest and social norm. Social norm did not influence one's judgment when the decision was made privately (Study 1), but it became influential when decision had to be made in public (Study 2).

Second, the general value ratings also guided one's situational importance judgments. They also interacted with the effects of situational differences in that as one endorsed the value more strongly, the effect of situational variable became smaller. Thus, as conceptualized, one's general value ratings provide a framework within which one's situational value importance judgments vary; although they vary, they do not vary unpredictably. They are still governed by the level of value endorsement at an abstract level.

Third, when both of the two values that are in conflict were taken into consideration, the result showed that those who did not endorse either value strongly were most susceptible to the effect of situational differences. On the other hand, those who had a clear hierarchy between the two values (i.e., endorsed one value more strongly than the other) tended to be less influenced by the situational factors than the value they endorsed more.

For those who endorsed both values strongly, the result was inconclusive. Because they endorsed both values to the similar extent, it was expected that they might experience internal value conflict and that they would pay more attention to the situational differences. However, the result indicated that they were more strongly guided by their high endorsement level of protecting the environment, and less by situational factors.

Speculation about the unpredicted findings, implications of the findings in environmental decision-making, and avenues for future studies are discussed, as well as the limitations of the present investigation.

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CHAPTER I

OVERVIEW

In social psychology, values are considered to be the central construct in individual cognitive systems, and have been demonstrated to influence individual attitudes and decisions. Conventionally, the hierarchy of importance among various values has been considered to be stable across various situations. However, some scholars have argued that the value importance hierarchy is dynamic, changing depending on the specifics of situations. This dynamic value hierarchy perspective has an important implication in situations in which two values are in conflict. If individual value hierarchies can change depending on the circumstances, the conflict between the values may be resolved or alleviated. This is especially relevant in environmental issues because most of the environmental issues are value conflicts between different stakeholders. However, there have been few studies to my knowledge that investigated the dynamics of value hierarchy systematically in the context of environmental issues. Thus, the overall purpose of the present investigation is to examine more systematically the dynamics of value importance hierarchy, specifically in environmental issues.

This dissertation is organized as follows. In chapter II, I review the relevant literature on this issue. The first part overviews the definitions and measures of values by two distinguished scholars, Milton Rokeach and Shalom Schwartz, which are most commonly used among social psychologists working in the areas of attitudes and values. As well, I will introduce two different views about value hierarchy change.

In the second section I will define my conceptualization of value priority change. Focusing on the cases in which two values are in conflict, I will examine how the relative

importance of these two values can vary according to situational factors. In this conceptualization, I also propose that there are two major factors that influence value priority change. One is the situational context, and the other is individual differences in which value one endorses in general. These factors interact with each other in that the effect of situational factors varies according to the level of one's general value endorsement.

Then related literature is reviewed that offers some insight into how one might process information in case of value conflict. After discussing some of the boundary conditions for value priority change, the present investigation is described. This section ends with discussion of hypotheses.

The two studies, questionnaire surveys of community residents, were conducted in this investigation using different environmental issues. The second study replicated and extended the first study. Chapters III and IV describe Study 1 and 2 respectively. Because of the multiple studies, results and discussion are combined for each study. General discussion follows in Chapter V.

CHAPTER II

LITERATURE REVIEW

Definition of Values

Values are one of the most important constructs in social psychology (e.g., Maio, Olson, Allen, & Bernard, 2001). Values are often considered to be one's central belief that influences a wide variety of information processing and activities. The importance of values is reflected in a large number of topics in social psychology, such as value expression as one of the most basic psychological functions of attitudes (e.g., Maio & Olson, 1994; 2000), ideological reasoning (Tetlock, 1986; Tetlock, Kristel, Elson, Green, & Lerner, 2000), prosocial behavior (Schwartz, 1977), and prejudice (e.g., Esses, Haddock, & Zanna, 1993).

In social psychology, the two scholars most prominently associated with the studies of values are Milton Rokeach and Schalom Schwartz. Below, I will describe their definitions and measurement of values. Discussion of some related issues, such as values and self, and social values, will follow.

Rokeach's Value System

Definitions. Rokeach (1973), in his seminal book, *The Nature of Human Values*, described five assumptions about the nature of human values: (1) The total number of values one possesses is relatively small; (2) All people share the same values to different degrees; (3) Values are organized into value systems, in which each value is ordered in priority with respect to other values; (4) The antecedents of human values can be traced to various sources, such as culture, society, institutions, and personality; and (5) The

consequences of human values will be manifested in virtually all phenomena that social scientists might consider worth investigating and understanding (p. 3).

A value was defined as an "enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach, 1973, p. 5). Values are further distinguished into two kinds: instrumental and terminal. Instrumental values are "the mode of conduct," whereas terminal values are "the end-states." Instrumental values are considered to be a means to attain terminal values. Rokeach identified 18 terminal values (e.g., a comfortable life, an exciting life, a sense of accomplishment, a world of peace, a world of beauty, etc.) and 18 instrumental values (e.g., ambitious, broadminded, capable, cheerful, clean, courageous, forgiving, etc.).

Rokeach (1973) assumed that values as beliefs are tripartite, like attitudes: cognitive, affective, and behavioral. Having a particular value means that a person knows what is the desirable way to behave or desirable end state to strive for. Values are affective in that one gets emotionally attached to them, and becomes emotional especially when one's cherished values are violated (Tetlock, Kristel, Elson, Green, & Lerner, 2000). Values have also a behavioral component in that they motivate individuals to act according to their values.

Values are also distinguished from various similar concepts such as attitudes, social norms, and needs (Rokeach, 1973). For example, values are considered to transcend objects and situations whereas attitudes are evaluative beliefs focused on a specific object or situation. Values occupy a more central position in one's cognitive system and they guide attitudes. Likewise, social norms may derive from satisfying some

specific values in a certain context. Further, needs and values are different in that values are cognitive representations of personal and societal needs; all animals have needs, but only humans are considered to have values.

Measurement. The Rokeach value survey (1973) asks participants to rank-order the 18 instrumental and 18 terminal values, usually listed in respective columns. The instruction to the participants is to "arrange them in order of importance to YOU, as guiding principles in YOUR life" (p. 27). To facilitate the difficult task of ranking among 18 values, each value and its defining phrase are printed on gummed labels, so that participants can arrange and re-arrange their ranking with ease.

The structure of values. To investigate the structure of the 36 values, Rokeach (1973) examined correlations among all the 36 values and performed a factor analysis. For example, for the sample of white Americans, the highest positive correlation was found between values "a comfortable life" and "pleasure" ($\underline{r} = .38$), the highest negative correlation between "an exciting life" and "salvation" ($\underline{r} = -.32$). Factor analysis yielded 7 factors, which include: immediate versus delayed gratification (a comfortable life, pleasure, clean, and an exciting life; versus wisdom, inner harmony, logical, and self-controlled); competence versus religious morality (logical, imaginative, intellectual, and independent; versus forgiving, salvation, helpful, and clean); self-constriction versus self-expansion (obedient, polite, self-controlled, and honest, versus broadminded and capable); social versus personal orientation (a world at peace, national security, equality, and freedom, versus true friendship and self-respect); societal versus family security (a world of beauty, equality, helpful, and imaginative, versus family security, ambitious, responsible, and capable); respect versus love (social recognition and self-respect versus

mature love and loving); and inner- versus other-directed (polite versus courageous and independent) (notice some of the values are complex items; i.e., loaded on more than one factor).

Schwartz's Value System

Schwartz extended Rokeach's research into values in many ways. First of all, he strived to create a comprehensive list of human values and expanded the list of values from 36 in Rokeach's value survey to 56. Other major differences between Rokeach (1973) and Schwartz's (1992) investigations into values are that: (1) Schwartz examined the structure of values more thoroughly; (2) Schwartz sought to identify the universality of value structures across many countries, whereas Rokeach's value research is mainly about American values; and (3) Schwartz's measurement of values is not by ranking, but rating of each value.

Definitions. Schwartz and Bilsky (1987, 1990) defined a value in terms of five features: (1) A value is a belief; (2) it is a belief about desirable end states or behaviors; (3) it transcends specific situations; (4) it guides selection or evaluation of behavior, people, and events; and (5) it is ordered by importance relative to other values to form value priorities or hierarchies.

More specifically, Schwartz (1994) defined values as "desirable trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity" (p. 21). He postulated that various values are distinguished and organized according to the type of motivational goal they express. Such goals represent three universal requirements of human existence: needs of individuals as biological organisms, requisites of coordinated social interaction, and survival and welfare needs of

groups. He derived ten (he later included Spirituality, thus eleven) motivationally distinct types of values from the three universal requirements: Self-direction (e.g., freedom, creativity), Stimulation (e.g., an exciting life), Hedonism (e.g., pleasure), achievement (e.g., ambitious, influential), Power (e.g., social power, wealth), Security (e.g., national security, family security), Conformity (e.g., obedient, self-discipline), Tradition (e.g., respect for tradition), Spirituality (e.g., inner harmony, meaning in life), Benevolence (e.g., helpful, responsible, forgiving, honest), and Universalism (e.g., equality, protecting the environment, a world of beauty). The 11 types are further categorized into four higher order value types: Conservation (security, conformity, and tradition), Openness to change (self-direction, stimulation, and hedonism), Self-enhancement (achievement and power), and Self-transcendence (benevolence and universalism).

The structure of values. Structure of values refers to the relations among the 56 values; either they are compatible or in conflict, as opposed to value hierarchy, which represents relative importance among values. Identifying the value structure among 56 values is probably the biggest contribution of Schwartz's research into values.

Schwartz and Bilsky (1987, 1990) formulated a series of hypotheses about the relations among the values: (1) Value types that are postulated to serve individual interests should be opposed to those that serve collective interests; (2) Universalism and security serve both types of interests, thus they will be located on the boundaries. The hypotheses were further revised to formulate the relationships about compatibilities and conflicts among values (Schwartz, 1992, 1994). Examples of values that are hypothesized to be compatible are: power and achievement; achievement and hedonism; and universalism and benevolence. Values that are hypothesized to be in conflict are:

universalism and benevolence versus achievement and power; hedonism versus conformity and tradition. These hypothesized relationships are represented in a circular structure (Figure 1). The adjacent values are considered to be compatible, and opposing values are considered to be in conflict. This circular structure is conceptualized further as organized on two dimensions: Openness to Change (self-direction, stimulation, and hedonism) to Conservation dimension (tradition, conformity, and security); and Self-Transcendence (universalism and benevolence) to Self-Enhancement (power, achievement, and security) dimension.

In order to empirically test these hypothetical relationships among values, Schwartz (1992, 1994) used Guttman-Lingoes Smallest Space Analysis (SSA; Guttman, 1968, as cited in Schwartz, 1992) to analyze the intercorrelation matrix of Pearson correlations between the importance ratings of the values. The results confirmed in general hypothesized relationships among values in cross-cultural studies (e.g., Schwartz, 1992, 1994).

Such an integrated value structure facilitates greatly the generation of systematic and coherent hypotheses regarding the relations of value priorities to other variables, such as attitudes and behavior. For example, if a certain attitude is considered to be positively associated with endorsing a certain value A, that attitude is hypothesized to be also positively associated with values adjacent to the value A more or less to the same degree. Moreover, the attitude is expected to be negatively associated with endorsing the values opposite to the value A (Sagiv & Schwartz, 1995).

Measurement. To represent the 11 types of values, 56 values are selected. These values are listed with explanatory phrases as in Rokeach's (1973) survey. Of these

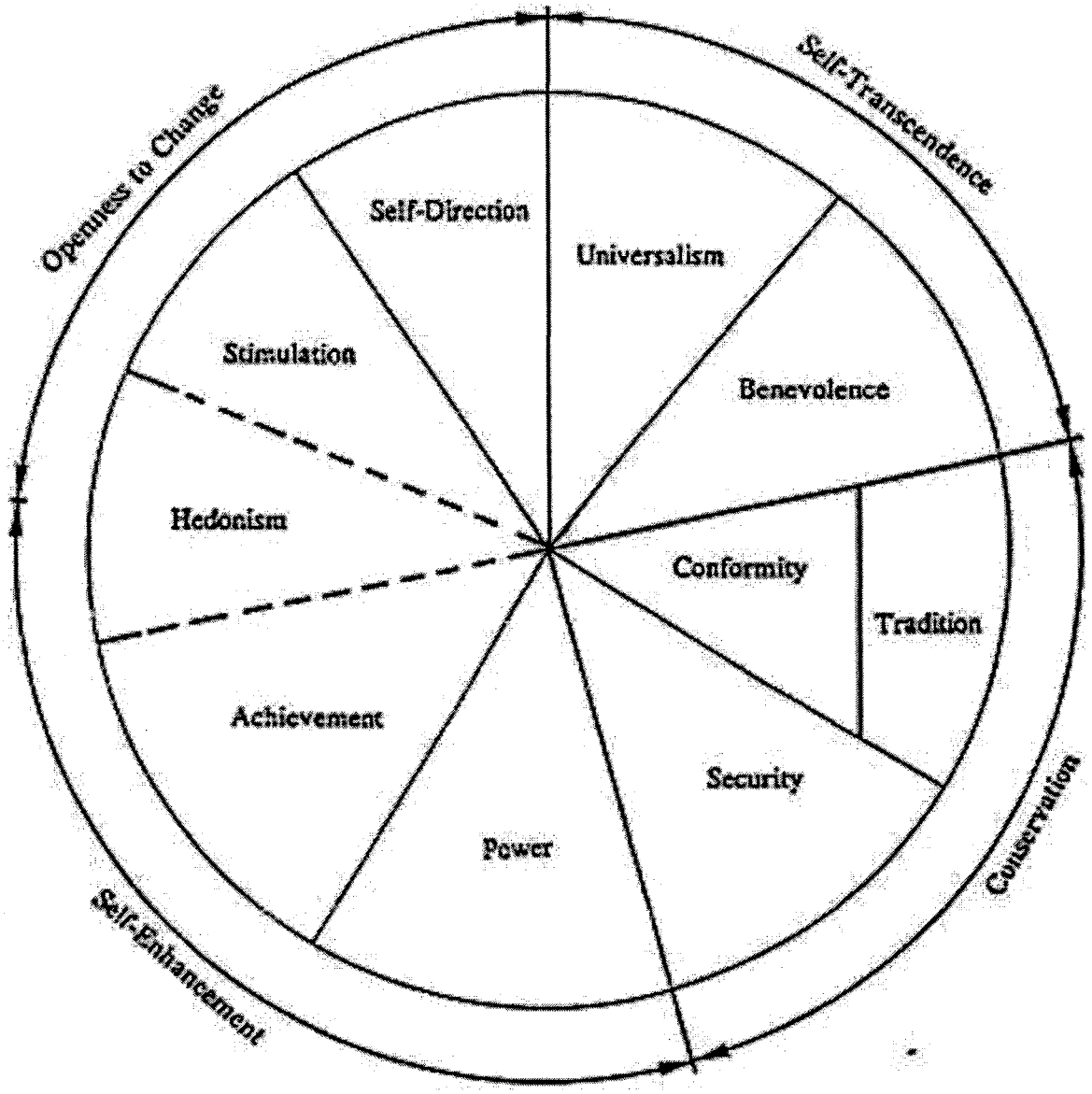

Figure 1

Schwartz's Value Classification.

values, 21 are identical to those in Rokeach survey. This survey asks respondents to rate each value "AS A GUIDING PRINCIPLE IN MY LIFE," on a 9-point importance scale, ranging from –1 (opposed to my value), to 0 (not important), to 7 (of supreme importance). Rating, rather than ranking, was employed by Schwartz because of the large number of single values, which makes it very difficult to rank-order them, and to facilitate statistical analysis. Schwartz (1994) also claims that rating is phenomenologically closer to the way values are used for preference decisions compared to ranking. In ranking, people are required to express sharp, definitive preferences among the values; however, people are typically not aware of the possible contradictions between relevant values in making decisions.

These two different methodologies employed by two prominent scholars of values contributed to the debate whether values should be measured by ranking or rating (e.g., Krosnick & Alwin, 1988; Maio, Roese, Seligman, & Katz, 1996). Thus far, most scholars endorse rating over ranking. I also support the rating of each value because it is easier for participants to do so, and for the ease of statistical analyses.

Values and "Self"

Values are beliefs about the desirable mode of conduct and end state, and as such, they are a part of self-image (Rokeach, 1973). Both Rokeach's Value Survey (1973) and Schwartz's Value Survey (1992) intend to measure values in general, at abstract levels, as describing one's ideal/ought self. Values contribute to a person's sense of identity. For example, a person might consider herself to be honest and might mention this value when asked to describe herself.

However, the extent to which certain values are integrated into self-image may vary according to individuals. Verplanken and Holland (2002) proposed a construct, value centrality, in their investigation into the relation among values, self, and choices. They consider that values would lead to value-congruent choices only to the extent that the values are central to the person. In other words, values may acquire motivational properties by making up a part of the self-image. Thus, value-congruent behavior may also be enhanced by making people more aware of their selves. In fact, when self-focus was manipulated by priming participants with self-related words (e.g., I, me, etc.), the participants acted in a more value-congruent way. To the extent that values are central to a person, those central values should be activated when the self is activated (i.e., when a person becomes aware of self).

Values are also shared with others and may constitute the basis of social, professional, or political groups, or cultural identities. However, if a person merely adopts certain values as social norms or cultural truism, those values may yet to be integrated into his/her self-image. It is likely that only a small number of values may eventually become central and a part of one's self-concept (Verplanken & Holland, 2002).

Social Values

Another way of classifying values not yet discussed is whether a value is for oneself or for society as a whole. Rokeach (1973) differentiated two kinds of values within his terminal values: personal values, which are more self-centered; and social values, which are more society-centered. He argued that personal values and social values are in conflict and that an increase in one social value would lead to an increase in other

social values and decreases in personal values. However, he included only five social values: national security, a world at peace, equality, a world of beauty, and freedom. It is interesting to note that all the other values are personal values.

Braithwaite (1994) focused more on the types of social values. In predicting support for left- or right-wing policies, Braithwaite (1994) proposed two dimensions within social values: Harmony versus Security. The Harmony dimension represents the endorsement of "actions toward cooperation, peaceful coexistence and productivity for the collectivity" (p. 225), which usually related to left-wing or liberal policy support. The Security dimension, on the other hand, "legitimates competition for resources" (p. 224), and is related to right-wing or conservative policy support. She termed this conceptualization as the two-value model of political ideology. Her Social Goal Inventory with 18 values (1994) measures "international harmony and equality" and "national strength and order" dimensions.

Social values were not the main interest of Schwartz; he did not classify social versus personal values specifically, but the value type Universalism can be considered to represent social values. Social values have been more of the interest among sociologists for many years. Braithwaite's two dimensions of Harmony and Security correspond to two dimensions proposed by other sociologists (cited in Braithwaite, 1998): international cooperation versus international competitiveness (Scott, 1960), equality versus achievement (Lipset, 1963), communalism versus individualism (Katz & Hass, 1988), post-materialism versus materialism (Ingelhart, 1971), and equality versus freedom (Rokeach, 1973).

Values as Personality

Long before Rokeach started his investigation into values, Gordon Allport and Philip Vernon published in 1931 a scale to measure their version of values. They used values and "basic interests and motives in personality" interchangeablely. They created a list of six basic types: theoretical, economic, esthetic, social, political, and religious, directly based on Spranger's *Types of Man* (1928, as cited in Allport & Vernon, 1931). The dominant interest for the Theoretical is the discovery of truth. The Economic is interested in wealth, prosperity, and other tangible blessings. The Aesthetics' interest is in form and harmony, in grace and symmetry. The Social places the highest value in love of people. The Political's primary interest is in power. And finally, the Religious's highest value is unity with God, or the cosmos as a whole.

Although dated, this treatment of endorsement of certain values as personality is unique, and worth noting. This conceptualization is similar to my conceptualization of general value ratings as a between-subject, individual difference, as described later.

Values in Environmental Psychology

Typical Value Constructs Used in Environmental (Conservation) Psychology

Within the domain of environmental or conservation psychology, research into values that affect environmentalism (e.g., pro-environmental attitudes, pro-environmental behavior) has been mainly guided by the works of Stern, Dietz, and their colleagues (e.g., Stern, Dietz, 1994; Stern, Dietz, & Kalof, 1993; Stern, Dietz, Kalof, & Guagnano, 1995; Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Values are usually conceptualized as relatively stable and central beliefs that precede more specific beliefs, attitudes, and pro-environmental behavior. As one of the major research goals in conservation psychology

is to promote pro-environmental behavior, values are often treated as antecedents of such behavior (e.g., Nordlund & Garvill, 2002) or environmental concern (e.g., Stern & Dietz, 1994) and research into values *per se* has been rare, if there has been any at all.

Values that are specifically relevant to this domain are often conceptualized as 3 value orientations: egoistic, social-altruistic (altruistic orientation toward humans), and biospheric (altruistic orientation toward other species) (Stern, Dietz, & Kalof, 1993; Stern & Dietz, 1994; Schultz, 2000).

Alternatively, Schwartz's value concept (1992) is also often used, especially as antecedents of pro-environmental behavior, as in value-belief-norm theory of environmentalism (Stern et al., 1999). Because pro-environmental behavior is usually conceptualized as one type of altruistic behavior, the value type of interest among Schwartz's 4 higher-order value types is Self-Transcendent (combination of Universalism and Benevolence; e.g., protecting the environment, a world of beauty, honest, forgiving) (Stern et al., 1999; Nordlund & Garvill, 2002). Often the value type Self-Enhancement (combination of Power and Achievement; e.g., social power, wealth) is used as an opposing value type. However, some of the values in Self-Transcendent, especially those of Benevolence (e.g., helpful, honest, forgiving, loyal) are not directly relevant to environmental issues. In fact, Schwartz's value classification is not in terms of the relevance to environmental issues, and his value types often needs to be modified to fit into the context of environmental issues. Specifically, three values, protecting the environment, a world of beauty, and unity with nature, are considered to be most relevant values in this context. Those three values are considered to be equivalent to biospherism

(Stern, Dietz, & Kalof, 1993) and to be more predictive of pro-environmental behavior (Schultz & Zelezny, 1998; 1999).

Other Value Orientations Used in Environmental Psychology

Social value orientations. Many of the environmental problems, typically those that involve use of natural and often limited resources (e.g., water shortage, overfishing, etc.) are considered to be cases of social dilemmas, in which pursuit of self-interest is in conflict with collective interest. In this paradigm, acting environmentally friendly means acting "cooperatively," and not acting in such a way is viewed as "defective," because one is pursuing one's own interest at the cost of collective interest. Much research into the factors that encourage cooperative behavior has been done in the field of environmental psychology (see Gifford, 2002; Komorita & Parks, 1994 for reviews).

Research on social dilemmas has pointed out the importance of social value orientations in understanding cooperative behavior, which are supposedly pre-existing personal predispositions. Social value orientations may be defined as strategic or motivational preferences for other's and own outcomes in an interdependent situation (Liebrand, Jansen, Rijken, & Suhre, 1986). Among several social value orientations that have been identified, the following three orientations are used most commonly among researchers: cooperator, individualist, and competitor. Cooperative social orientation is defined by the preference for the outcomes that maximize joint gains, individualistic orientation by maximizing own gain, and competitive orientation by maximizing relative gain.

Social value orientations are commonly measured using "decomposed games." The name, decomposed games, comes from the fact that outcomes are presented

(decomposed) in such a way that they allow one to infer the motives that underlie the available choices, compared to payoff matrices that were conventionally used in game theory (Messick & McClintock, 1968). Decomposed games are only for two-person interdependent cases. For example, Van Lange and Kuhlman (1994) used a set of 9 decomposed games with three choices each. An example of their decomposed game is as follows. Choice A has 480 points for self and 80 points for other; choice B has 540 points for self and 280 points for other; and choice C has 480 points for self and 480 points for other. Choice A represents a competitive orientation, because it's relative gain (480 –80 = 400) is the largest among the three choices. Choice B represents individualists as one's own gain (540) is the largest among the three. Choice C represents cooperators because the joint gain (480 + 480 = 960) is the largest among the three. Subjects are classified into one of the social orientations if they made at least 6 consistent choices out of 9. This decomposed game technique has been proven to have both a good internal consistency and test-retest reliability (Van Lange & Kuhlman, 1994).

Individuals with cooperative value orientations have been shown to act (or make behavioral decisions to act) pro-environmentally (i.e., toward preserving natural and common resources), whereas those with competitive value orientations act rather selfishly for their immediate gain without considering the long-term consequences of their behavior. Individuals with individualistic value orientations may act pro-environmentally or anti-environmentally, depending on which way would make more profit to the individual in a specific situation. However, other studies (e.g., Van Lange, 1999; Van Lange & Kuhlman, 1994; Van Lange & Liebrand, 1991) have suggested that cooperative individuals act cooperatively not necessarily to preserve natural or common

resources per se, but from the moral obligation to be fair and considerate to others. They do so at the expense of their personal desire, so they become outraged upon finding that others are not behaving the way they do and are enjoying increased personal gain as a result. These deceived cooperators often turn into competitors themselves (so-called "behavioral assimilation," Kelly & Stahelski, 1970, as cited in Van Lange, 1999). This line of research suggests that social value orientations reflect underlying core values, such as fairness and altruism, despite the rather superficial and simple-minded way of measuring them as described above.

Axelrod's value orientations. Axelrod (1994a, 1994b) proposed another set of value orientations that are considered to influence behavioral decisions concerning pro-environmental behavior: economic, social, and universal. These three different value orientations are proposed to reflect one's motivational goals. For instance, an individual with economic, social, or universal value orientation would pursue most strongly "achieving a comfortable and financially secure life"; "achieving a sense of belonging and acceptance from others"; or "maintaining a sense of self-respect derived from acting in accord with deeply held values," respectively (Axelrod, 1994a, pp. 55-56).

When presented with scenarios that described a situation in which economic motivations and environmental protection were in conflict, university students with universal value orientations were more likely to choose pro-environmental options than those with economic value orientations. The decisions by those with social value orientations were more influenced by the social factor (i.e., which decision was supported by the majority) described in the scenario.

As reviewed above, in the domain of environmental/conservation psychology as well, values and value orientations have been treated as an important factor that influence one's decision as to behaving environmentally responsible or not.

Stable or Dynamic Value Importance?

The Influence of Internal Value Conflict and Situational Differences

Two Views of Value Hierarchy

A conventional view of value hierarchies, like the one by Rokeach (Grube, Mayton, & Ball-Rokeach, 1994; Rokeach, 1973), is that the ranking of the values is relatively stable across situations. For example, Rokeach (1973) defined value hierarchy as "an enduring organization of beliefs concerning preferable modes of conduct or end-states of existence along a continuum of relative importance" (p. 5). This view of trans-situationality of values is also adopted by Schwartz (e.g., 1992), mainly to study the structure among types of values at the same level. However, he acknowledged the importance of context of measurement and different situations; "Studies combining our abstract levels of measurement with contextually specific measures would increase our understanding of how values enter into concrete decision-making" (1992, p. 47).

Contrary to the conventional view, a value system may be viewed as dynamic, in that the hierarchy of values may change depending on specific issues and situations (Seligman & Katz, 1996; Seligman, Syme, & Gilchrist, 1994). The proponents of this view argue that value hierarchies may be reorganized within individuals depending on the issue. This multiple value-hierarchy perspective suggests that we construct value hierarchy dependending on the context of the situation. For example, one might oppose capital punishment, while supporting abortion. On the surface, this may look

contradictory; as in one issue, he/she supports saving a life, and in the other, supports taking a life. Seligman and Katz (1996) argue that this is because the value priority ranking changes between the two issues; in capital punishment, the most important value is the sanctity of life of the convicted over the state's freedom to take a life, whereas in abortion, it is women's free choice over the sanctity of life (p. 54).

Most studies that investigate value hierarchy changes employ some kind of intervention between the first measurement of the value ranking and the second. An intervention may be writing an essay about the issue in question (Seligman & Katz, 1996), completing a questionnaire on a relevant issue (Seligman, Syme, & Gilchrist, 1994), analyzing reasons why specific values are important (Maio & Olson, 1998), or some other ways of priming specific values (e.g., impression formation task; Verplanken & Holland, 2002).

It might be necessary here to clarify the meaning or conceptualization of value hierarchy change that I adopt in this study. Often, one issue involves in it two conflicting values, as in the example of abortion. One's value hierarchy may be dynamic in that the importance attributed to each of the two conflicting values can change depending on the context and situation. In fact, there are few situations, if any, in which only one value is involved. Most of our everyday situations involve a set of conflicting values, which makes our decision-making difficult, and some kind of trade-off between the values becomes necessary. Schwartz (1996) succinctly described the relevance of value conflict when values exert their influences on our decision-making:

> "...attitudes and behavior are guided not by the priority given to a single value but by tradeoffs among competing values that are implicated simultaneously in a

behavior or attitude. Indeed, values may play little role in behavior except when there is value conflict...It is in the presence of conflict that values are likely to be activated, to enter awareness, and to be used as guiding principles" (p.2).

In investigating the mechanism of value importance change across many situations, I propose that there are two major influencing factors involved in it: one is the situational differences themselves, and the other is pre-existing individual differences in which value to endorse and to what extent. These two factors dynamically interact to produce value importance change within the individual according to the specifics of the situation. Below, I will discuss these two factors: first, individual differences in value endorsement, and second, situational factors.

Individual Differences in Internal Value Conflict

Values may be in conflict externally or internally. A situation can involve a set of conflicting values (external conflict) and when faced with such a situation, a person may experience internal conflict within him/her regarding which conflicting value to endorse. For example, capital punishment involves a conflict between pursuing justice and saving human life. However, whether one experiences internal conflict over the issue depends on which value he/she endorses and to which extent. If an individual places more importance on pursuing justice than saving human life, there will not be much internal conflict within the person, although the situation may appear to be posing conflict between the two values. On the other hand, if the person endorses both values very highly, or at least to the same extent, he/she will experience internal conflict. Thus, which values to choose in a certain situation is a function of *both* external and internal value conflicts, and we need to take both into account to understand such decision-making fully. It is important to do

so because the extent of internal value conflict is likely to affect how one perceives the situation, or how situational differences may exert influence on the individual.

Below, I will review the literature that offers some insight into how individual differences in the degree of internal value conflict may affect the effect of situational differences.

Value Conflicts in Political Reasoning

Tetlock's value pluralism model. The existing literature on internal value conflict is primarily in the context of political reasoning and its effects on information processing (e.g., Suedfeld, Bluck, Loewen, & Elkins, 1994; Suedfeld & Wallbaum, 1992, Tetlock, 1986; 1999; Tetlock, Peterson, & Lerner, 1996). The value pluralism model of ideological reasoning (Tetlock, 1986) attempts to explain how people cope with everyday value conflicts and trade-offs. It posits the following: 1. Political belief systems are based on core values; 2. Acknowledging conflict among core values is aversive both cognitively and emotionally, and trade-offs among core values may be embarrassing in the political context; and 3. Thus people should prefer "easy" processing modes for value trade-offs as much as possible. Such easy processing includes denial and bolstering (i.e., denying the less important value and bolster the more important one), and this can be done when individuals have clear importance hierarchy between core values within them. When they place high importance on *both* values, however, they are forced to engage in more complex information processing, which is high on "integrative complexity." In such information processing, people try to specify "when, why, and to what degree, one value should prevail over another" (Tetlock, Peterson, & Lerner, 1996, p. 28).

This original model was further modified to include two aspects: the social content of the value and the social context of decision-making. The social content postulate states that when the value content is "sacred," then it is socially not acceptable (taboo) to trade-off such values with other values. The social context postulate takes into consideration the accountability of a decision-maker to public. Only when value trade-offs are socially acceptable *and* one is held accountable for the decision to the audience that magnifies the motives for accuracy and vigilance, does he/she engage in integratively complex thinking (Tetlock et al., 1996). In other words, one will try to avoid integratively complex trade-off reasoning until there is no way out.

Tetlock and his colleagues' works (e.g., Tetlock, 1986, Tetlock et al., 1996) give insight into how people deal with internal value conflict. A similar line of work related to Tetlock's research has been conducted by Braithwaite.

Braithwaite's value balance model of political evaluation. In the context of decision-making between right- or left-wing policy support, Braithwaite (1998) proposed the "value balance model" of political evaluations. As described earlier, Braithwaite's main interest was to predict right- or left-wing policy preferences from the endorsement of harmony and security value dimensions. According to the degree of endorsement on these two value dimensions, people can be divided into the following four groups: 1. clearly security-oriented; 2. clearly harmony-oriented (these two groups are called value imbalanced group); 3. those who endorse both value dimensions high (dualist); and 4. those who do not endorse either (relativist) (these two groups are called value balanced groups). In fact, Tetlock (1986) had made similar distinctions. He called those attaching

high priority to only one of the two conflicting values as monistic, and those who attach high priority to both values as pluralistic.

Based on Tetlock's theory (1986, 1996), she predicted that for the value imbalanced group, it is easy to make decisions; they simply follow their value priorities. On the other hand, for the value-balanced group, the decision can be more challenging because following their values does not give them much guidance.

Braithwaite (1998) proposed that, although two value-balanced groups are the same in that they do not have clear hierarchy of the two values, they should be different. To explore the differences, she conducted a series of three studies. First, she hypothesized that dualists would be more likely to adopt political positions (whether right or left) than relativists. However, this hypothesis was not supported. Both groups expressed similar opinions, sometimes favoring the left, and sometimes favoring the right. Thus, in terms of their attitudes toward policies, they did not show any differences.

However, she pointed out that there was a clear attitudinal difference between relativists and the other three groups when she had conducted a study of the relationship between environmental attitudes and these four group-memberships. Relativists' attitudes were different from those of the other groups' in that relativists did not agree to preserve nature at all costs (Blamey & Braithwaite, 1996, as cited in Braithwaite, 1998). These inconclusive findings across beliefs in different domains are worth investigating further.

Braithwaite (1998) did find other differences between the two groups, however. In study 1, she performed a chi-square test of the median ranking of social values from the Rokeach value survey (i.e., freedom, a world at peace, equality, a world of beauty, and national security) between the two groups. The analysis showed that more relativists

than dualist assigned significantly less importance to a world at peace, equality, and national security. This finding is not surprising, as the definition of dualist itself shows that they would rank those values higher.

In study 2, she explored the possibility that relativists should base their decisions more on particulars in each situation, rather than basing them on held values. A one-way ANOVA on the number of "yes" answers to one item in the questionnaire, "it depends on the situation," found that the relativist group had the highest number of "yes" among the four groups. In study 3, she tested the hypothesis that relativists should place their decision more on self-interest, as opposed to societal interest, whereas dualist should do the opposite. A chi-square test of independence was performed on the percentage of people who answered "vote in self-interest" and "vote in society's interest" to the question "How should people vote?" and "How do you usually vote?" The result indicated more relativists tended to answer "in self-interest" for both questions than dualists.

Although Braithwaite (1998) conducted these three studies, the analyses used answers to only one questionnaire item, and only used a chi-square test, which is based only on frequencies, was performed. A more systematic way of investigating group differences would be preferable.

Value Conflict in Environmental Issues

The issue of value conflict is very important in the domain of conservation psychology as well because most of the environmental issues involve value conflicts (Dietz & Stern, 1998; Dietz, Stern, & Rycroft, 1989; Lockwood, 1999; Wade-Benzoni, Hoffman, Thompson, Moore, Gillespie, & Bazerman, 2002; Vining & Schroeder, 1989).

Such conflicts of values imply that difficult trade-offs are often necessary among conflicting values. Investigating into the dynamics of value importance change across different situations should provide deeper understanding of an environmental conflict and some meaningful insights into how to resolve such conflict.

Despite the relevance of internal value conflict and its interaction with situational differences, it has not yet been studied systematically within conservation psychology, unlike in the political decision-making arena. Thus, a major purpose of my study is to investigate this.

Situational Differences

The second factor that may influence one's value importance judgment across different situations is the situational differences themselves. Three variables, self-interest, social norms, and immediacy of impact, are selected for this study because they are meaningful situational differences. These situational variables are expected to interact with the levels of one's value endorsement.

Self-interest

Material or non-material self-interest is a strong influence on our everyday lives. In other words, one might say that our lives are to fulfill our self-interest. Especially in the domain of environmental issues, such as deciding on a site for a nuclear power plant or major water restrictions, in which one's quality of life is at risk, self-interest becomes an even stronger influence on our judgments or preferences. Most environmental issues can be viewed as conflicts between self-interests among different stakeholders. Moreover, to be environmentally friendly in general (e.g., reducing one's car use, conserving energy, etc.) often means self-sacrifice to certain extent. How to tame our

self-interest in order to attain more environmentally responsible behavior has been a topic of discussion in the conservation psychology literature (e.g., Kaplan, 2000).

Consider the case of "universal fairness" and "situational fairness" described by Syme, Nancarrow, and McCreddin (1999). In a series of seven studies, they investigated what "fairness" would be in terms of groundwater allocation in relatively arid areas of Australia. Unlike most of the studies of values that used university students, their samples were drawn from the actual stakeholders for a relatively urgent and consequential issue of water allocation. They found that fairness principles are applied differently at the universal (in general) and situational (directly related to the respondents) levels. Especially when respondents are a group of groundwater license holders, and the situation was more urgent with possible dramatic negative consequences to their livelihood if the water allocation system was changed, fairness principles diverged considerably from the fairness principles in general. This is the case when value importance judgment and self-interest are in conflict. "When personal income and livelihood are affected, issues such as the public good, procedural justice and environmental rights tend to take the 'back seat'" (Syme et al., p. 60).

In terms of the interaction between internal value conflict and situational influences as well, self-interest is a most reasonable influence to consider as a factor that affects those who do not endorse either value of the two conflicting values. To more systematically investigate the influence of self-interest on internal value conflict after Braithwaite's preliminary finding (1998), I included self-interest as one probably important situational influence.

Social Norms

Social norms have been identified as a strong influence on one's attitudes and behavioral intentions in social psychology. The influence of social norm is meaningful to include as a situational variable, as it often conflicts with the fulfillment of self-interest.

One of the most popular definitions of social norms was proposed in the theory of reasoned action (Fishbein & Ajzen, 1975) and the theory of planned behavior (Ajzen, 1991): the norms imposed by one's significant others as their perceived approval or disapproval of the action (termed "subjective norms"). Such norms form a pressure that one has to weigh against the desire to fulfill pure self-interest. In a large number of studies of the theory of reasoned action and the theory of planned behavior, this definition of social norm has been shown to influence one's intention together with one's attitudes and perceived difficulty of the action in various behavioral domains, such as health-related behaviors (e.g., Baker, Little, & Brownell, 2003; Johnston, & White, 2003), leisure activities (Ajzen & Driver, 1991), sexual behavior (e.g., Bryan, Fisher, & Fisher, 2002; Sheeran, & Taylor, 1999), and environmentally responsible behaviors (e.g., Kaiser & Gutscher, 2003).

Cialdini, Reno, and Kallgren (1990) further distinguished social norms into "descriptive norms" and "injunctive norms." Injunctive norms refer to rules as to what is morally approved or disapproved, or in other words, what ought to be done, which is equivalent to Ajzen's (1991) subjective norm. In contrast, descriptive norms describe what is typical or normal, or in other words, what most people do in a given situation. They demonstrated that the effect of social norms is the strongest when both injunctive and descriptive norms point to the same action in reducing littering behavior. It is

possible that injunctive and descriptive norms influence one's behavior through different information-processing modes. For example, descriptive norm is similar to heuristics in that one might use it without careful and deliberate thinking. As such, descriptive norms may be more relevant to those who have not established their value systems fully. For example, descriptive norms have been shown to affect university students more strongly than injunctive norms in the use of public transportation (Heath & Gifford, 2003).

The influence of institutional/organizational norms. The influence of institutions is a valid variable for one's expression of values. Institutions may influence our value systems in three ways: regulative, normative, and cognitive (Wade-Benzoni, Hoffman, Thompson, Moore, Gillespie, & Bazerman, 2002). Regulative influence takes place usually by ways of laws and regulations. In the environmental domain, such regulations are often meant to reduce self-interested, destructive behaviors. Normative influences are values and beliefs that are embedded within such programs as educational curricula, professional standards, and organizational structure. For example, MBA programs in business schools usually do not teach students how to integrate environmental and strategic considerations (Wade-Benzoni et al). Differences between lay people and professionals in their mindsets and perceptions are reported elsewhere (e.g., Slovic, 1987). Cognitive aspect of institutional influence is represented in the cognitive beliefs that are at the root of regulative and normative aspects of institutions. Most typical of such cognitive institution is the belief that economic growth and environmental protection are incompatible.

Institutional or organizational norms are likely to influence one's value expression, or value hierarchy. Consider the influence of institutional norms in an

environmental issue related to global climate change. Because control or governmental regulation over greenhouse gas emissions has a tremendous implication over energy-producing and energy-dependent industries, such industries as a whole may object strongly to governmental regulations (Wade-Benzoni et al., 2002). If one works for one of the industries that provides his/her income for living, it may not be easy for the individual to endorse more pro-environmental values, at least publicly.

Implicit societal norms, such as expectation to abide by regulations and laws, can be another kind of pressure that can go against self-interest. Which kind of norms may exert most influence in one's value hierarchy may be context-dependent. Yet, these different kinds of norms share the same property in that they often go against one's self-interest.

Immediacy of Environmental Damage

Generally speaking, whether a given environmental problem is urgent or not makes a big difference. For example, the scarcity of the forest resource was found to influence people's judgment on the importance of the competing goals of preserving wilderness versus maintaining maximum level of timber production (Schroeder, 1981).

More specifically, urgency of the situation may act as a moderating variable for the influence of self-interest and/or social norms. For example, the influence of self-interest may be weaker if the situation is urgent compared to when it is not. On the other hand, the urgency of the situation may make the influence of self-interest even stronger, as in the study of water allocation in Australia (Syme et al., 1999); when water is truly scarce, one may become more desperate to get water for oneself, compared to when it is

not, in which case one can afford to be more generous in allocating water for other purposes.

In summary, these three variables, self-interest, social norms, and urgency of environmental damage, will be included as defining different situations.

Some Boundary Conditions of Value Importance Change

Although I have proposed that one's value priority should change according to situational differences, there may well be cases in which people resist changing their value priority despite situational changes, and this possibility needs to be addressed. They may resist changing value priorities because a certain value is too important to be put aside. Two such cases are reported: one is sacred value (Tetlock, Kristen, Elson, Green, & Lerner, 2000), and the other is protected values (Baron, 1997; Baron & Leshner, 2000; Baron & Spranca, 1997). In addition, two other possibilities are discussed.

Sacred Values and Protected Values

Sacred values are those, such as honor, love, justice, and life, that people vehemently reject being traded off with other values. Sacred values may be defined as "any value that a moral community implicitly or explicitly treats as possessing infinite or transcendental significance that precludes comparison, trade-offs, or indeed any other mingling with bounded or secular values" (Tetlock et al., 2000, p. 853). The sacred-value-protection model (SVPM; Tetlock, 1999; Tetlock et al., 2000) does not make any assumptions about what kind of values, content-wise, people generally deem "sacred," hence free from value trade-off, but it postulates how people may cope with the threats to their sacred values: by expressing moral outrage and by engaging in moral cleansing. Moral outrage is a combination of cognitive, affective, and behavioral reactions.

Cognitive reaction may take a form of harsh character attributions to those who committed sacred-value trade-offs. Affective reactions are anger and contempt for those. Behavioral reaction may be expressed by supporting punishment for those who committed trade-offs. Moral cleansing is an act to express re-affirmation of and loyalty to the sacred values, by, for example, trying to restore the moral order that has been violated by the trade-off.

The model also acknowledges the condition- and domain-specific nature of prohibited value trade-offs. For example, if the concerns based on which value trade-offs are prohibited are addressed, people become more lenient to such value trade-offs.

Protected values are so termed because they are protected against being traded off for any other values. Baron (1997) discussed this value in the context of contingent valuation research, as a possible nuisance for policy makers. For example, if the value of forest preservation is infinite and thus protected against any value trade-offs, we simply cannot cut down trees for whatever reasons. Among other things, protected values are seen as moral obligations, not just personal preferences. They are "seen as universal and independent of what people think" (Baron, 1997, p. 84). As well, people may become angry at the thought of a violation of protected values. Thus, sacred values and protected values share similar properties and are much-related concepts. This type of value expression may be termed as noncompensatory preference expressions, as opposed to exchange preference (Lockwood, 1999). The latter is the case in which individuals can trade-off among alternatives, and the former is the case in which individuals are not willing to make trade-offs between the alternatives, although they can rank order the relative importance between them. Clearly, noncompensatory preference expression

poses a serious threat to contingent valuation method of value measurement usually employed in economics.

Defensiveness

One may resist changing value priorities because one may wish to save face, or because of denial or defensiveness. It is known that people process information in a self-serving manner (i.e., motivated information processing). For instance, female coffee drinkers often criticize and disbelieve a finding that links caffeine to breast cancer compared to female non-coffee drinkers (Kunda, 1987; Liberman & Chaiken, 1992). According to self-affirmation theory (Aronson, Cohen, & Nail, 1999; Steele, 1988), this is because such information threatens one's self-image. Self-image consists of one's values, experiences, and important relationships, and regulates one's motivational and behavioral system (Steele, 1988). Because one desires to maintain a positive, adaptive, capable, and moral self-image, such threatening information will arouse defensiveness. This defensiveness may prompt individuals to process the threatening information in a biased way, in an attempt to restore a positive self-image (Sherman, Nelson, & Steele, 2000).

This defensiveness and systematically biased information processing in a self-serving manner, often studied in the context of encouraging health-related behavior, is very relevant to environmental issues. People often seem to assume that protecting the environment is an inherently good cause; it is altruistic and idealistic. However, doing so often involves giving up a free, easy life style (e.g., reducing car use, water and energy conservation, etc.). Because no one wishes to do so, one is motivated to process threatening information, such as information about global climate change, in a self-

serving manner, which leads one not to believe the credibility of the information. In such a case, even additional information or situational changes may not motivate individuals to change their value priorities.

However, according to self-affirmation theory, this defensiveness can be reduced relatively easily if positive self-image is restored by some other way of boosting self-esteem. For example, expressing one's cherished values merely by writing an essay on them reduced defensiveness and made people more willing to accept threatening information (Sherman et al., 2000).

Use of Heuristics

Another kind of boundary condition may exist when people use some sort of heuristics for all situations, regardless of the differences among them. People are usually considered as "cognitive misers," thus, they may be more inclined to judge every situation more or less in the same way, without paying much attention to the details of a situation. Such use of heuristics is reported in the context of fairness judgment (Peterson, 1994; Syme et al., 1999).

The Present Study

The preceding literature review points out some under-explored issues in terms of the dynamic value priority view: 1) There have been only few studies (e.g., Seligman & Katz, 1996; Seligman, Syme, & Gilchrist, 1994) of the dynamic value priority view specifically in the domain of environmental issues; 2) The dynamics of value priority have not been conceptualized clearly. Most studies have examined the difference in value ratings between pre- and post-interventions; 3) The effects of situational variables have not been systematically investigated at all; 4) The issue of internal value conflict has not been systematically investigated in the domain of environmental issue, unlike in political decision-making; and 5) The relationship between internal value conflict and the effect of situational variables has not been systematically investigated (e.g., Braithwaite, 1998). This investigation attempts to address these five points.

First, the main purpose of the present investigation is to explore the dynamic value priority view in the domain of environmental issues. More specifically, I will investigate the relation between one's value endorsement level and the effects of situational influences in the judgment of value importance across varied situations in a certain environmental issue.

Second, as discussed earlier, I propose a new conceptualization of value priority change; it is an interaction between one's general value endorsement and the effects of situational variables. Focusing on a situation in which two values are in conflict, value priority can be dynamic in that one may endorse value A over value B in one situation, but value B over A in another. This change in the degree of endorsement for one value is presumably brought about directly by situational differences. However, the degree to

which situational differences can influence one's value endorsement in that situation is considered to depend on how much one endorses that particular value in general. This situation can be conceptualized as an interaction between one's general value endorsement and the effect of situational variables. In this view, one's value judgment in one situation can be seen to be influenced by: a) the degree of endorsement to a specific value in general (as an individual difference like personality trait); b) the effect of situational variables; and c) the interactions between them.

Third, to better understand the effects of situational variables, they should be experimentally manipulated to examine their effects systematically. In my study, I will manipulate the situational variables using scenarios.

Finally, I will investigate the effect of internal value conflict and its relation to the susceptibility to the effect of situational change. To the best of my knowledge, this line of study has not been conducted in the domain of environmental psychology. A mixed-model ANOVA with different situations as repeated-measures and a general value endorsement as a between-subject variable enables an examination of the systematic effects of situational variables and their interaction between one's value endorsement in general. This investigation will expand Braithwaite's (1998) investigation in the domain of environmental issues.

Brief Overview of the Research Design (see Method for more detail)

This study employs a mixed-model ANOVA design. Three situational variables described above, self-interest, social norm, and immediacy of environmental damage, with 2 categories each will be manipulated in a scenario to create 2 x 2 x 2 = 8 different situations. Scenarios describe a situation in which two values are in conflict, namely,

protecting the environment and pursuing economic development. Participants are asked to rate, for each situation, the importance of these two values separately. These ratings constitute the situational value ratings, which are repeated-measures. Besides this scenario questionnaire, participants will complete Schwartz Value Survey (1992). Because the Schwartz Value Survey does not include a single value, "pursuing economic development," this item will be added. The ratings for these two values in the Survey are used as general value rating, which is considered to reflect one's pre-existing level of the value endorsement. These value ratings serve as a between-subject variable. According to these value ratings, four groups will be created as described below.

Questions and Hypotheses

This study attempts to address the following questions.

Question 1: Do people change their value importance judgment depending on situational differences?

The first question directly concerns the dynamic value priority view versus stable value priority view. I predict that value importance judgments vary according to situational differences, when situational differences are systematically manipulated. Moreover, the three situational variables are predicted to have different degrees of influence on one's judgment. Considering the strong effect of self-interest in most situations, I predict that self-interest will have the strongest effect among them. In addition, it is expected that the effects of three situational variables interact. For example, the effect of self-interest may be smaller when the environmental damage is immediate. I will explore how they actually interact.

Hypothesis 1:

a) Value importance changes depending on situational differences.

b) Self-interest has the largest effect among the three situational variables.

c) The effects of the three situational variables interact with each other.

Question 2: Do the effects of situational variables vary according to one's general value ratings?

This question is the main interest to my study. I expect pre-existing degree of value endorsement should influence (interact with) the effect of situational variables. The nature of interaction is somewhat exploratory. However, one possibility is that the effect of situational variables becomes smaller as one's value endorsement becomes higher, because one is more likely to be guided by the value rather than the situational differences.

Hypothesis 2:

a) The effects of situational variables vary according to one's general value ratings.

b) The nature of their interaction is such that the effect of situational variable becomes smaller as one's general value endorsement becomes higher.

Question 3: Does taking both of the two values in conflict into account predict better than using a single value?

In order to take both values into account, I will create 4 groups according to general value ratings on the two conflicting values: HH (those who strongly endorse both values); LL (those who do not endorse either value strongly); HL (those who endorse economic development more strongly than protecting the environment); and LH (those

who endorse protecting the environment more strongly than economic development; both the HL and LH groups have clear hierarchy between the two values). Similar to Braithwaite's (1998) reasoning, because these groups are created by taking both of the conflicting values into consideration, this group membership (or value endorsement pattern) may be a better predictor of people's situational value importance judgment than the level of endorsement to only one of the two values. This may be the case especially when a situation involves clear conflict between the two values.

Hypothesis 3: The value endorsement pattern of the two conflicting values (i.e., group membership) is a better predictor than the rating of a single value.

Question 4: Do the effects of situational variables vary depending on the value endorsement pattern?

This question directly addresses what Braithwaite (1998) left out. Because she did not include manipulated situational variables, her investigation into the difference between the HH and LL groups was limited. The design of my study will address this question in a more elaborate manner.

Based on Tetlock et al.'s (1986) reasoning, I predict that when people are pluralistic in their value ratings, and when they endorse the two conflicting values to the same extent, they should experience more internal conflict. Further, because they cannot use their values as their guiding principles, they should pay more attention to the situational differences for the situational judgment of value importance.

However, like Braithwaite (1998), I predict that the HH and LL groups should behave differently. More specifically, the HH group should experience the highest internal conflict, and is likely to engage in more deliberate thinking. On the other hand,

because the LL group members do not endorse either value strongly, they should be most influenced by situational differences, and likely to be directed most by self-interest.

Hypothesis 4:

a) The effects of situational variables vary depending on the value endorsement pattern.

b) Those who do not endorse either value strongly (the LL group) should be most influenced by situational variables among the four groups. Specifically, the effect of self-interest should be strongest for the LL group.

Concerning the effects of situational variables on the HH group, one notices a contradiction. On one hand, it is reasonable to think when we are dealing with only one value, that the effects of situational differences become smaller as one's value endorsement becomes higher. On the other hand, when we consider both of the conflicting values, we may conclude the opposite; following Tetlock et al.'s (1986) reasoning, we would expect that the effects of situational variables should be stronger when one experiences high internal conflict, as in the HH group, in that they are likely to engage in more deliberate thinking. Which would be true?

However, deliberate thinking, or more complex information processing, does not necessarily mean only paying more attention to the situational differences. As well, even in the HH group, not all of them will have exactly the same importance rating for both values. The existing literature reviewed above does not offer a clear answer to this question, and the effects of situational influence on the HH group on their importance judgment is explored in this study.

CHAPTER II

STUDY 1

Method

Sample and Procedures

Eight hundred questionnaires were hand delivered to randomly selected houses in Victoria, British Columbia. After one week, a reminder was sent out to encourage participation. Among the 225 questionnaires returned (return rate 28.13%), 14 were omitted due to missing items, resulting in 211 usable questionnaires.

The mean age of the participants was 50.78, ranging from 18 to 92, with 55.9% female. The annual income of the participants ranged from $1200 to $300,000, with a mean of $68,634. Thirty five percent completed high school only, 51% bachelor's degrees, and 14% more advanced degrees. According to 2001 census information, the median age of the population in Greater Victoria (mean age not reported) is 41 with 52.4% female and average income of $42,121. Thus this sample was slightly older with a little higher range of income. Nonetheless, it covers a wide range of age and income groups in the community as a whole.

Design

This study employed a repeated-measures experimental design using scenarios. Three within-individual variables, each with two categories, were manipulated in the scenarios, creating 2 (Self interest: for mining development versus for protecting the environment) x 2 (Social norm: for mining development versus protecting the environment) x 2 (Immediacy of the impact: immediate economic gain and gradual environmental damage versus gradual economic gain and immediate environmental

damage), thus, eight different combinations. The order of presenting the eight scenarios was counter-balanced.

Besides these repeated-measures, general value ratings (on protecting the environment and pursuing economic development) as between-subject variables were also measured before the within-subject variables, using the Schwartz Value Survey described below. The main interest was the interaction between the between-subject and within-subject variables.

Materials

Schwartz Value Survey. A questionnaire consisted of three parts. The first part was the Schwartz Value Survey (1992) to measure general value importance ratings. The original Schwartz's value survey lists 56 single values, each followed by a short explanatory phrase. Among the 56 values, some are particularly of interest to this study, because they are considered to be associated more with either pro-environmentalism or anti-environmentalism. For example, protecting the environment, unity with nature, and a world of beauty, are typically considered to be on the pro-environmental side. For the values on anti-environmental side, social power, wealth, pleasure, and enjoying life, can be considered. In Study 1, values that are considered to be irrelevant to the subject issue were not included (e.g., honest, clean) to make the questionnaire short, resulting in 27 values. Besides these 27 values from the original Schwartz Value Survey, one item, "pursuing economic development" was added to create a value that is most closely relevant to the context of the scenario. The response format, following the original Schwartz survey, was a 9-point, Likert-type scale, ranging from –1 (opposed to my value), to 0 (not important), to 7 (of supreme importance).

Other part of the questionnaires. The second part of the questionnaire was filler items (18 items) so that the general value ratings in the first part would not directly influence the responses for scenario questions that followed in the third part. Questions about each scenario are discussed in the next section.

Scenarios

Environmental issue. The scenarios described were created to reflect a situation that people might actually encounter in their real lives, so that the situations described in the scenarios would be relevant to community residents' lives. In Study 1, an actual on-going debate over the Lillooet Land Use Plan was used without mentioning that it was about Lillooet. The Lillooet area, 80 km north of Whistler, has been a provincial park, but recently a mining association in British Columbia began to pressure BC government to open the provincial park for mining exploration. The BC Environmental Network launched a campaign against the move, calling for cooperation from general public. The scenario described a situation in which community residents were asked to write a letter to an MP to voice his/her opinion. (See Appendix I for the actual scenarios used.)

Conflicting values. The scenarios were meant to describe a situation in which two values are in conflict with each other. Within environmental issues, the most common conflicting values usually are between the value placed on material or economic gain versus that placed on protecting the environment (e.g., Kemmelmerier, Krol, & Kim, 2002). Conflicting values are most likely to vary according to each specific environmental issue, although the conflict between economic gain and protecting the environment almost always underlies environmental issues. The two conflicting values in this scenario were protecting the environment and pursuing economic gain. To make

certain that the two conflicting values were actually perceived as conflicting, the scenario was pre-tested. Thirty-five students in a third-year psychology course were asked to read the scenario and answer the question, "In this situation, two values, protecting the environment and pursuing economic gain, are implied. Do you think they are in conflict?" All the participants except for one answered "yes" to this question.

Dependent measure for the scenarios. Participants were asked to rate the importance of each of the two values described above separately, after reading each manipulated situation presented by a scenario, using a response format, 1 "Not important at all as the guiding principle for this decision" to 10 "Very important." This dependent measure will be referred to as "situational value judgment" henceforth to distinguish it from general value ratings.

Analyses

First, a mixed-model ANOVA was used for the analysis of within- and between-individual variabilities in the dependent variables. The dependent variables are the values of importance rating on the value "protecting the environment" and "pursuing economic gain." The three situational within-subject variables were manipulated. These were categorical variables with two-levels each, whereas general value was a non-manipulated, continuous between-subject variable. (Note that this analysis employs in fact a general linear model rather than a conventional mixed-ANOVA, because the between-subject variable is continuous, not categorical.)

Second, participants were categorized using median-splits into 4 groups according to their general value ratings of the two values: 1. those who rated both values high (HH); 2. those who rated economic development high and protecting the environment low (HL:

"economic development" oriented); 3. those who rated economic development low and protecting the environment high (LH: "protecting the environment" oriented); and 4. those who rated both values low (LL). Then, mixed-model ANOVA was performed again using this value endorsement pattern as a between-subject variable. (This categorization of participants into HH, HL, LH, and LL groups will be referred to as "value endorsement pattern" henceforth.)

In order to examine the possibility that females may be more influenced by situational or contextual differences because of their care-oriented reasoning (e.g., Gilligan, 1982), gender was also included as a between-subject variable in the above analyses.

Third, and more exploratory in nature, the standard deviation of the repeated-measures for each person, separately for each value rating, was calculated. Standard deviations of repeated-measures are often used in developmental psychology as a measure of fluctuation or "inconsistency" across situations (cf. Hultsch, MacDonald, Hunter, Levy-Bencheton, & Strauss, 2000). The larger the value, the more "inconsistent" that person is. This measure is used as another way of examining the situational variations. A one-way ANOVA on this standard deviation was performed using value endorsement pattern (the HH, HL, LH, and LL group membership) as a between-subject variable to examine whether the inconsistency assessed by this standard deviation is different across groups.

Results and Discussion

This section describes the statistical analyses performed on the data obtained from Study 1 questionnaires, combined with summary and interpretation of the results of the analyses. Before the analysis of interest, importance ratings of the Schwartz Value Survey were summarized. Then three different analyses were employed on situational value judgments. First, a mixed-model ANOVA using general rating of a single value as a between-subject variable was conducted. (This value endorsement rating obtained from the Schwartz Value Survey for protecting the environment and pursuing economic gain will be called "general value rating" henceforth.) Second, another mixed-model ANOVA was performed, using the value endorsement pattern (groups created by two general value ratings, with the rating for pursuing economic development first: HH, HL, LH, and LL.) as a between-subject variable. In both mixed-ANOVA analyses, gender difference was also included as a between-subject variable to control for the possible effect. Third, a one-way ANOVA on the standard deviation across situations was conducted using the value endorsement pattern as a between-subject variable.

Schwartz Value Survey

Table 1 lists all the 27 values measured in Study 1 with mean ratings and standard deviations. Among them, the value "responsibility" received the highest importance rating ($M = 6.24$, $SD = .99$) and "social power" the lowest ($M = 1.16$, $SD = 2.05$). The rating for protecting the environment was fifth among the 27 values included ($M = 6.07$, $SD = 1.13$) and that for pursuing economic development was 20th ($M = 4.77$, $SD = 1.77$).

Table 1

Descriptive Statistics for Values in Study 1.

	N	Mean	S.D.	Min.	Max.
Responsible	208	6.24	0.99	0	7
Inner harmony	211	6.15	1.12	1	7
Peace	211	6.14	1.17	2	7
Freedom	211	6.10	1.09	1	7
Protect the environment	208	6.07	1.13	2	7
Equality	211	6.06	1.28	1	7
True friendship	210	5.97	1.39	-1	7
Justice	209	5.88	1.37	1	7
Broad-minded	210	5.82	1.33	1	7
Wisdom	211	5.75	1.19	1	7
Enjoyable life	210	5.57	1.44	0	7
Sense of belonging	211	5.45	1.47	0	7
A world of beauty	209	5.42	1.41	2	7
Social order	209	5.39	1.61	-1	7
Ambitious	209	5.15	1.49	0	7
Unity with nature	211	5.13	1.61	0	7
Self-discipline	210	5.11	1.47	-1	7
National security	210	5.11	2.05	-1	7
Obedient	210	4.91	1.66	-1	7
Pursuing economic development	209	4.77	1.77	-1	7
Exciting life	211	4.73	1.53	-1	7
Reciprocating favors	210	4.68	1.89	-1	7
Social recognition	211	4.66	1.57	0	7
Pleasure	211	4.34	1.59	-1	7
Wealth	210	3.70	1.69	-1	7
Preserving my public image	207	3.45	1.85	-1	7
Authority	211	3.29	2.03	-1	7
Social power	209	1.16	2.05	-1	7

For the value types of interest, Power (5 single values) and Universalism (9 single values), reliability coefficients were calculated to determine whether those sets of values actually create coherent groups as Schwartz's theory states (1992). Cronbach's alpha for the value type Power and Universalism was .72 and .84 respectively, both of which are reasonably high. The correlation between value type Power and Universalism was -.04.

Descriptive Statistics of the Dependent Variables

Table 2 lists the means and standard deviations for each situational value judgment for both values. The importance judgments of economic development were more widely distributed than those of protecting the environment, and the distribution of the latter was negatively skewed, reflecting the fact that most people judged the value highly important across situations.

Mixed-model ANOVA Analysis

First, a mixed-model ANOVA was conducted with 3 within-subject variables (the effect of self-interest: for mining development versus against the development, social norm: for mining development versus against the development, and immediacy of the impact: immediate economic gain and gradual environmental damage versus immediate environmental damage and gradual economic gain) and 2 between-subject variables (general value rating and gender) on situational value ratings for each value separately.

Situational value judgments of economic development as a dependent variable. Three significant main effects were found: self-interest ($F(1, 201) = 39.74, p < .001, \eta^2 = .17$), social norm ($F(1, 201) = 4.83, p < .05, \eta^2 = .02$), and immediacy of impact ($F(1, 201) = 56.70, p < .001, \eta^2 = .22$). These significant main effects of situational variables

Table 2

Descriptive Statistics for Dependent Variables (Situational Importance Judgments)

For the situational importance judgment of pursuing economic gain

Variables	N	Mean	S.D.	Range	Min.	Max.
SI hi, SN hi, Im hi	211	5.65	2.62	9	1	10
SI hi, SN hi, Im low	211	5.11	2.54	9	1	10
SI hi, SN low, Im hi	211	5.55	2.57	9	1	10
SI hi, SN low, Im low	211	5.07	2.54	9	1	10
SI low, SN hi, Im hi	210	5.28	2.43	9	1	10
SI low, SN hi, Im low	210	4.70	2.47	9	1	10
SI low, SN low, Im hi	211	5.18	2.49	9	1	10
SI low, SN low, Im low	211	4.59	2.48	9	1	10

For the situational importance judgment of protecting the environment

Variables	N	Mean	S.D.	Range	Min.	Max.
SI hi, SN hi, Im hi	211	7.95	2.08	9	1	10
SI hi, SN hi, Im low	211	8.25	1.89	7	3	10
SI hi, SN low, Im hi	211	8.06	1.98	8	2	10
SI hi, SN low, Im low	211	8.30	1.85	9	1	10
SI low, SN hi, Im hi	211	8.18	1.85	8	2	10
SI low, SN hi, Im low	210	8.56	1.66	7	3	10
SI low, SN low, Im hi	211	8.24	1.85	7	3	10
SI low, SN low, Im low	211	8.60	1.61	6	4	10

Notes. SI = self-interest, SN = social norm, Im = immediacy of impact. "High" indicates favoring economic gain, "low" indicates favoring preserving the wilderness.

basically confirm the effects of the manipulation. When self-interest is for mining development, the importance rating of economic development is higher ($M = 5.38$) than when self-interest is for protecting the environment ($M = 4.97$). When the social norm is for mining development, the rating is higher ($M = 5.21$) than when not ($M = 5.13$). When economic profit is immediately available, the rating is higher ($M = 5.44$) than when not ($M = 4.90$).

The general value rating of economic development as a between-subject variable was also significant ($F(1, 201) = 27.16, p < .001, \eta^2 = .12$), although gender was not. One marginally significant two-way interaction between self-interest and general value rating of economic development was found ($F(1, 201) = 3.48, p = .063, \eta^2 = .02$), in that the effect of self-interest was larger when the value rating was in the middle range. When the general value rating was high, there was no effect of that variable.

Situational value judgments of protecting the environment as a dependent variable. Two significant main effects were found: self-interest ($F(1, 201) = 16.21, p < .001, \eta^2 = .08$), and immediacy of impact ($F(1, 201) = 38.54, p < .001, \eta^2 = .16$). Again, the direction of effects were as expected by the manipulation. When self-interest is for protecting the environment, the importance rating of protecting the environment is higher ($M = 8.41$) than when not ($M = 8.16$). When environmental damage is immediate, the rating is higher ($M = 8.44$) than when not ($M = 8.14$).

The general value rating of protecting the environment was significant as a between-subject variable ($F(1, 201) = 73.34, p < .001, \eta^2 = .27$). Gender was also a significant predictor, $F(1, 201) = 13.43, p < .001, \eta^2 = .06$, in that females tended to rate the value higher ($M = 8.58$) than males ($M = 7.86$) across situations. Gender difference

moderated the effect of one situational variable, social norm, ($F(1, 201) = 5.63, p < .05$, $\eta^2 = .03$); females rated higher on the value when their significant others supported protecting the environment, but this difference was not seen for males (see Figure 2).

There were also two significant two-way interactions between situational variables and general value rating: immediacy of impact x general value rating of protecting the environment ($F(1, 201) = 6.06, p < .05, \eta^2 = .03$), and self interest x protecting the environment rating ($F(1, 201) = 11.34, p < .001, \eta^2 = .05$). In both cases, the general tendency is that the effect of situational variable becomes smaller as the general rating becomes higher than 4 (see Figures 3a and 3b). In this particular sample, because the number of people who rated the value as 2 or 3 was small, the marginal means for the ratings did not seem to reflect the true marginal means.

Summary and Interpretation for the Mixed-model ANOVA Analysis with a Single Value

The results of mixed-model ANOVA demonstrated the following. First, the main effects of situational variables confirm the effects of manipulation. Thus, as hypothesized, when situational variables are systematically varied, one's judgment of value importance can change accordingly. However, although hypothesized, interactions among the three situational variables were not observed.

Among the three situational variables, the effect of social norm was the weakest, and was not significant for the situational ratings of protecting the environment. Unexpectedly, the effect of immediacy of impact, and not that of self-interest, was the strongest for both situational value judgments, but in the opposite way. For the situational value judgments of economic development, the ratings were highest when the economic

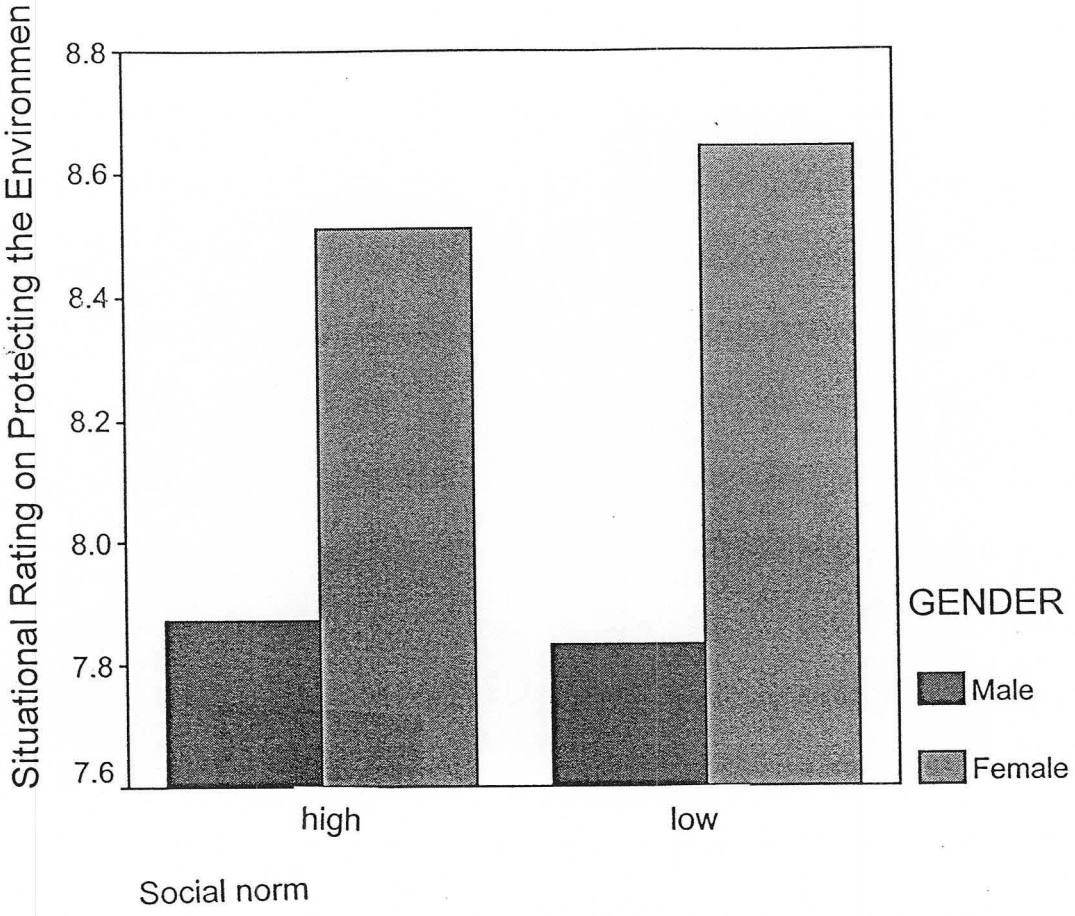

Figure 2

Interaction plot between social norm and gender on the general rating of protecting the environment. Social norm high: significant others support mining development; Social norm low: they support protecting the environment.

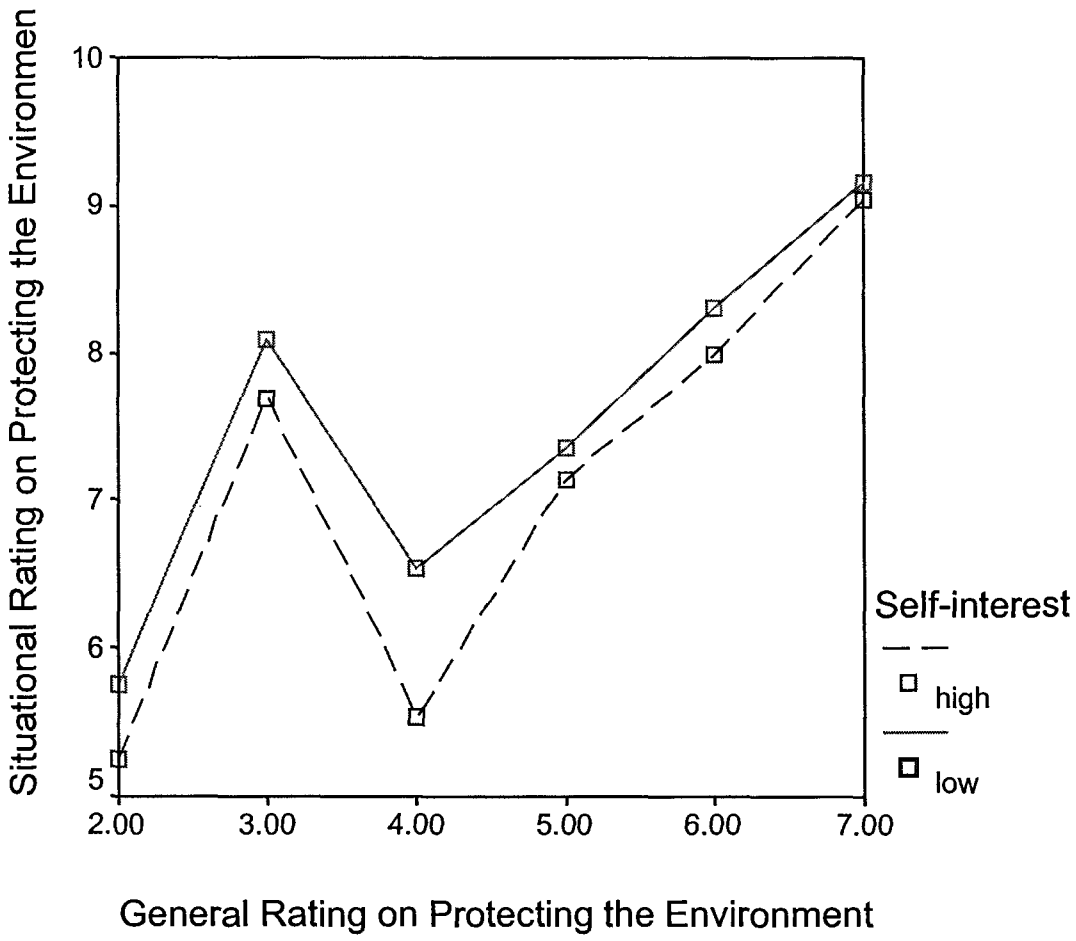

Figure 3 a.

Interaction plot between general value ratings of protecting the environment and self-interest. Self-interest high: self-interest for mining development; Self-interest low: self-interest for preserving the wilderness as a park.

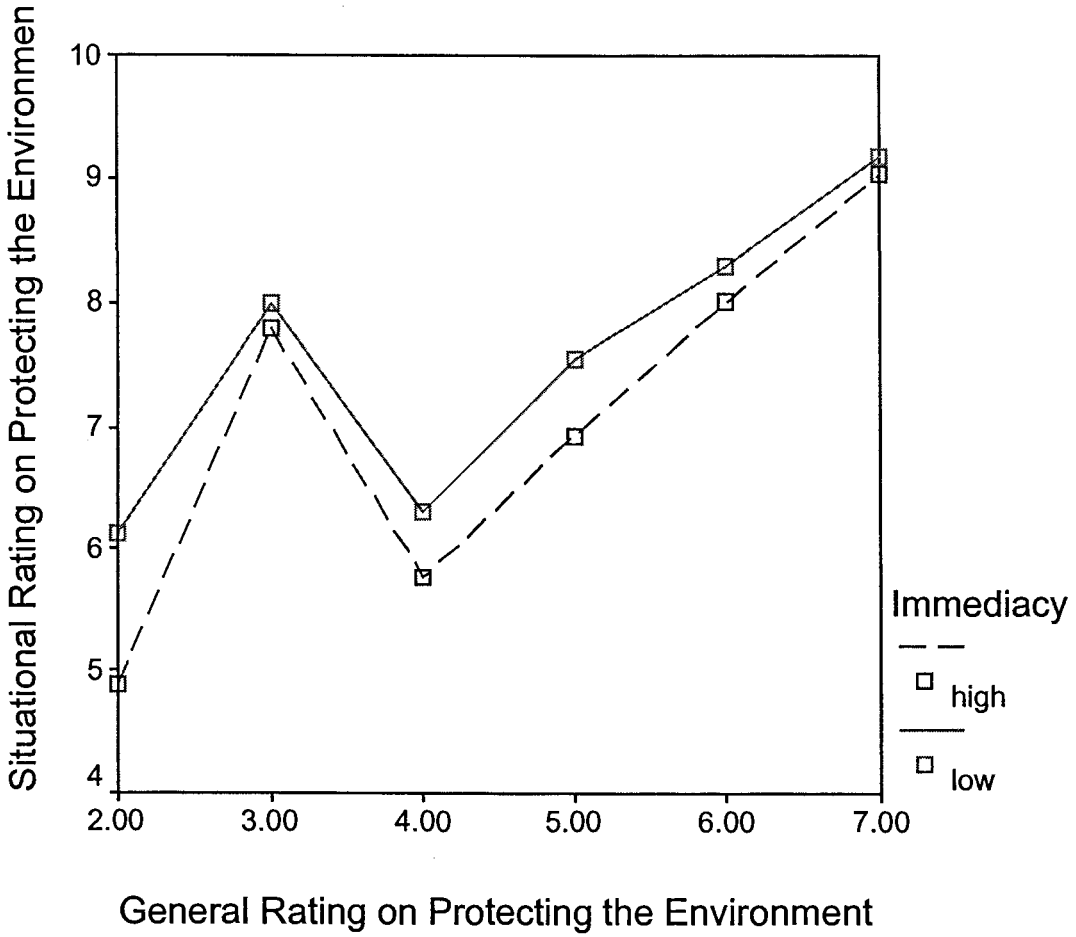

Figure 3 b.

Interaction plot between general value ratings of protecting the environment and immediacy of environmental damage. Immediacy high: immediate economic gain and gradual environmental damage; Immediacy low: gradual economic gain and immediate environmental damage.

gain is immediate, whereas for those of protecting the environment, they were highest when the environmental damage is immediate. Especially for the situational value importance judgments of economic development, whether or not economic gain was obtained immediately had the strongest effect, followed by the effect of self-interest.

Second, as hypothesized, general value ratings do guide participants' judgment on situational value importance. Both general value ratings were significant predictors of situational value judgments. It is of note that the effect size of the general value rating, economic development, was much smaller than that for protecting the environment in predicting the situational value judgments. This suggests that situational value judgments on economic development are not as strongly guided by the value as the situational value judgments on protecting the environment. This is also evident in that there was only one significant interaction between situational variables and general value rating for economic development, whereas there were two for protecting the environment.

Third, also as hypothesized, there were significant interactions between situational variables and general value ratings, which was the main interest of this analysis. As expected, for the situational ratings of economic development, the effect of self-interest varied depending on the general value rating of economic development in that the effect of the variable became smaller as the general rating of the value became higher.

For the situational value judgments of protecting the environment, both effects of self-interest and immediacy of environmental damage varied depending on the general value rating of protecting the environment. For both cases, when the general rating is

high, the situational variables did not have much effect on situational importance ratings (i.e., situational difference did not matter very much).

Median-split Grouping of Participants

Similar to the situational value judgment of the values, the general rating for economic development had a wider range and more normal distribution. The general rating for protecting the environment was negatively skewed, indicating that most people tended to rate the value high. The median values were 5 and 6 for economic development and protecting the environment respectively. Table 3 displays the frequencies for the median-split groups. The LL group had the largest size, but overall, they are relatively evenly distributed. This median-split grouping represents value endorsement pattern.

In order to examine the gender distribution among these four groups, chi-square test of independence was also performed. The result indicated that in the HH group, there were more females, and in the HL group, there were more males than expected, χ^2 (3, N = 203) = 7.78, $p < .05$.

Mixed-model ANOVA Using Value Endorsement Pattern as a Between-subject Variable

A mixed-model ANOVA using this median-split grouping (value endorsement pattern) as a between-subject variable was conducted, controlling for the gender difference. For both situational ratings on economic development and protecting the environment, value endorsement pattern was a significant between-subject variable: $F(3, 197) = 20.19, p < .001, \eta^2 = .24$, for the ratings of economic development and $F(3, 198) = 17.95, p < .001, \eta^2 = .21$, for those of protecting the environment. Gender difference was also a significant between-subject predictor for the situational value judgments of

Table 3

Median-split Grouping

		Frequency	Percent	Valid Percent	Cumulative Percent
Group	1	42	19.7	20.3	20.3
	2	76	35.7	36.7	57
	3	32	15	15.5	72.5
	4	57	26.8	27.5	100
	Total	207	97.2	100	
	Missing	6	2.8		
	Total	213	100		

Note. 1: HH group (those who endorse both values strongly); 2: LL group (those who do not endorse either value strongly); 3: HL group (those who endorse pursuing economic gain more strongly than protecting the environment); 4: LH group (those who endorse protecting the environment more strongly than pursuing economic gain).

protecting the environment, $F(1, 198) = 14.09, p < .001, \eta^2 = .07$. The effect of gender was exactly the same as in the previous mixed-model ANOVA.

For the situational ratings of economic development, the rating was highest for HL group (6.70), followed by LL (5.73), HH (5.23), and LH (3.57) groups. Thus, when participants had a clear hierarchy between the two values, the rating became either highest or lowest, reflecting their value hierarchy. A post-hoc probe using Tukey's HSD at family-wise error rate of .05 was conducted to examine further how ratings were different among the groups. HL rated higher than HH and LH groups. LL group rated higher than LH group. HH group rated higher than LH group, but there was no significant differences between HH and LL ratings.

For the situational ratings of protecting the environment, the rating was highest again for LH group (those who rated economic development low but protecting the environment high; 9.18), followed by HH (8.99), LL (7.57), and HL (7.43) groups. Thus, the similar ordering was obtained in that ratings by those with clear hierarchy were either highest or lowest. The same post-hoc probe revealed that LH group rated significantly higher than LL and HL groups, and HH group rated higher than LL and HL groups. There was no significant difference between HH and LL ratings for economic development, but the difference was significant for protecting the environment.

Concerning the situational variables, the result of this mixed-model ANOVA was basically the same as when the general value ratings were used for a between-subject variable. However, overall, there were more significant interactions between situational variables and value endorsement pattern. This may partly be because the general value ratings are continuous and value endorsement pattern is a categorical variable. However,

with value endorsement pattern it is easier to interpret the nature of interaction. These results are summarized below.

Situational value judgments of economic development as a dependent variable. All three main effects of situational variables were significant: self-interest, $F(1, 197) = 29.42, p < .001, \eta^2 = .13$; social norm, $F(1, 197) = 4.14, p = .052, \eta^2 = .02$; and immediacy of impact, $F(1, 197) = 57.33, p < .001, \eta^2 = .23$. Again, whether or not economic gain is obtained immediately had the strongest effect, followed by self-interest and social norm. The directions of the main effects are the same as in the mixed-model ANOVA described above.

However, the effects of self-interest and immediacy of impact were qualified by value endorsement pattern: $F(3, 197) = 3.43, p < .05, \eta^2 = .05$; and $F(3, 197) = 2.98, p < .05, \eta^2 = .04$, respectively. The effect of self-interest was the strongest for those who rated both values low. Also, whether or not economic gain is immediately obtained had the strongest effect on the HL group (those who endorsed economic development high but protecting the environment low) (see Figures 4a and 4b).

There was also one 3-way interaction among self-interest, immediacy of impact, and value endorsement pattern, $F(3, 197) = 4.12, p < .01, \eta^2 = .07$. When economic gain is immediate, self-interest did not have much effect on the situational importance ratings of economic development for the HH and LH groups. In other words, those who rated protecting the environment strongly regardless of the rating of economic development were not influenced by self-interest further when economic gain was immediate. The HL and LL groups were still influenced by self-interest when economic gain was immediate.

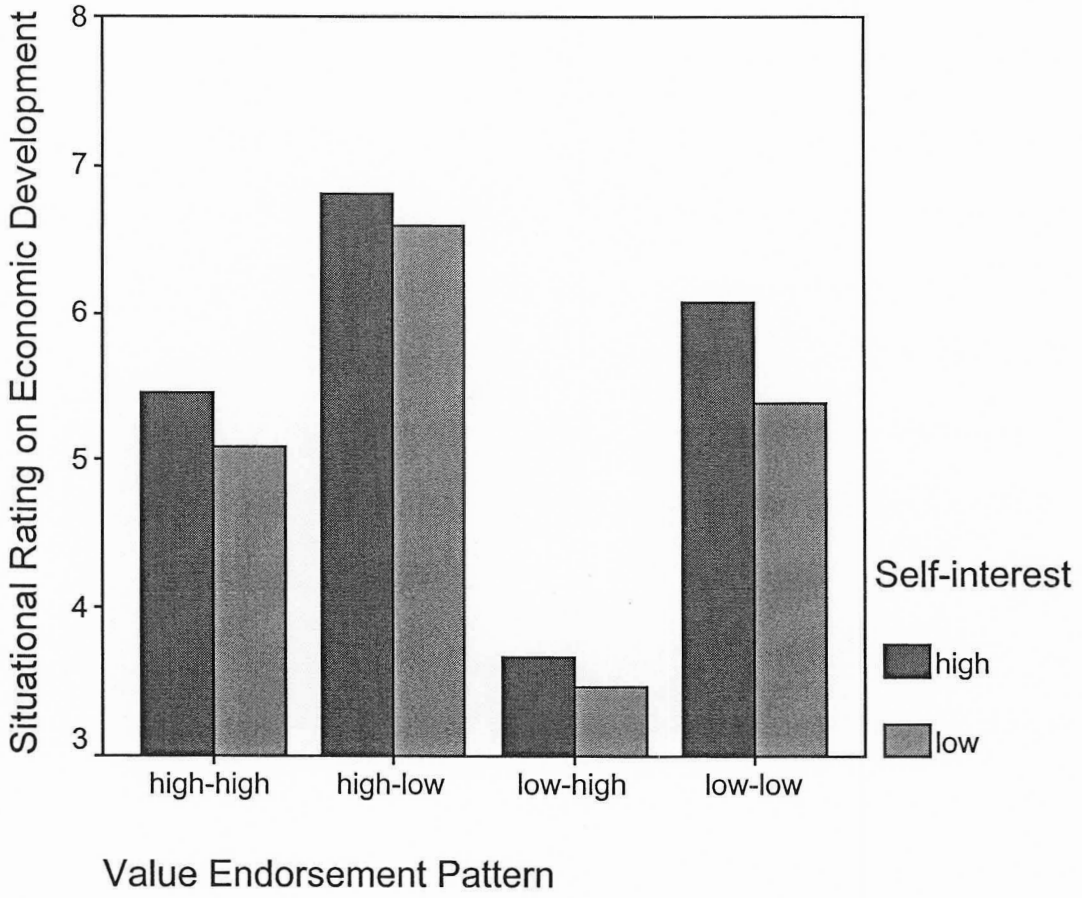

Figure 4 a.

Interaction plot between value endorsement pattern and the effect of self-interest. Self-interest high: self-interest for mining development; Self-interest low: self-interest for preserving the wilderness for a park. Value endorsement pattern is expressed as (general value rating of economic development)-(general value rating of protecting the environment).

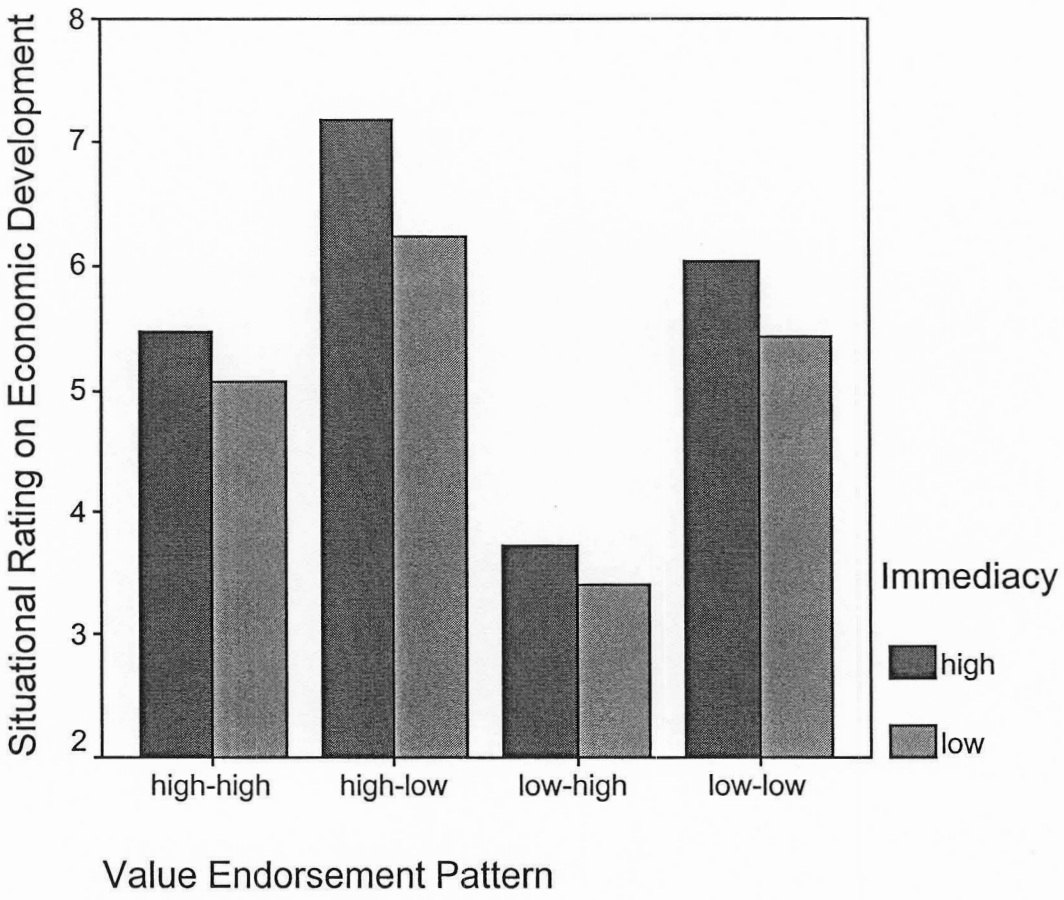

Figure 4 b.

Interaction plot between value endorsement pattern and immediacy of environmental damage. Immediacy high: immediate economic gain and gradual environmental damage; Immediacy low: gradual economic gain and immediate environmental damage. Value endorsement pattern is expressed as (general value rating of economic development)-(general value rating of protecting the environment).

On the other hand, when economic gain was obtained only gradually, self-interest did not influence the HL group, although it influenced the HH, LL, and LH groups (see Figure 5). For the HL group (those who endorse economic development high, but protecting the environment low), the strong effect of immediate economic gain is obvious.

Situational value judgments of protecting the environment as a dependent variable. The main effect of self-interest, $F(1, 198) = 12.37, p < .001, \eta^2 = .06$, and immediacy of impact, $F(1, 198) = 33.24, p < .001, \eta^2 = .14$, were significant. The main effect of social norm again was not significant, but it was qualified by the value endorsement pattern, $F(3, 198) = 3.45, p < .05, \eta^2 = .05$. Both significant main effects were also qualified by value endorsement pattern; $F(3, 198) = 2.54, p = .058, \eta^2 = .036$, for self-interest; and $F(3, 198) = 2.76, p < .05, \eta^2 = .04$, for immediacy of impact. Both self-interest and social norm were influential only for LL group, but not for other three groups. The immediacy of economic gain had more influence on the HL and LL groups compared to the HH and LH groups (see Figures 6-8).

Summary and Interpretation for the Mixed-Model ANOVA using Value Endorsement Pattern

As hypothesized, the fourfold value endorsement patterns that took both values into consideration was a significant predictor of situational value importance judgment. However, contrary to what was expected, value endorsement pattern was not always a better predictor than the general value rating for a single value. The effect size for value endorsement pattern was much larger for the ratings of economic development compared to the effect size of the general value rating of economic development only. On the other

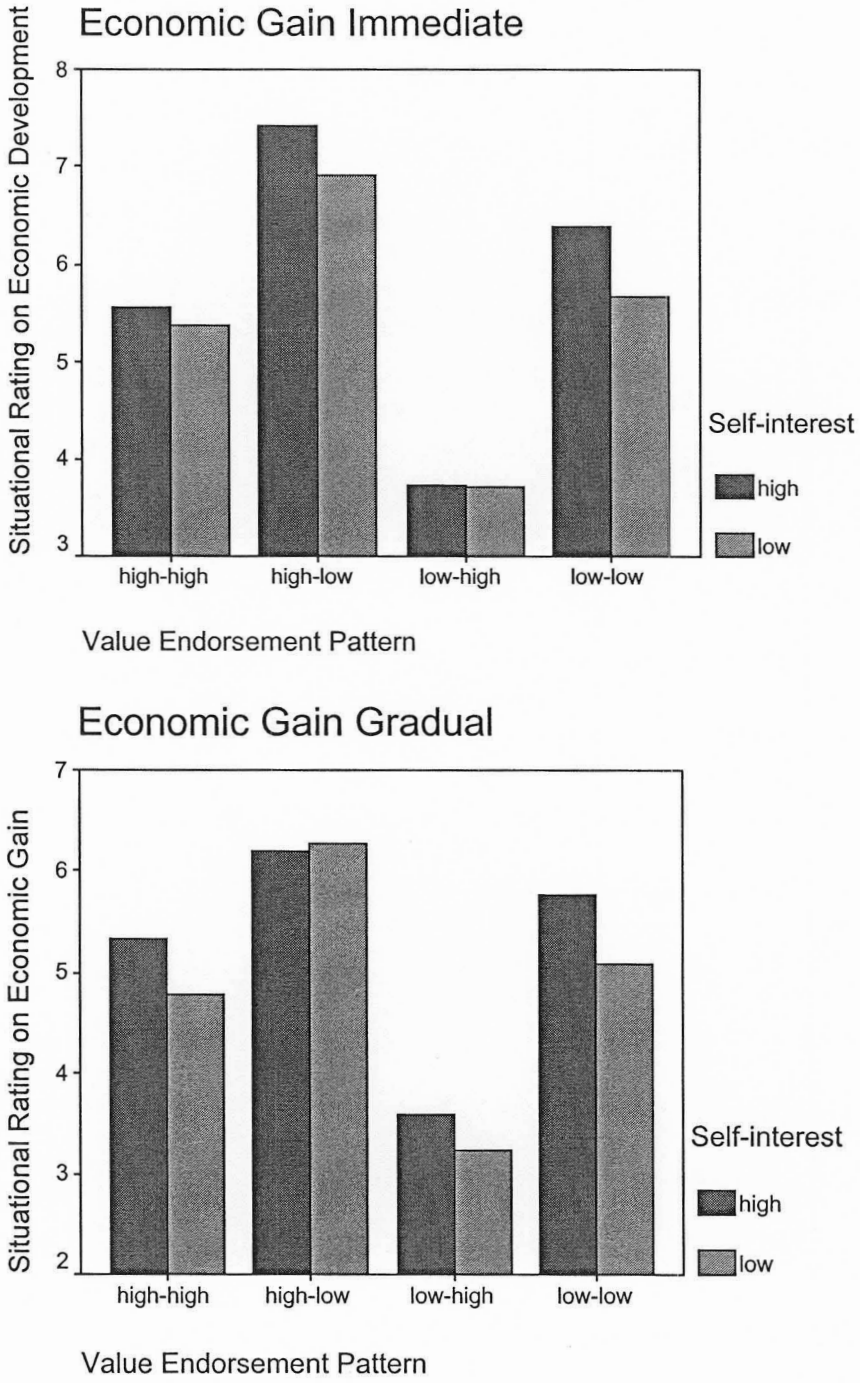

Figure 5.

3-way interaction plot between self-interest, immediacy of impact, and value endorsement pattern. Self-interest high: for mining development; Self-interest low: for preserving the wilderness for a park. Value endorsement pattern is expressed as (general value rating of economic development)-(general value rating of protecting the environment).

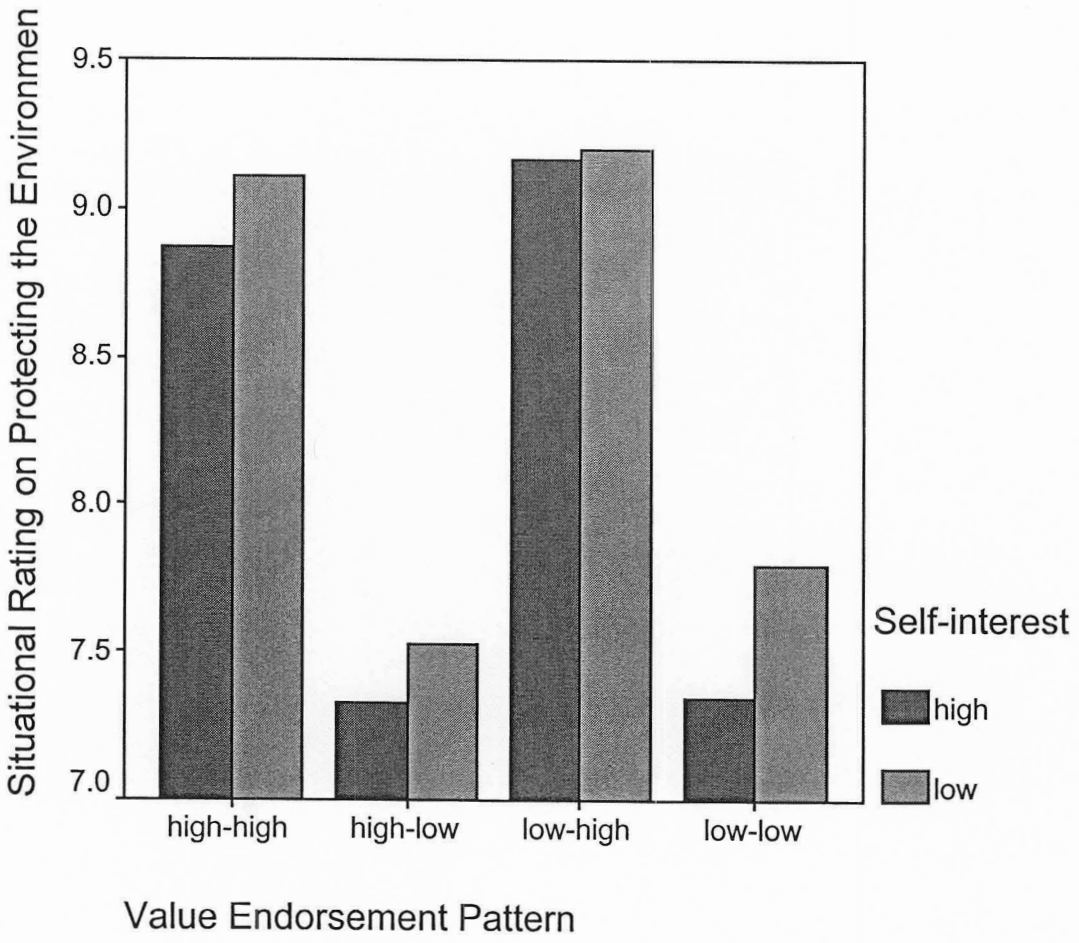

Figure 6

Interaction plot between self-interest and value endorsement pattern. Self-interest high: self-interest for mining; Self-interest low: self-interest for preserving the wilderness for park. Value endorsement pattern is expressed as (general value rating of economic development)-(general value rating of protecting the environment).

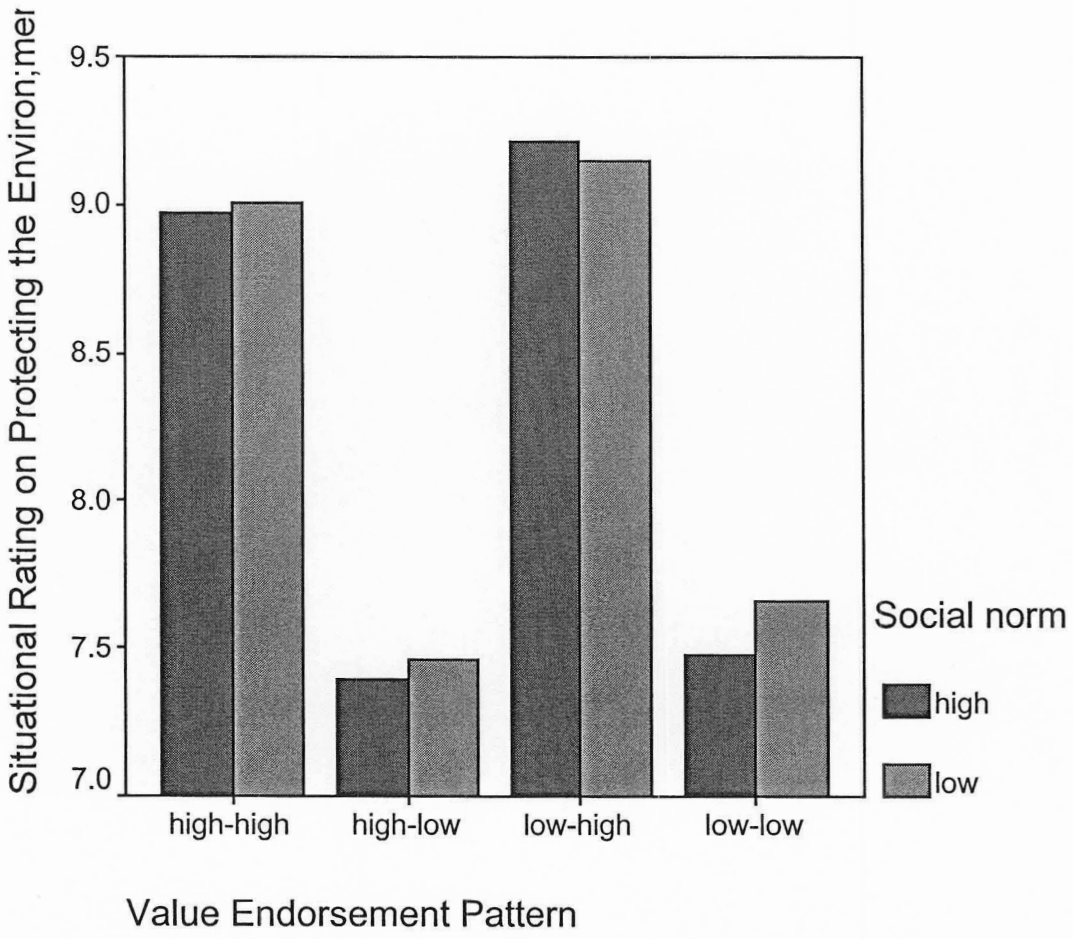

Figure 7

Interaction plot between social norm and value endorsement pattern. Social norm high: significant others support for mining development; Social norm low: they support for preserving the wilderness. Value endorsement pattern is expressed as (general value rating of economic development)-(general value rating of protecting the environment).

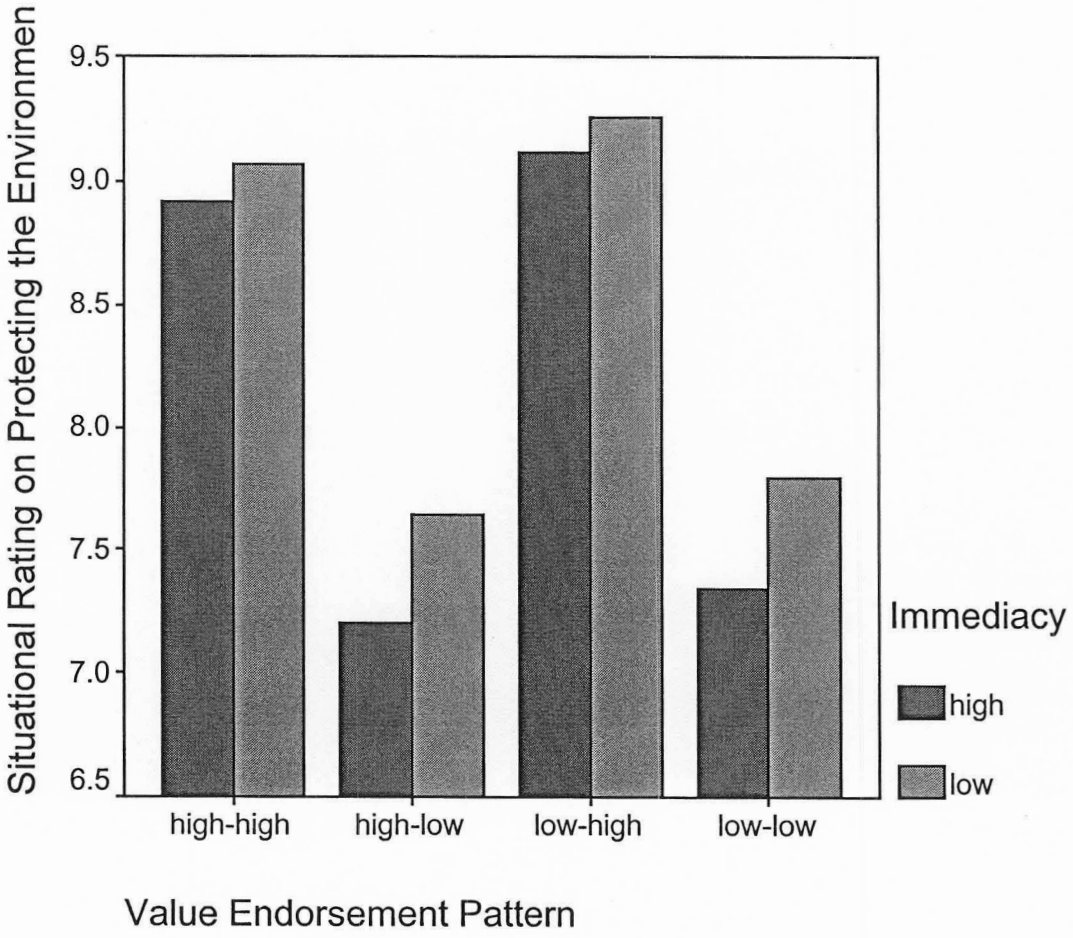

Figure 8

Interaction plot between immediacy of impact and value endorsement pattern. Immediacy high: immediate economic gain and gradual environmental damage; Immediacy low: gradual economic gain and immediate environmental damage. Value endorsement pattern is expressed as (general value rating of economic development)-(general value rating of protecting the environment).

hand, when predicting situational value judgments for protecting the environment, the effect size of value endorsement pattern was smaller than the effect size of the general value rating of protecting the environment only. Thus, for the situational ratings of economic development, this value endorsement pattern performed better as a predictor, whereas for the situational ratings of protecting the environment, the general value rating of that single value was a better predictor. This suggests that situational value judgment for protecting the environment is more strongly guided by that value only.

Moreover, value endorsement pattern interacted with the effects of the situational variables as hypothesized; the LL group was most influenced by self-interest for both situational value importance judgments. For the situational value judgment of protecting the environment, the effect of social norm also varied depending on value endorsement pattern in that only the LL group was influenced by it. These findings confirm the hypothesis that the LL group should be most influenced by the situational differences.

On the other hand, there were two unexpected findings. First, the HL group was also strongly influenced by a situational variable, immediacy of economic gain. This is understandable, although it was not hypothesized. Those who would rate economic development as highly important might do so because they place most importance on (or they are very influenced by) immediate economic gain.

Second, the HH group was not as influenced by the situational variables as might be expected from Tetlock et al.'s (1986) reasoning. When the general rating of protecting the environment is high, that high endorsement of protecting the environment seems to dominate their situational value judgments, regardless of the general rating of economic development.

Analysis of Situational Rating Fluctuations (Inconsistency) Across Situations

Next, to further explore the nature of fluctuation in the situational ratings and its relation to one's general value ratings, I calculated standard deviations across 8 different situational ratings for each individual. They were calculated separately for the two situational value importance judgments (i.e., for the protecting the environment and pursuing economic gain). The standard deviation becomes a new variable that represents the individual differences in the degree of fluctuation across different situations. The following analysis is exploratory in nature.

One-way ANOVA using value endorsement pattern as a between-subject variable. A one-way ANOVA was conducted on the standard deviation using value endorsement pattern as a between-subject variable. For the standard deviation calculated for the situational value importance judgments of economic development, value endorsement pattern was not a significant predictor, $F(3, 203) = 2.33, p > .05$. For those of protecting the environment, it was a significant predictor, $F(3, 203) = 4.92, p < .01, \eta^2 = .07$. The marginal mean values of the standard deviation was the highest for the HL group ($M = .75$), followed by the LL group ($M = .64$), the HH group ($M = .40$), and the LH group ($M = .29$). A post-hoc probe of group difference in the value of standard deviation, using Tukey's HSD with family-wise error rate of .05, showed that the HL and LL groups fluctuated significantly more than the LH group. Other differences were not statistically significant.

Summary and Interpretation of the Analysis of Fluctuation (Inconsistency)

The result of a one-way ANOVA showed the expected tendency: LL group members fluctuated more across situations, whereas LH group members (those who clearly support protecting the environment more) fluctuated less.

Interestingly, HL group members (those who endorse economic development more) also fluctuated more across situations than LH group members. On the other hand, HH group members did not fluctuate as much as LL group members, although the difference was not statistically significant. This corroborates the finding of mixed-model ANOVA analysis above that HH group members are not influenced by situational differences as expected. Rather, they seemed to be guided more on their high value endorsement level.

CHAPTER III

STUDY 2

Study 1 results confirmed most of its hypotheses. Nonetheless, in order to replicate the findings and to address some of the issues identified in Study 1, a second study was conducted. More specifically, below is the list of the findings to be replicated.

First, concerning the effects and strength of the situational variables, there was no effect of social norm on the situational value judgment of protecting the environment. Does this hold when a situation changes? Also, can the order of strength of other situational variables be replicated? Moreover, contrary to expectation, there were no interactions among the situational variables. Do these findings replicate for other environmental issues?

Second, as hypothesized, the nature of interaction between the effects of situational variables and general value rating was such that their effects become smaller as one's general value ratings become higher. Does this finding replicate?

Third, in terms of the effect of general value ratings to guide situational value judgments, those of protecting the environment was much more strongly affected by the corresponding general value endorsement level than those of economic development. This implies that the situational value judgment for pursuing economic development may not be influenced very much by the general rating of that value. Does this finding replicate?

Fourth, the value endorsement pattern created from the two general value ratings was not necessarily a better predictor for the situational value judgment than the level of endorsement of a single value; it was better for the importance judgment of economic

development, but it was not for that of protecting the environment. Does this finding replicate? In terms of the effects of situational variables on value endorsement pattern, the LL group (those who do not endorse either value strongly) was most influenced by situational variables as hypothesized. Does this finding replicate? On the other hand, the result with the HH group (those who endorse both values strongly) indicated that they are more influenced by their level of value endorsement. This tendency was also shown in the analysis of fluctuation across situations. Do these results replicate?

In order to answer these questions and address some other issues, a number of changes were introduced in Study 2. Otherwise, the basic framework of Study 2 was the direct replication of Study 1.

First, to examine the generalizability of Study 1 findings to another environmental issue, the environmental issue described in the scenario was changed from mining development to oil and gas exploration and development. More specifically, the focus of the controversy is whether to lift the moratorium for oil development or not. Although they are different, the underlying conflict for both mining development and oil and gas development is the same; that is, between pursuing economic development and protecting the environment.

Second, one more situational variable with two categories was introduced, increasing the manipulated combinations to 16 from 8. In Study 1, variable "immediacy of impact" had two categories: 1. immediate economic gain *and* gradual environmental damage; and 2. gradual economic gain *and* immediate environmental damage. However, it was pointed out that this variable had two different aspects in one variable. One is about immediacy of economic gain and the other being immediacy of environmental

damage. To make the interpretation of the effect of this variable clearer, two separate variables were created representing each. Thus, "immediacy of impact" variable was created separately for economic gain and environmental damage, creating four situational variables (together with self-interest and social norm).

Third, the situation described in the scenario was changed from a "private" decision-making situation to a "public" decision-making situation. Specifically, the private one was the situation in which one is writing a letter expressing her opinion to an MP. The public scenario created for Study 2 is a situation in which one is at a public hearing with her significant others to express an opinion in public. This different situation was introduced for the following two reasons. First, in real-life situations, both are common situations when a community resident tries to respond to or influence governmental decisions. Thus it is meaningful to examine the both situations. Second, the variable, social norm, had the weakest effect of the three situational variables in Study 1. This "public" decision-making situation was introduced to examine whether the effect of social norm would be enhanced in this public situation.

Fourth, two more dependent variables besides situational importance rating were introduced. One is actual decision on lifting or not lifting the moratorium. Although the interest of the study is to investigate situational value importance fluctuations in relation to general value endorsement level, it is not very meaningful to examine it if the situational value importance judgment does not contribute to the final decision. In Study 1, it was rather assumed that the importance judgment would contribute to actual decisions. In Study 2, the actual decision was added as a dependent variable to make

certain that the assumed relationship between one's importance ratings on relevant values and her actual decision exists.

The other was a difficulty rating for each decision. This was in an attempt to capture one's inner conflict when one must choose one value over the other when a person endorses both values. Ideally, a qualitative analysis may be a better way to capture such conflict. However, it was not feasible in this questionnaire survey.

Fifth, the complete set of Schwartz Value Survey (1992), with all the 56 values, were measured. This was to address a concern that the omission of some values from the original survey in Study 1 was rather arbitrary. As well, this will allow the examination of the relationship among the values in the complete set.

Finally, there were also changes in procedures for data collection. Two new measures were introduced: lottery prizes (three prizes of $250) and a second reminder. Because the questionnaire was now twice as long as that of Study 1, with 16 combinations of scenarios and the full 56 values included, it was decided that some kind of incentive would be helpful to encourage the completion of the entire questionnaire. As well, there was some concern about a possible selection bias in Study 1 in that more "pro-environmental" people might have returned the questionnaire. The lottery prizes were set up to encourage participation from a wide range of people who might not be interested in environmental issues.

Hypotheses

The same four hypotheses as in Study 1 were tested. However, reflecting the changes introduced in Study 2, two new ones were added.

Hypothesis 5:

a) Situational value judgments will significantly contribute to the final decision for the situation.

b) Decisions as to whether to support or oppose lifting the moratorium will be predicted by the value endorsement pattern created by the two general value ratings (i.e., the HH, HL, LH, and LL groups). More specifically, those who have clear hierarchy between the two values will more strongly support or oppose to lifting the moratorium.

Hypothesis 6: Difficulty ratings should be higher for the HH and LL groups, reflecting their internal conflict, and lower for the groups which have a clear hierarchy between the two conflicting values (i.e., the LH and HL groups).

Method

Sample and Procedures

One thousand questionnaires were hand-delivered to randomly selected community residents in Victoria, British Columbia. Two reminders were sent out with one-week intervals. Total of 284 questionnaires were returned (return rate 28.4%), of which 8 were omitted because of a large number of missing values, resulting in 276 completed questionnaires.

The age of participants ranged from 18 to 87, with mean age of 49.8. Among them, 66.1% were female. Annual income of participants ranged from $1,000 to $275,000, with mean annual income of $60,731. As for the level of education of participants, 12.8% finished high school, 37.2% finished some post-secondary degree, 28.8% had earned a bachelor's degree, and 21.2% had earned more advanced degrees. As in Study 1, compared with the 2001 census information for Greater Victoria, this sample had slightly more females and individuals with a little higher range of incomes. Nonetheless, it covers a wide range of age, income, and education groups and relatively representative of Victoria community residents.

Design

The design of this study was fundamentally the same as in Study 1. It employed a repeated-measures experimental design using scenarios. However, with one more situational variable introduced, there were four within-individual variables, instead of three in Study 1. These four variables, each with two categories, were manipulated in the scenarios, creating 2 (Self interest: for lifting the moratorium versus for not lifting the moratorium) x 2 (Social norm: for lifting the moratorium versus not lifting the

moratorium) x 2 (Immediacy of economic gain: immediate versus gradual) x 2 (Immediacy of environmental damage: immediate versus gradual), thus 16 different combinations. The order of presenting the scenarios was counter-balanced.

As in Study 1, between-subject variables, general value ratings for protecting the environment and pursuing economic development, were also measured before the scenarios. The main interest was in the interaction between the between-subject and within-subject variables. Gender difference was again included as a between-subject variable to control for the possible effect on situational variables.

Materials

Schwartz Value Survey. The first part of the questionnaire again was the Schwartz Value Survey (1992), but with its complete set of 56 values (see Appendix II for the complete set). The response format was the same as in Study 1, ranging from –1 (opposed to my value), to 0 (not important), to 7 (of supreme importance).

Filler items. A different set of filler items (15 items) from the one used in Study 1 was used for the second part of the questionnaire so that the general value ratings in the first part would not influence directly the responses for scenario questions that followed in the third part. Scenario questions are discussed in the next section.

Scenarios

Environmental issue. As in Study 1, environmental issue for the scenario was selected to reflect a real-life situation to make the situation more engaging and realistic for community residents. For Study 2, another controversial environmental issue regarding oil and gas exploration and development offshore British Columbia was used. Recently, in responding to the pressure from oil and gas companies, the Government of

British Columbia has asked the Government of Canada to consider lifting the moratorium (federal moratorium) on oil and gas activities offshore of British Columbia. Naturally, this has met outrage from environmental organizations. In February 2004, the Royal Society of Canada issued a report exploring cons and pros of this issue. The scenario described a situation in which participants were at one of the public hearing sessions for this issue, and they were asked to express their opinion in public when their significant others were also present. (See Appendix III for the actual scenarios used.) The two conflicting values in this scenario were again protecting the environment versus pursuing economic gain.

Dependent measures for the scenarios. In Study 2, there were three dependent variables as described above. First, participants were asked to rate the importance of each value separately, after reading each manipulated situation presented by a scenario, using a response format, 1 "Not important at all as the guiding principle for this decision;" to 10 "Very important." This dependent measure will be referred to as "situational value judgment" as in Study 1.

Second, they were also asked to indicate their decision; "What would be your decision about the moratorium?" with a bi-polar response format ranging from –5 "strongly support lifting it," to 5 "strongly oppose lifting it." Participants were asked after this question, "Was it difficult for you to make this decision?" with a response format ranging from 1 "not at all difficult," to 10 "very difficult."

Analyses

The analyses were exactly the same as in Study 1, except for additional two dependent variables. The participants' actual decisions were also analyzed using a mixed-

model ANOVA. To examine whether there were differences among the 4 groups in the difficulty ratings for the decisions, a mixed-model ANOVA was also performed on their difficulty ratings.

Results and Discussion

This section describes the statistical analyses of the data obtained from the Study 2 questionnaires, combined with summary and interpretation of the results. For the most part, exactly the same set of analyses as in Study 1 was performed on the data, with additional analyses of the two new dependent variables, decision ratings and difficulty of the decision ratings.

Schwartz Value Survey

Table 4 lists all the 56 values in the order of mean value ratings. Health ($M = 6.7$, $SD = 0.7$) received the highest importance rating, followed by honest ($M = 6.4$, $SD = 0.8$) and family security ($M = 6.3$, $SD = 1.1$.) None of these values were included in the Study 1. The mean ratings of other values are as follows: Protecting the environment ($M = 5.7$, $SD = 1.3$) was on 22nd; economic development ($M = 4.5$, $SD = 1.7$) was on 43rd; wealth ($M = 3.6$, $SD = 1.6$) 52nd, and social power ($M = 0.8$, $SD = 1.8$) was again at the end of the order as in Study 1.

As in Study 1, reliability within the same value types proposed by Schwartz was calculated. The value types Power and Universalism had similar reliability coefficients as in Study 1: Cronbach's alpha = .70 and .85, respectively. The correlation between value types Power and Universalism was again non-significant ($p = .096$).

Cronbach's alpha for the other value types with more than 3 single values was also calculated: Benevolence, .80; Tradition, .67; Security, .70; Conformity, .76; Achievement, .70; and Self-direction, .71. They are all reasonable values, although it was relatively low for Tradition.

Table 4

Descriptive Statistics for Schwartz Value Ratings

Values	N	Mean	S.D.	Min.	Max.
HEALTHY	275	6.56	0.72	4	7
HONEST	274	6.40	0.77	4	7
FAMILY SECURITY	276	6.32	1.09	0	7
SELF-RESPECT	276	6.25	0.98	0	7
FREEDOM	275	6.15	1.10	2	7
PEACE	276	6.12	1.30	0	7
RESPONSIBLE	275	6.10	0.94	3	7
EQUALITY	274	6.09	1.14	2	7
CAPABLE	275	6.02	1.06	2	7
LOYAL	276	6.02	1.07	2	7
TRUE FRIENDSHIP	274	6.02	1.23	1	7
BROAD-MINDED	276	5.99	1.11	2	7
INNER HARMONY	276	5.98	1.26	2	7
CHOOSING OWN GOALS	275	5.93	1.15	2	7
POLITE	276	5.88	1.25	1	7
INTELIGENT	274	5.88	1.06	2	7
WISDOM	275	5.87	1.13	2	7
MEANING IN LIFE	276	5.82	1.45	0	7
INDEPENDENT	276	5.81	1.23	1	7
JUSTICE	276	5.78	1.40	1	7
HONORING OF PARENTS AND ELDERS	275	5.75	1.37	-1	7
PROTECT THE ENVIRONMENT	275	5.69	1.30	0	7
ENJOYABLE LIFE	275	5.65	1.29	0	7
MATURE LOVE	275	5.60	1.53	0	7
BEAUTY	276	5.53	1.40	0	7
SENSE OF BELONGING	276	5.50	1.45	0	7
CURIOUS	274	5.42	1.30	1	7
HELPFUL	275	5.42	1.47	-1	7
CREATIVE	276	5.41	1.43	0	7
SUCCESS	275	5.33	1.24	1	7
AMBITIOUS	276	5.26	1.44	0	7
SOCIAL ORDER	275	5.14	1.64	0	7
VARIED LIFE	276	5.09	1.63	-1	7
CLEAN	275	5.08	1.67	0	7
SELF-DISCIPLINE	275	5.07	1.49	0	7
FORGIVING	274	5.05	1.42	0	7
UNITY WITH NATURE	276	5.01	1.68	0	7
EXCITING LIFE	276	4.86	1.57	0	7
OBEDIENT	273	4.86	1.76	0	7
RECIPROCATING FAVORS	276	4.86	1.79	-1	7

Table continued.

Table 4 continued.

Values	N	Mean	S.D.	Min.	Max.
NATIONAL SECURITY	275	4.65	2.07	-1	7
SOCIAL RECOGNITION	276	4.59	1.55	0	7
PURSUING ECONOMIC DEVELOPMENT	276	4.54	1.74	-1	7
HUMBLE	275	4.32	1.71	-1	7
ACCEPTING MY PORTION IN LIFE	274	4.30	2.03	-1	7
PLEASURE	276	4.22	1.53	0	7
SPIRITUALITY	276	4.21	2.19	-1	7
TRADITION	274	4.17	1.83	-1	7
MODERATE	275	4.10	1.79	-1	7
INFLUENTIAL	275	4.07	1.71	0	7
PRESERVING MY PUBLIC IMAGE	275	3.68	1.90	-1	7
WEALTH	276	3.58	1.56	-1	7
DARING	275	3.37	1.90	-1	7
DETACHMENT	273	2.91	2.01	-1	7
DEVOUT	275	2.84	2.64	-1	7
AUTHORITY	274	2.80	2.08	-1	7
SOCIAL POWER	275	0.83	1.76	-1	7

Table 5 displays the correlations among the value types. The values that are most correlated to each other are found directly adjacent to each other in Schwartz's (1992) proposed value structure (see Figure 1), and the value with the lowest correlation is found directly opposite to the value in most cases. For example, value type Power had the lowest correlation with Universalism, which is directly opposite to it. The value type Universalism had the highest correlation with Benevolence, which is directly adjacent to it.

Descriptive Statistics for the Dependent Variables

Table 6 lists the means and standard deviations of each situational value judgment for both values. Despite the effort to address the possible selection bias, the importance ratings of protecting the environment were substantially higher across all the 16 situations compared to those of economic development. Average decision ratings were all against lifting the moratorium, and difficulty ratings were relatively low across all the situations, although both ratings covered all the possible range for each situation.

Mixed-model ANOVA Analysis with a Single Value

First, a mixed-model ANOVA with 4 within-subject variables (the effect of self-interest: for lifting the moratorium versus for not lifting the moratorium; social norm: for lifting the moratorium versus for not lifting the moratorium; immediacy of the impact on economic development: immediate economic gain versus gradual economic gain; and immediacy of the impact on environmental damage: immediate environmental damage versus gradual environmental damage) and 1 between-subject variable (general value rating; either for protecting the environment or pursuing economic development),

Table 5

Correlations Among Schwartz's Value Types

	1	2	3	4	5	6	7
1. POWER							
2. UNIVERSALISM	0.10						
3. ACHIEVEMENT	0.53	0.46					
4. SELFDIRECTION	0.23	0.65	0.58				
5. BENEVOLENCE	0.15	0.73	0.55	0.55			
6. TRADITION	0.35	0.35	0.42	0.26	0.58		
7. SECURITY	0.46	0.49	0.56	0.42	0.55	0.50	
8. CONFORMITY	0.36	0.54	0.59	0.40	0.67	0.62	0.72

Note. Correlations are all significant at $p = .001$ level except for the correlation between Power and Universalism ($p = .12$; not significant) and Power and Benevolence ($p = 0.02$).

Table 6

Descriptive Statistics for Dependent Variables for Study 2

For situational importance judgments of pursuing economic gain

Situations	N	Mean	S.D.	Range	Min.	Max.
SI 1, SN 1, IMECO 1, IMENV 1	275	6.31	2.42	9	1	10
SI 1, SN 1, IMECO 1, IMENV 2	276	5.92	2.70	9	1	10
SI 1, SN 1, IMECO 2, IMENV 1	274	5.51	2.70	9	1	10
SI 1, SN 1, IMECO 2, IMENV 2	276	5.28	2.79	9	1	10
SI 1, SN 2, IMECO 1, IMENV 1	276	5.81	2.66	9	1	10
SI 1, SN 2, IMECO 1, IMENV 2	274	5.72	2.68	9	1	10
SI 1, SN 2, IMECO 2, IMENV 1	275	5.07	2.72	9	1	10
SI 1, SN 2, IMECO 2, IMENV 2	274	5.09	2.78	9	1	10
SI 2, SN 1, IMECO 1, IMENV 1	276	5.40	2.65	9	1	10
SI 2, SN 1, IMECO 1, IMENV 2	275	5.36	2.69	9	1	10
SI 2, SN 1, IMECO 2, IMENV 1	274	4.85	2.81	9	1	10
SI 2, SN 1, IMECO 2, IMENV 2	275	4.87	2.81	9	1	10
SI 2, SN 2, IMECO 1, IMENV 1	275	5.13	2.79	9	1	10
SI 2, SN 2, IMECO 1, IMENV 2	275	5.00	2.78	9	1	10
SI 2, SN 2, IMECO 2, IMENV 1	276	4.43	2.87	9	1	10
SI 2, SN 2, IMECO 2, IMENV 2	276	4.37	2.83	9	1	10

For situational importance judgments of protecting the environment

Situations	N	Mean	S.D.	Range	Min.	Max.
SI 1, SN 1, IMECO 1, IMENV 1	276	8.25	1.87	9	1	10
SI 1, SN 1, IMECO 1, IMENV 2	276	8.42	1.82	9	1	10
SI 1, SN 1, IMECO 2, IMENV 1	274	8.76	1.66	9	1	10
SI 1, SN 1, IMECO 2, IMENV 2	276	8.91	1.46	9	1	10
SI 1, SN 2, IMECO 1, IMENV 1	276	8.39	1.84	9	1	10
SI 1, SN 2, IMECO 1, IMENV 2	274	8.42	1.83	9	1	10
SI 1, SN 2, IMECO 2, IMENV 1	275	8.77	1.54	9	1	10
SI 1, SN 2, IMECO 2, IMENV 2	275	8.85	1.53	9	1	10
SI 2, SN 1, IMECO 1, IMENV 1	276	8.64	1.62	9	1	10
SI 2, SN 1, IMECO 1, IMENV 2	275	8.67	1.51	8	2	10
SI 2, SN 1, IMECO 2, IMENV 1	274	9.02	1.38	8	2	10
SI 2, SN 1, IMECO 2, IMENV 2	275	9.02	1.32	8	2	10
SI 2, SN 2, IMECO 1, IMENV 1	275	8.65	1.54	9	1	10
SI 2, SN 2, IMECO 1, IMENV 2	275	8.72	1.45	7	3	10
SI 2, SN 2, IMECO 2, IMENV 1	275	9.08	1.30	7	3	10
SI 2, SN 2, IMECO 2, IMENV 2	275	9.12	1.25	7	3	10

Table continued.

Table 6 continued.

For decisions

Situations	N	Mean	S.D.	Range	Min.	Max.
SI 1, SN 1, IMECO 1, IMENV 1	274	0.63	3.51	10	-5	5
SI 1, SN 1, IMECO 1, IMENV 2	275	0.94	3.50	10	-5	5
SI 1, SN 1, IMECO 2, IMENV 1	272	2.05	3.13	10	-5	5
SI 1, SN 1, IMECO 2, IMENV 2	275	2.31	3.08	10	-5	5
SI 1, SN 2, IMECO 1, IMENV 1	276	0.80	3.49	10	-5	5
SI 1, SN 2, IMECO 1, IMENV 2	275	1.26	3.31	10	-5	5
SI 1, SN 2, IMECO 2, IMENV 1	273	2.39	2.96	10	-5	5
SI 1, SN 2, IMECO 2, IMENV 2	275	2.53	2.92	10	-5	5
SI 2, SN 1, IMECO 1, IMENV 1	276	1.45	3.27	10	-5	5
SI 2, SN 1, IMECO 1, IMENV 2	273	1.65	3.23	10	-5	5
SI 2, SN 1, IMECO 2, IMENV 1	274	2.72	2.84	10	-5	5
SI 2, SN 1, IMECO 2, IMENV 2	275	2.83	2.79	10	-5	5
SI 2, SN 2, IMECO 1, IMENV 1	275	1.52	3.18	10	-5	5
SI 2, SN 2, IMECO 1, IMENV 2	273	1.97	3.08	10	-5	5
SI 2, SN 2, IMECO 2, IMENV 1	276	2.96	2.78	10	-5	5
SI 2, SN 2, IMECO 2, IMENV 2	275	3.15	2.62	10	-5	5

For difficulty rating of the decisions

Situations	N	Mean	S.D.	Range	Min.	Max.
SI 1, SN 1, IMECO 1, IMENV 1	276	4.53	3.06	9	1	10
SI 1, SN 1, IMECO 1, IMENV 2	274	3.64	2.55	9	1	10
SI 1, SN 1, IMECO 2, IMENV 1	274	3.77	2.87	9	1	10
SI 1, SN 1, IMECO 2, IMENV 2	276	3.53	2.82	9	1	10
SI 1, SN 2, IMECO 1, IMENV 1	276	3.57	2.62	9	1	10
SI 1, SN 2, IMECO 1, IMENV 2	275	3.57	2.55	9	1	10
SI 1, SN 2, IMECO 2, IMENV 1	274	3.47	2.61	9	1	10
SI 1, SN 2, IMECO 2, IMENV 2	274	3.24	2.53	9	1	10
SI 2, SN 1, IMECO 1, IMENV 1	276	3.45	2.51	9	1	10
SI 2, SN 1, IMECO 1, IMENV 2	274	3.39	2.55	9	1	10
SI 2, SN 1, IMECO 2, IMENV 1	273	3.23	2.57	9	1	10
SI 2, SN 1, IMECO 2, IMENV 2	275	3.02	2.50	9	1	10
SI 2, SN 2, IMECO 1, IMENV 1	275	3.38	2.49	9	1	10
SI 2, SN 2, IMECO 1, IMENV 2	275	3.21	2.43	9	1	10
SI 2, SN 2, IMECO 2, IMENV 1	276	3.04	2.54	9	1	10
SI 2, SN 2, IMECO 2, IMENV 2	275	2.79	2.42	9	1	10

Notes. SI: self-interest; SN: social norm; IMECO: immediacy of economic gain; IMENV: immediacy of environmental damage. 1 is always for favoring economic development, and 2 is for protecting the environment. Sixteen situations were created by combining these four variables.

controlling for the effect of gender (as a between-subject variable), was conducted on situational value judgments for each value separately.

Situational value judgment of economic development as a dependent variable. All four situational variables had significant main effects: self-interest ($F(1, 265) = 55.25, p < .001, \eta^2 = .17$), social norm ($F(1, 265) = 9.62, p < .01, \eta^2 = .04$), immediacy of economic gain ($F(1, 265) = 57.17, p < .001, \eta^2 = .18$), and immediacy of environmental damage ($F(1, 265) = 75.50, p < .001, \eta^2 = .22$). Again, these significant main effects of situational variables basically confirm the effects of the manipulation. When self-interest was for lifting the moratorium, the importance ratings of economic development was higher ($M = 5.58$) than when self-interest was for protecting the environment ($M = 4.92$). When social norm was for lifting the moratorium, the rating was higher ($M = 5.31$) than when it was not ($M = 5.19$). When economic profit was immediately available, the rating was higher ($M = 5.43$) than when not ($M = 5.07$). When environmental damage is immediate, the rating was lower ($M = 4.93$) than when it was not ($M = 5.57$).

In Study 2, there was one significant 3-way interaction, between self-interest, social norm, and immediacy of economic gain, $F(1, 265) = 10.53, p < .001, \eta^2 = .04$. When economic gain was immediate, and self-interest was for lifting the moratorium (i.e., both are in favor of lifting the moratorium), whether or not the social norm was for or against lifting the moratorium had an effect. However, if self-interest was against lifting the moratorium, social norm had no effect. On the other hand, when economic gain was not immediate, and self-interest was against lifting the moratorium, then social norm had an effect in that rating of economic development was higher when one's significant others supported lifting the moratorium (see Figure 9).

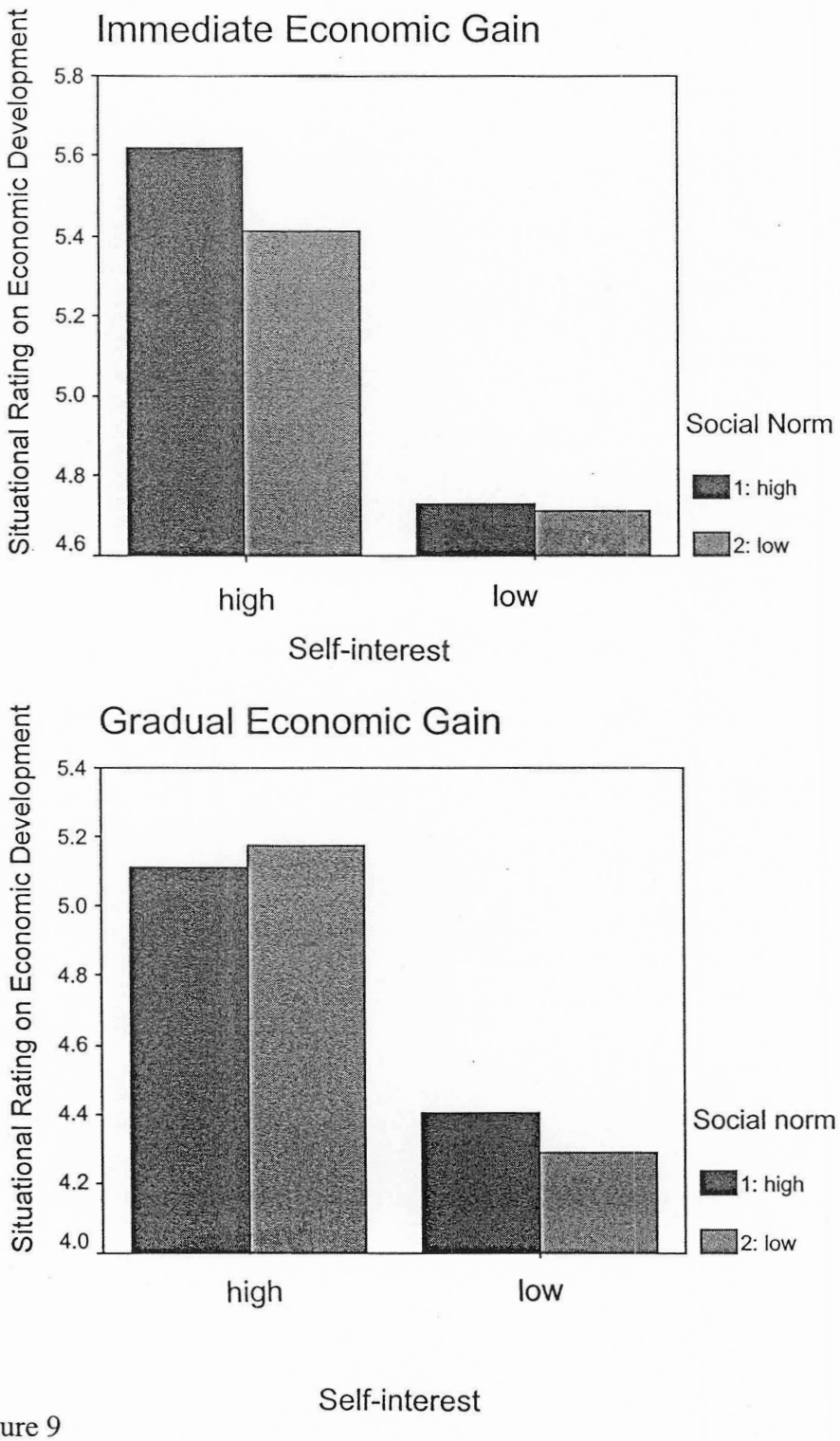

Figure 9

3-way Interaction plot between self-interest, social norm, and immediacy of economic gain. Self-interest high: for gas and oil development; Self-interest low: for protecting the environment. Social norm high: for gas and oil development; Social norm low: for protecting the environment.

The general value rating for economic development as a between-subject variable was also significant, $F(1, 265) = 10.81, p < .001, \eta^2 = .04$. One significant interaction between situational variable, immediacy of economic gain, and general value rating on economic development, ($F(1, 265) = 4.66, p < .05, \eta^2 = .02$) qualified this relation. When the general rating was high, whether or not economic gain was immediate did not matter; ratings were high in both cases (see Figure 10). Gender difference was also a significant between-subject variable, $F(1, 265) = 7.06, p < .01, \eta^2 = .03$, such that males tended to rate the value, pursuing economic development higher ($M = 5.77$) than females ($M = 4.97$) across situations. However, there were no interactions that involved gender.

Situational value judgments of protecting the environment as a dependent variable. Unlike in Study 1, all four situational variables, including social norm, had significant main effects on the situational importance ratings: self-interest ($F(1, 263) = 23.80, p < .001, \eta^2 = .08$), social norm ($F(1, 263) = 10.73, p < .001, \eta^2 = .04$), immediacy of impact on economic development ($F(1, 263) = 3.86, p < .05, \eta^2 = .02$) and immediacy of impact on environmental damage ($F(1, 263) = 64.89, p < .001, \eta^2 = .20$). Again, the direction of effects were as expected by the manipulation. When self-interest was for protecting the environment, the importance rating of protecting the environment was higher ($M = 8.88$) than when it was not ($M = 8.62$). When social norm was for lifting the moratorium, the rating was lower ($M = 8.72$) than when it was against lifting the moratorium ($M = 8.79$). When economic gain was immediate, the rating was lower ($M = 8.73$) than when it was not ($M = 8.77$). When environmental damage was immediate, the rating was higher ($M = 8.54$) than when it was not ($M = 8.96$).

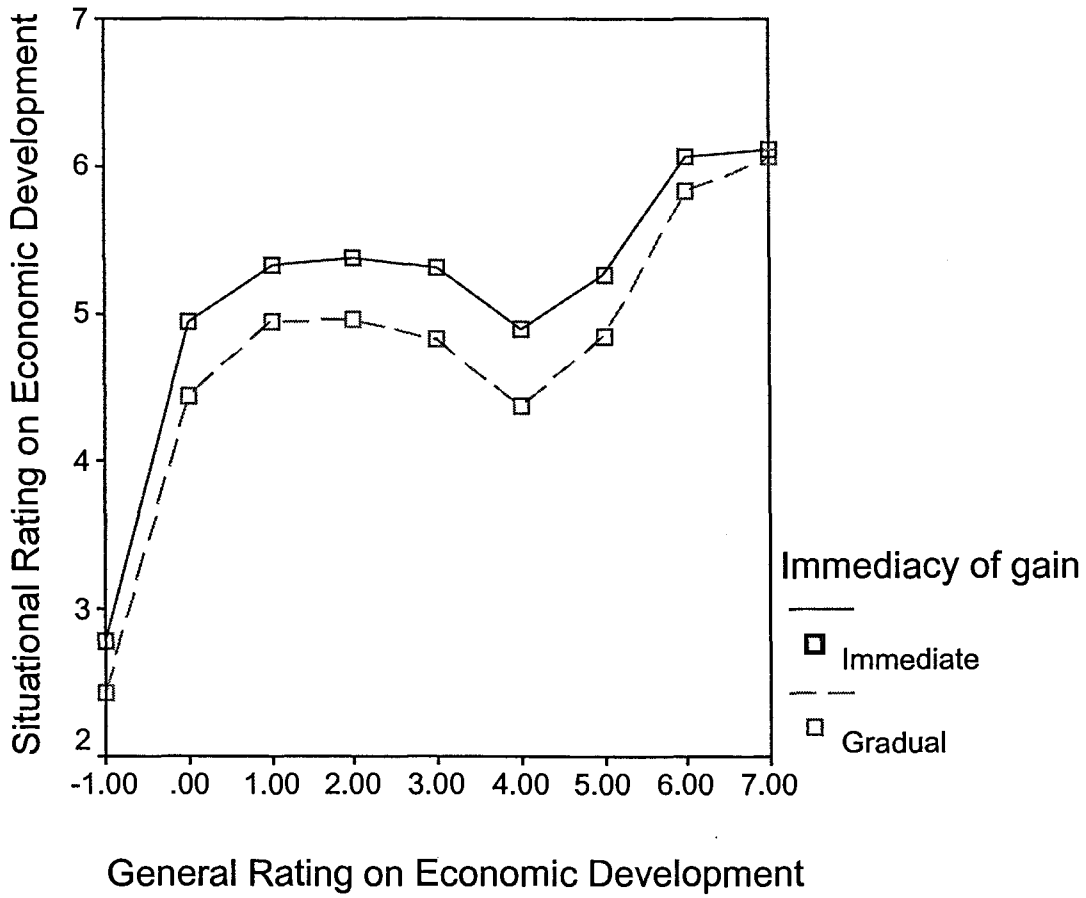

Figure 10

Interaction Plot between general rating of economic development and situational variable, immediacy of economic gain.

The general value rating for protecting the environment was significant as a between-subject variable, $F(1, 263) = 103.74, p < .001, \eta^2 = .28$, and had the largest effect size among the significant effects, indicating that the general rating strongly guided situational value judgments. Gender difference was not a significant between-subject predictor.

The effects of situational variables varied depending on this general value rating. The effect of self-interest was qualified by the general rating, $F(1, 263) = 4.34, p < .05, \eta^2 = .02$, in that the effect of self-interest became smaller when the general rating was higher. So was the effect of immediacy of impact on environmental damage, $F(1, 263) = 7.82, p < .01, \eta^2 = .03$, and the nature of the interaction was the same (Figures 11 and 12).

There was also one significant 3-way interaction involving situational variables and general value rating: among self-interest, immediacy of impact on environmental damage, and general value rating, $F(1, 263) = 4.60, p < .05, \eta^2 = .02$. When self-interest was for NOT lifting the moratorium, there was no interaction between immediacy of the environmental damage and general value rating. On the other hand, when self-interest was for lifting the moratorium, and when general value rating was low, whether environmental damage was immediate or gradual mattered more. If environmental damage was not immediate, protecting the environment was rated much lower (see Figure 13).

Summary and Interpretation for Mixed-model ANOVA Analysis with a Single Value

The results mainly replicated Study 1's findings. The effects of situational variables were all as intended by the manipulation. However, because of the two changes

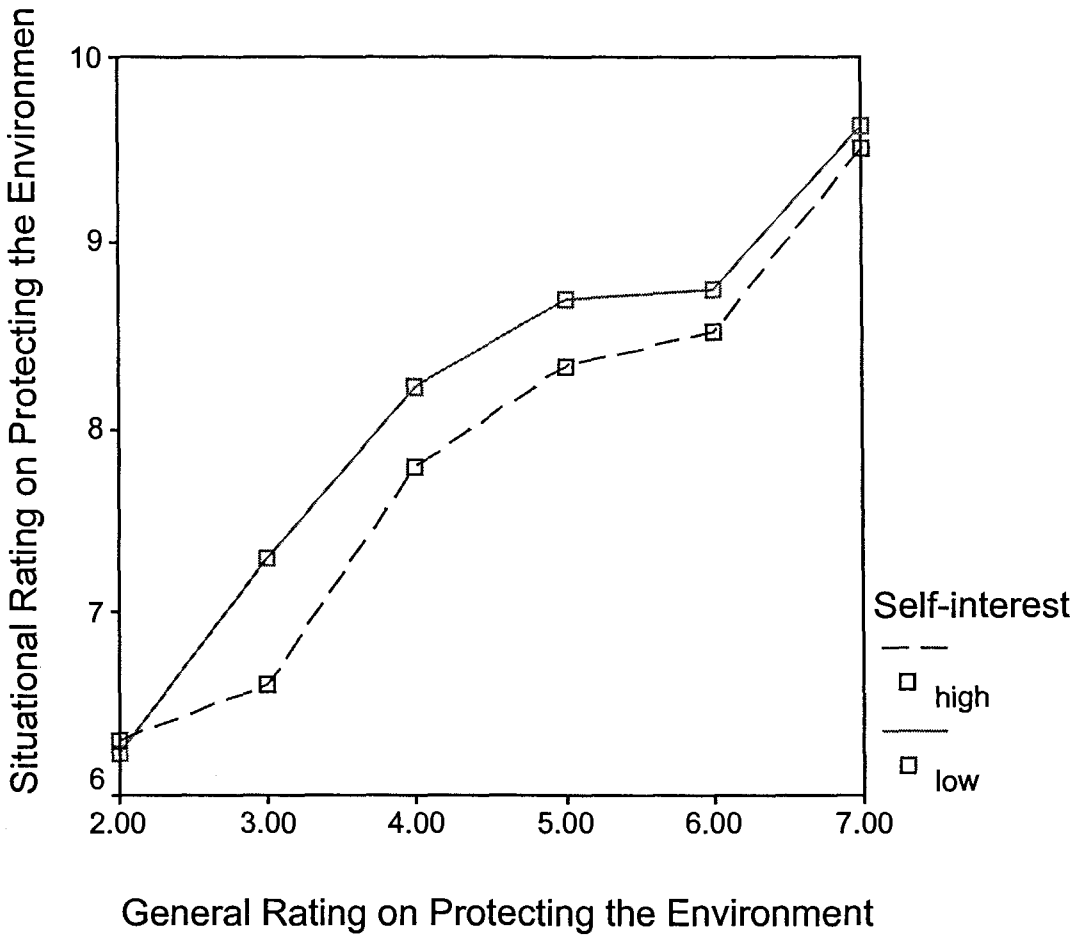

Figure 11

Interaction plot between self-interest and the general value rating of protecting the environment. Self-interest high: for oil and gas development; Self-interest low: for protecting the environment.

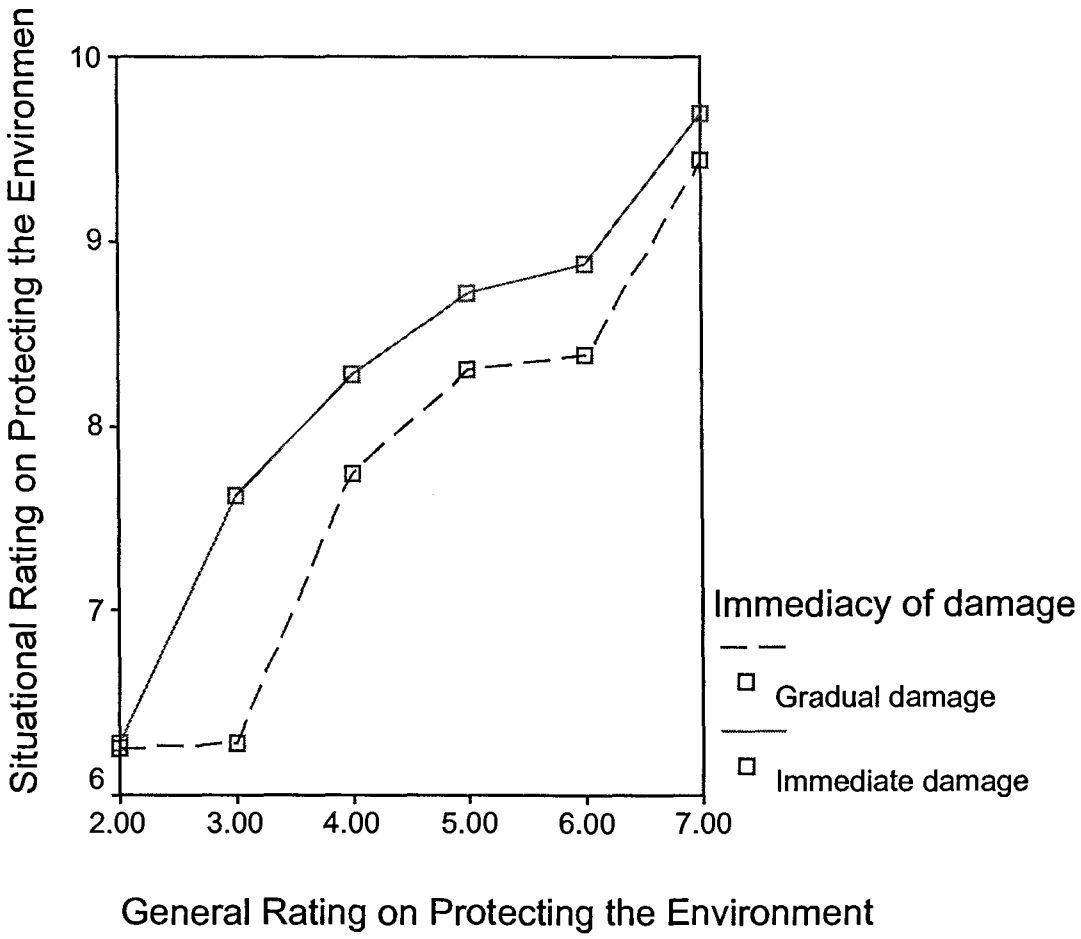

Figure 12

Interaction plot between immediacy of environmental damage and the general value rating of protecting the environment.

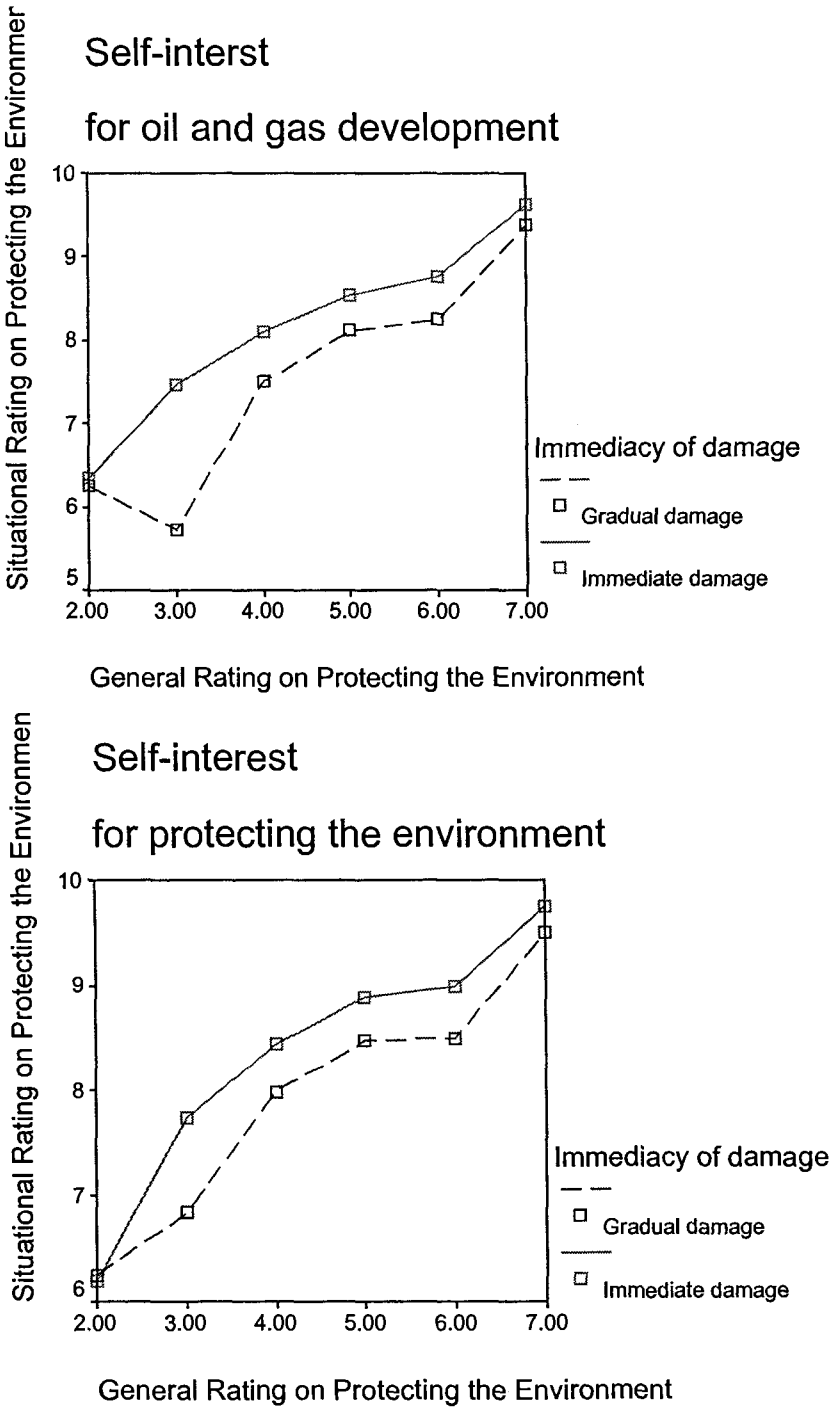

Figure 13

3-way interaction plot between self-interest, immediacy of environmental damage, and the general value rating for protecting the environment.

introduced in Study 2, some results naturally reflect these changes. First, although social norm still had the weakest effect, when the decision must be made in public, the effect of social norm became significant in the situational value judgments of protecting the environment.

Second, because the distinction was made in Study 2 between immediacy of economic gain and immediacy of environmental damage, the results were different in that regard. For the situational ratings of economic development, surprisingly, the effect of immediacy of environmental damage was the strongest among all the four variables in terms of effect size, followed by immediacy of economic gain, self-interest, and social norm. This was unexpected because immediacy of economic gain like in Study 1, or self-interest, was predicted to have the strongest effect.

For the situational ratings of protecting the environment, as in Study 1, immediacy of environmental damage had the strongest effect, followed by self-interest, social norm, and immediacy of economic gain. When immediacy of economic gain and environmental damage is separated, now it is clear that the immediacy of economic gain is least significant on importance rating of protecting the environment.

In Study 2, as hypothesized, 3-way interactions were observed among the situational variables themselves. For both 3-way interactions, the nature of the interaction was such that, when two of the three situational variables are in the same direction (e.g., both are for lifting the moratorium), the effect of the third variable was enhanced (i.e., whether that variable was for or against the moratorium made a bigger difference on their judgment).

The effects of general value ratings were also as hypothesized and they replicate Study 1 findings. They guide participants' judgment on situational value importance, but to a different degree depending on the value. Again, as in Study 1, the general value rating of economic development had a small effect ($\eta^2 = .04$) in guiding the situational importance ratings, whereas that for protecting the environment had the strongest effect among all the variables ($\eta^2 = .28$) on the corresponding situational ratings.

The effect of interest, interactions between situational variables and general value ratings were also observed and basically replicate Study 1 results. For the situational value judgments of economic development, the effect of immediacy of economic gain varied depending on the general value rating of economic development, in that its effect was larger when the general value rating was low. In Study 1, effect of self-interest interacted with the general value rating, but when immediacy of economic gain was available as a separate piece of information, that information had more effect than self-interest on their situational ratings.

For the situational value judgments of protecting the environment, exactly as in Study 1, the effects of self-interest and immediacy of environmental damage varied depending on the general value rating of protecting the environment. In both cases, the effect of situational variables become smaller as the general rating becomes higher.

Value Endorsement Patterns (Median-split Grouping of Participants)

Frequencies of the two general value ratings and median-split groups. The frequency distributions of the two general value ratings are very similar to those in Study 1. The rating for economic development has a wider range and a more normal distribution. The rating for protecting the environment was again negatively skewed,

indicating that most participants tended to rate the value highly. The median values were the same as in Study 1: 5 and 6 for economic development and protecting the environment respectively. Table 7 displays the frequencies for the median-split groups. The LL group (those who did not endorse either values very strongly) had the largest size again, almost 50 percent of the sample. As in Study 1, this median-split grouping will be referred to as "value endorsement pattern" henceforth.

A chi-square test of independence was again performed to examine whether any difference in male and female frequencies occurred in the four groups. Unlike in Study 1, there were more females in the LH group than expected, χ^2 (3, N = 272) = 10.10, $p < .05$.

Mixed-model ANOVA with Value Endorsement Pattern as a Between-subject Variable

As in Study 1, this value endorsement pattern based on the two general value ratings was used as a between-subject variable on situational value judgments. A mixed-model ANOVA was conducted on each situational value judgment separately. The effect of interest here is that of value endorsement pattern as a between-subject variable, and its interaction with situational variables. Gender difference was again included as a between-subject variable to control for the possible influence of gender on situational value judgments.

The effect of value endorsement pattern. Value endorsement pattern was a significant between-subject variable as in Study 1 for situational value judgments of both economic development and protecting the environment: $F(3, 261) = 6.42, p < .001, \eta^2 = .07$, for the ratings of economic development and $F(3, 264) = 20.47, p < .001, \eta^2 = .19$, for those of protecting the environment. However, unlike in Study 1, the effect size of this value endorsement pattern for situational value judgments of economic development

Table 7

Frequencies for Median-split Grouping for Study 2

			Frequency	Percent	Valid Percent	Cumulative Percent
Group	1	HH	40	14.5	14.6	14.6
	2	HL	44	15.9	16.1	30.7
	3	LH	56	20.3	20.4	51.1
	4	LL	134	48.6	48.9	100
	Total		274	99.3	100	
	Missing		2	0.7		
	Total		276	100		

Note. 1: HH group (those who endorse both values strongly); 2: HL group (those who endorse pursuing economic gain more strongly than protecting the environment); 3: LH group (those who endorse protecting the environment more strongly than pursuing economic gain); and 4: LL group (those who do not endorse either value strongly).

was not much larger than that of general rating of the single value ($\eta^2 = .04$). The effect size of value endorsement pattern on situational value judgments of protecting the environment was smaller than that of general value rating of single value ($\eta^2 = .28$) as in Study 1.

Thus, the general value rating of the single value was a better predictor for the situational value judgments of protecting the environment again, whereas for the situational value judgments of economic development, value endorsement pattern performed better as a predictor, only to much less degree compared to Study 1 result.

Examination of the marginal means for the situational value judgments of economic development revealed the following: the rating was highest for the HL group (6.50), followed by the HH (5.48), LL (5.11), and LH (4.36) groups. A post-hoc probe using Tukey's HSD at family-wise error rate of .05 showed that these situational ratings were significantly different only between the HL and LH groups, and the HL and LL groups in that the HL group rated higher than the LH and LL groups. As in Study 1, the HH and LL groups did not differ significantly on situational ratings.

Marginal means for the situational ratings on protecting the environment was highest for the HH (9.59) and LH (9.54) groups, followed by the LL (8.33) and HL groups (8.27). The same post-hoc probe revealed that there was no difference between the HH and LH groups; they both rated high to the same extent. These two groups both rated significantly higher than the LL and HL groups. There was no significant difference between the LL and HL groups. Thus, for the situational value judgments of protecting the environment, the endorsement level of economic development was not exerting much

influence; the situational value judgments only depended on how highly one endorsed the value, protecting the environment.

It is of note, in both ratings, that it was not LL group members who rated lowest on the value; it was those who had a clear hierarchy of the importance ratings of the two values.

Gender was a significant between-subject predictor only for situational value judgments of economic development, $F(1, 261) = 4.19, p < .05, \eta^2 = .016$. The nature of the effect is exactly the same as the previous mixed-ANOVA analysis in Study 2. But there were no interactions involving gender.

The effects of situational variables and their interaction: for the situational value judgments of economic development. All four main effects of situational variables were significant: self-interest, $F(1, 261) = 35.91, p < .001, \eta^2 = .12$; social norm, $F(1, 261) = 9.34, p = .001, \eta^2 = .04$; immediacy of economic gain, $F(1, 261) = 31.51, p < .001, \eta^2 = .11$; and immediacy of environmental damage, $F(1, 261) = 68.64, p < .001, \eta^2 = .21$. Immediacy of environmental damage had the strongest effect among the four, followed by self-interest, immediacy of economic gain, and social norm. The directions of the main effects were all as intended by the manipulation.

One significant 3-way interaction qualified the relationship among the three situational variables, self-interest, immediacy of economic gain, and social norm ($F(1, 261) = 8.38, p < .01, \eta^2 = .03$) in the following manner: when social norm was against lifting the moratorium, and self-interest was also against it, immediacy of economic gain had stronger effect. When social norm was against lifting the moratorium, but self-

interest was for it, the effect of immediacy of economic gain had a smaller effect (see Figure 14).

This tendency is the same for all the 3-way interactions found in Study 2. When two of the three situational variables were in the same direction, the effect of the third variable was enhanced.

Only one interaction between the effect of situational variable and value endorsement pattern was found. The effect of immediacy of economic gain was qualified by value endorsement pattern (group membership), $F(3, 261) = 2.98, p < .05, \eta^2 = .03$, in that the effect was stronger for the LL and LH groups than it was for the HH and HL groups (see Figure 15).

The effects of situational variables and their interaction: for the situational value judgments of protecting the environment. All main effects of the situational variables were also significant for the situational value judgments of protecting the environment: the main effect of self-interest, $F(1, 261) = 11.25, p < .001, \eta^2 = .04$; social norm, $F(1, 261) = 7.44, p < .01, \eta^2 = .03$; immediacy of economic gain, $F(1, 261) = 3.68, p < .05, \eta^2 = .02$; and immediacy of environmental damage, $F(1, 261) = 35.60, p < .001, \eta^2 = .12$.

The effect of immediacy of environmental damage varied depending on value endorsement pattern, $F(3, 261) = 3.07, p < .05, \eta^2 = .03$, in that the effect was stronger for the LL and HL groups (see Figure 16). There was also one significant 3-way interaction between self-interest, immediacy of economic gain, and value endorsement pattern, $F(3, 261) = 2.76, p < .05, \eta^2 = .03$. When economic gain was not immediate, self-interest had an effect only on LL group. When economic gain was immediate, self-interest had an effect on all three groups except for the HH group (see Figure 17).

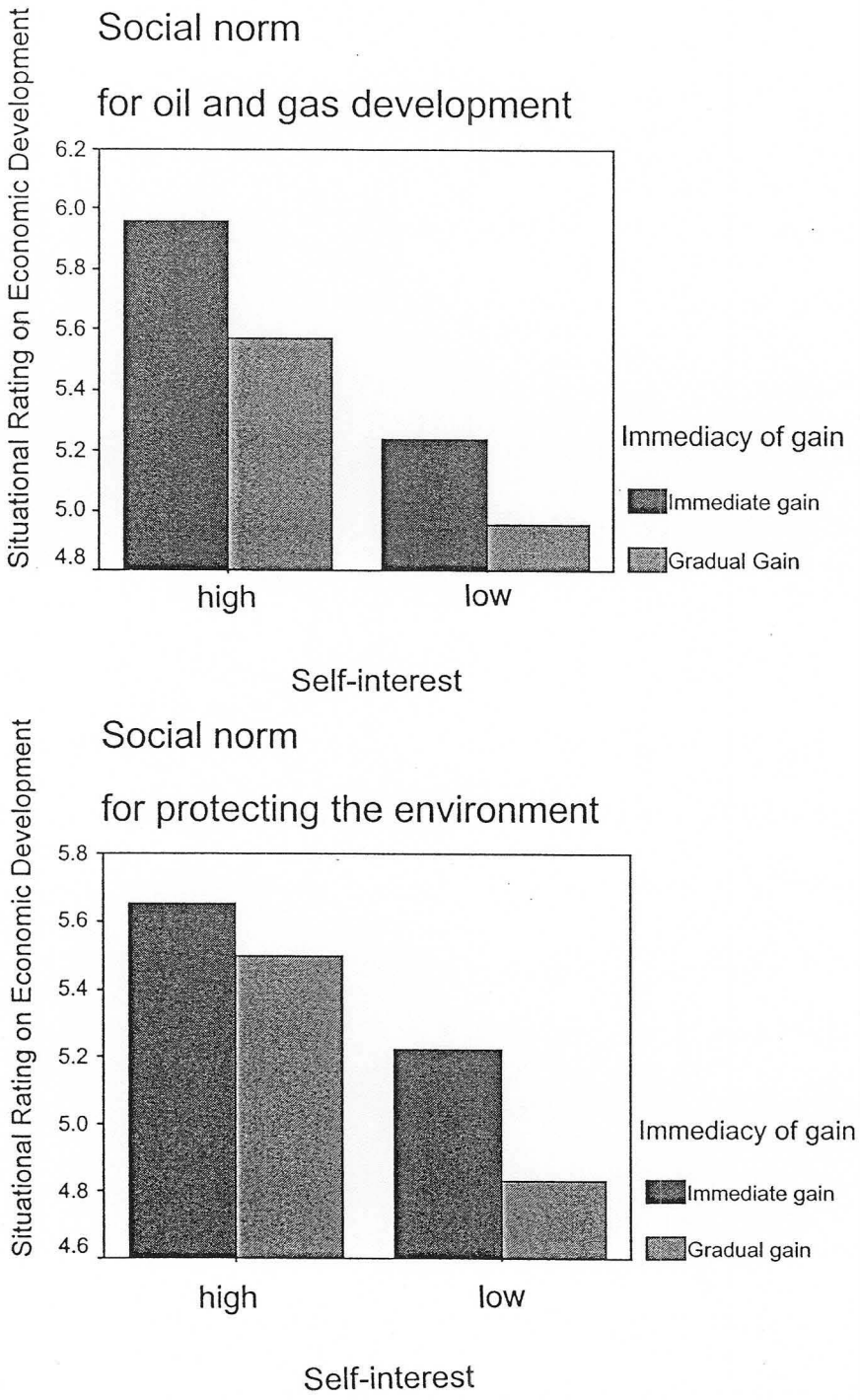

Figure 14

3-way interaction plot between self-interest, social norm, and immediacy of economic gain.

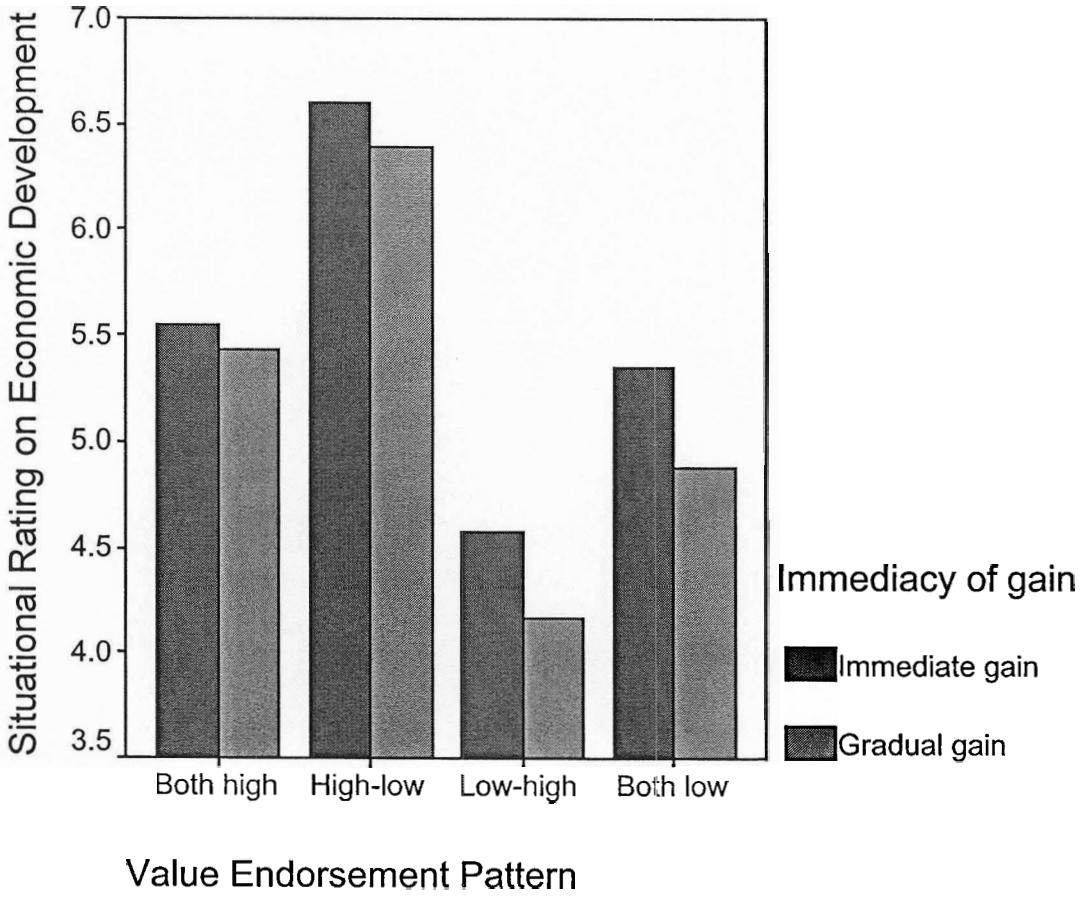

Figure 15

Interaction plot between value endorsement pattern and immediacy of economic gain.

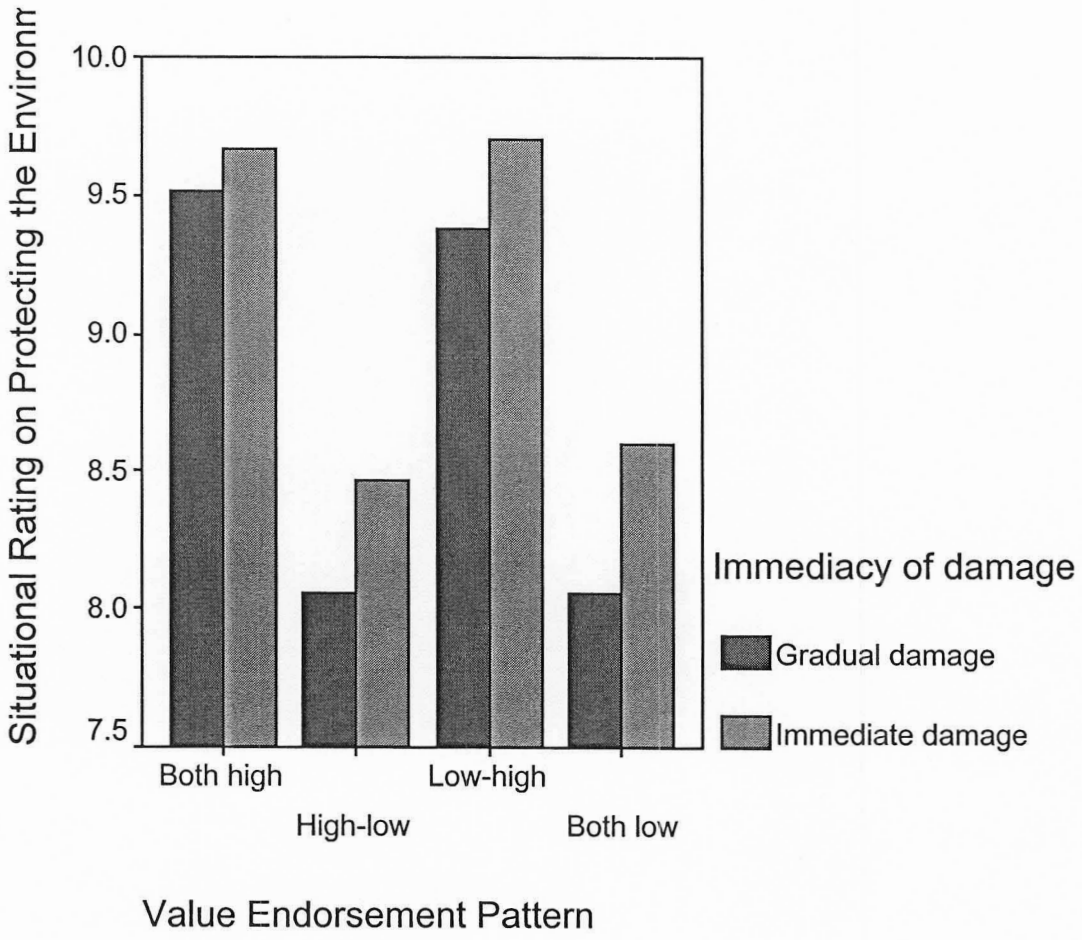

Figure 16

Interaction plot between value endorsement pattern and immediacy of economic gain for the situational value judgment of protecting the environment. Value endorsement pattern is expressed as (general rating of economic development)-(general rating of protecting the environment).

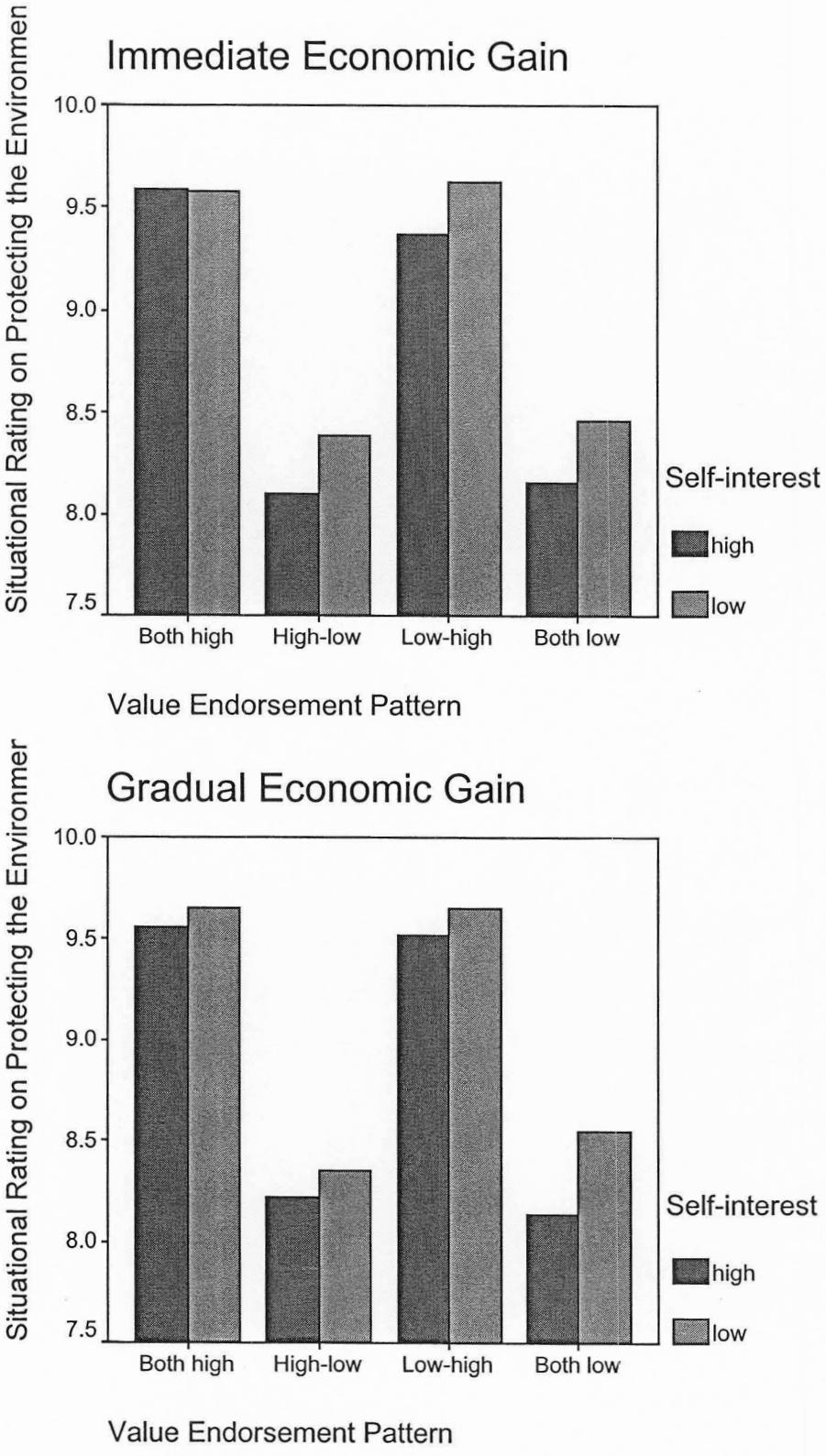

Figure 17

3-way interaction plot between self-interest, value endorsement pattern and immediacy of economic gain for the situational value judgment of protecting the environment.

Summary and Interpretation of the Analysis of Mixed-model ANOVA with the Value Endorsement Pattern

The value endorsement pattern was again a significant predictor of situational value judgments, but, it was not a better predictor for both value importance judgments. This result was the same as in Study 1. For situational value judgments for protecting the environment, the endorsement level of a single value serves as a better predictor.

Fewer interactions between situational variables and value endorsement pattern were found than expected. Nonetheless, for those significant interactions, the LL group was the one that was most influenced by the situational variable, which confirms the hypothesis. For the LL group, whether economic gain (or environmental damage) was immediate had a stronger effect than it did on other groups.

As in Study 1, the HH group was again not as influenced by the situational variables as the LL group. It seems, especially for the situational value judgments for protecting the environment, the HH group was guided more on the high level of general rating on the value, and the general rating of pursuing the economic gain did not seem to have influenced their importance judgment very much. This point will be discussed in the general discussion.

Mixed-model ANOVA on Decisions

In Study 2, the participant's decision as to whether to support or oppose lifting the moratorium was queried after each scenario, in addition to the importance rating of each value. Because situational importance ratings on values may not necessarily lead to a decision that reflects the rating in the specific situation, I first examined whether the situational value judgments indeed significantly contributed to the decisions by

regressing each decision on two situational value judgments. For all 16 decisions, the two situational value judgments were significant predictors of decisions at $p < .001$ levels, and R^2 ranged from 43.1 percent to 56.7 percent.

Next, a mixed-model ANOVA was performed on the decisions using the value endorsement pattern as a between-subject variable. The effects of interest here is only that of the value endorsement pattern as a between-subject variable.

The value endorsement pattern was a significant predictor of decisions, $F(3, 261) = 23.05, p < .001, \eta^2 = .21$, with relatively large effect size, compared to other effects found in this study. The LH group's (those who endorsed protecting the environment more strongly than they did pursuing economic gain) decision was most against lifting the moratorium (3.73 on a bi-polar scale ranging –5: support lifting the moratorium to 5: oppose lifting the moratorium), followed by the HH (2.88), LL (1.59), and HL groups (0.01). Again, the rating was highest or lowest for those who had clear hierarchy of values. Post-hoc probes of these group differences using Tukey's HSD at family-wise error rate of .05 revealed that the rating of the HL group members (those who endorsed pursuing economic gain more strongly than they did protecting the environment) was significantly lower from all the other three groups. The HH and LH groups did not differ significantly, but all the other pair-wise comparisons were significant.

Difficulty Ratings

In Study 2, difficulty of making decisions was also examined in an attempt to capture the possible internal value conflict. It was hypothesized that the HH and LL groups should have more difficulty in deciding which option to choose, because they do not have clear guidance from their values, in that they endorse both values to the same

extent. On the other hand, it was expected that decisions would be easier for the HL and LH groups, because they have a clear hierarchy in their value endorsement.

To test this general hypothesis, a mixed-model ANOVA was conducted on the difficulty ratings using the value endorsement pattern as a between-subject variable. The only result of interest is the effect of the value endorsement pattern.

The results showed that the value endorsement pattern was a significant predictor of decision difficulty, $F(3, 260) = 6.07, p < .001, \eta^2 = .07$. Estimated marginal means, however, did not confirm exactly the order expected from the hypothesis. The HL group had the highest difficulty rating (4.05), followed by the LL (3.71), HH (3.27), and LH (2.46) groups. A post-hoc probe using Tukey's HSD at family-wise error rate of .05 revealed that differences between the groups were significant between the HL and LH groups, and the LL and LH groups. Although HH group did not have the highest difficulty ratings, difficulty ratings for other two groups (LL and LH) were as expected; the LH group had the lowest difficulty ratings.

Summary and Interpretation of the Results from Mixed-model ANOVA on Decisions

The situational importance judgments of values were, as predicted, contributing significantly to one's decision as to support or oppose lifting the moratorium. The value endorsement pattern of the two general value ratings was also a significant predictor of one's decisions. As hypothesized, those who had clear hierarchy between the two values either supported or opposed to lifting the moratorium more strongly than those who did not.

However, the difficulty for this decision was not rated highest by the HH group as hypothesized. On the other hand, the hypothesis was confirmed for the LH and LL groups

in that the LH group members (those who endorsed protecting the environment more strongly than pursuing economic gain) had the lowest difficulty ratings and the LL group had the second highest difficulty ratings. Both the HH and LH groups had relatively low difficulty ratings, which indicates that those who endorsed protecting the environment strongly in general were more guided by the value regardless of their degree of endorsement of economic development. It was rather unexpected that the HL group had the highest difficulty ratings. It is possible that there was an influence of social desirability.

One-way ANOVA on Inconsistency Across Situations

Standard deviations across 16 different situational ratings for each individual were calculated again in Study 2 to explore more in the nature of inconsistency in the situational value judgments.

A one-way ANOVA with the value endorsement pattern (i.e., group membership) as a between subject variable was conducted again as in Study 1 to examine whether the degrees of fluctuation were different among the four value endorsement patterns. As in Study 1, the value endorsement pattern was a significant predictor of the degree of fluctuation for protecting the environment, $F(3, 270) = 3.65, p < .05, \eta^2 = .04$, but not for pursuing the economic gain, $F(3, 270) = .49, p > .05$. The LL group (those who did not endorse either values strongly) fluctuated most as predicted (.65), followed by the HL (.62), LH (.41), and HH (.31) groups. However, the difference was significant only between the LL and HH groups, according to a post-hoc probe using Tukey's HSD at family-wise error rate of .05.

Summary of the Analysis of Inconsistency

This analysis was conducted as another way of examining the changes in the situational value importance judgments across different situations. The results replicated Study 1 findings in that the LL and HL groups fluctuated in their situational value importance judgments more than the HH or LH groups. Thus, hypothesis was partly confirmed; the LH group members fluctuated less and the LL group members fluctuated most. However, the HH group did not fluctuate as much as expected in their situational value importance judgments. This finding corroborates the result of mixed-model ANOVA analysis with the value endorsement pattern. These results seem to point to the fact that the HH group was not experiencing internal value conflict, but guided more by their high level of endorsement to the value, protecting the environment.

CHAPTER IV

GENERAL DISCUSSION

In this project, I have explored how the priority of one's values may change across situations, using two similar, but different, environmental problems. The results of two studies help to create clearer understanding of the mechanism of value priority change.

The new conceptualization used in the current studies presents a framework within which we can understand the dynamics of value priority change more systematically, in a situation in which two values are in conflict. As these studies showed, value priorities do change across situations when situational factors change. However, the way they change is guided by the level of one's value endorsement at an abstract level. One's levels of the value endorsement in general provides a framework for the change in that the effect of situational change varies depending on the levels of endorsement.

This conceptualization is in line with Syme et al.'s (1999) suggestion that values at an abstract level (universal fairness, in their example) and a specific level (situational fairness) interact. They interact in that global values provide a framework within which local contexts may be evaluated, and such specific values in turn may influence global values. There may indeed exist a normally stable and enduring hierarchy among global values, but the hierarchy may change as those global values are expressed in real-life situations as a function of contextually and temporally varying circumstances. This perspective is the happy medium between the two extreme views, that the value hierarchy is always stable, and that the value hierarchy is always changing.

However, the degree to which one's general value endorsement levels can influence situational value judgment may depend on which value is being considered. The results of both studies suggest that situational value importance judgments for protecting the environment are more strongly guided by the general endorsement level of the value than those of economic development are by its general endorsement level. Protecting the environment is classified as Universalism in Schwartz' value typology. Universalism values (e.g., wisdom, unity with nature, a world of beauty) are considered to be self-transcendent, so it is reasonable to suggest that they are less likely to be influenced by situational differences. In contrast, pursuing economic development (although it was not an original value in Schwartz' list) resembles other values in the Power (e.g., social power, wealth) and Achievement (e.g., success, ambitious) domains, which is at the opposite end of the Self-Transcendence versus Self-Enhancement dimension. Values in the Self-Enhancement category may be more likely to be influenced by situational differences.

Among situational differences, whether or not the environmental damage is immediate had the strongest effect in both studies. In Study 1, immediate environmental damage was combined with gradual economic profit, and gradual environmental damage was combined with immediate economic gain in the scenario. Although this might have made participants' decision easy, to reflect the real life possibility, these two aspects were separated in the scenarios of Study 2. Then, it became clear that people disregard the information on immediate economic profit when they were making situational value judgment on protecting the environment. The immediacy of environmental damage also had the strongest effect in the situational value judgments of economic development in

Study 2. The effect of immediacy of economic profit was the second strongest effect. This finding might sound counter-intuitive, but the close examination of the effect of the variable reveals an interesting point. The effect of immediate environmental damage was strongest for those judgments, in that the importance judgments (of economic development) became much higher when environmental damage is *not* immediate. It is likely that immediate environmental damage worked like a suppressor; if that situation exists, people cannot seek what they actually want, but if that situation is absent, they can release the desire to pursue economic development and wealth.

Compared to immediacy of environmental damage or economic profit, social norm was the weakest situational influence. It was not a significant effect in the situational value judgment of protecting the environment in Study 1 with a private decision-making situation. However, when the situation in the scenario was changed such that one needs to express a judgment publicly in the presence of significant others, the effect became significant, as expected. Considering such a situation often exists in a real life, it is important to take this situational difference into account when policy makers seek to assess public opinion. As Tetlock et al. (1996) proposed, accountability for one's decision is a strong situational force to influence one's information processing, and the present study corroborates this point.

These various situational differences interact, as hypothesized in Study 2. There was one 3-way interaction each in situational value judgment of each value. The nature of both interactions suggests that when two of the three situational variables point to one direction (e.g., whether to support or oppose lifting the moratorium), the effect of the third variable was enhanced. This kind of combined influence among various situational

variables in affecting one's value importance judgment has important implications in real-life situations, because it is possible that an effect of one variable may change in nature or strength when other variables are present. Thus, it is important to identify and take into consideration all the possible forces at work in a given situation, and understand them as a whole, as a dynamic system in which each influences each other.

Although I have discussed the main effects of situational variables, it is of note that the differences in actual situational ratings were relatively small, even though they were statistically significant. Especially when the effect size was small, the "significant" differences obtained in these data may not be substantively meaningful differences in a real-world context. Thus the interpretation of the results of the effects of situational variables needs caution.

The situational variables not only interact with each other, but also they interact with one's levels of general value endorsement. How to better understand the nature of this interaction was one of the main purposes of the study. When only one value is being considered, the effects of situational differences became smaller as one's level of endorsement of the value in general became higher, which confirmed the hypothesis. This treatment of value endorsement as a continuous variable is a new approach that has not been tried in related studies, such as those in political reasoning.

Another way of capturing the interaction is to consider both conflicting values together, by creating four groups to represent value endorsement patterns: those who endorse both values strongly (HH), those who do not endorse either value strongly (LL), and those who endorse one value much more than the other values (HL and LH). With respect to this grouping, there were two major hypotheses. The first was that taking both

values in consideration should explain one's judgment on the importance better, especially in a situation in which two values are in conflict. However, this was not always the case. In both Study 1 and 2, such value endorsement pattern was a better predictor of one's situational value judgment only for pursuing economic gain. In contrast, for situational value judgments of protecting the environment, general endorsement level for the single value was a better predictor.

This finding suggests that when situational value importance judgments are guided strongly by the level of endorsement for the single value, that one variable may be a better predictor than the two values considered together, since the endorsement level of the second value does not seem to influence the judgment much. On the other hand, situational value importance judgments of pursuing economic development were not as strongly guided by the corresponding general value endorsement level. In such a case, taking the other competing value into consideration may result in a stronger overall prediction.

This finding expands Braithwaite's (1998) finding that taking both values into account could explain one's decision better than one value only, by offering a possible moderating factor. Considering both values together may not always provide a better predicting ability, but it may depends on what specific two values are considered, and how much each value is influencing one's judgment on its own.

The second hypothesis was concerned more specifically with the nature of the interaction between situational differences and the value endorsement pattern; the effects of situational variables should be stronger for the those who do not endorse either values strongly (LL group) because they are not strongly guided by either value and thus they

should be more influenced by situational differences. This hypothesis was supported in both Study 1 and Study 2. The LL group was most influenced compared to other groups by self-interest in Study 1, and immediacy of economic gain in Study 2, for the situational value judgments of economic development. For the situational value judgments of protecting the environment, again LL group was most influenced by self-interest and social norm in Study 1, and immediacy of environmental damage in Study 2.

By demonstrating the susceptibility of the LL group to specific situational influences, my study finding expands Braithwaite's (1998) finding. By including and manipulating actual situational differences, this study was able to show it more clearly.

There was one unexpected, but understandable finding in Study 1: the HL group, not the LL group, was most influenced by the immediacy of economic gain. This finding reminds us of the importance of considering which specific situational factor is being considered. The LL group, although they may be most susceptible to the effect of situational differences, may not be most influenced by *any* situational factors; when the situational factor is most relevant to one of the competing values, it is reasonable that those who endorse that value over the other are most influenced by the factor.

In retrospect, this variable, "immediacy of economic gain," could be considered as a part of the value "pursuing economic development" which was under investigation. Then, it is not surprising that those who rated that value highly also was influenced most by that factor, because it was a component of the value.

Unlike the predicted finding for the LL group, the behavior of the HH group is still not fully explored. Findings from Study 1 suggest that the HH group was less influenced by situational differences than by their levels of general value endorsement.

This finding was replicated in Study 2. Especially in Study 2, the situational fluctuation measure (i.e., standard deviation) for the HH group members indicated that they fluctuated less than other group members. The difficulty ratings also showed that the HH group had relatively low difficulty rating. These findings indicate that the HH group did not experience internal value conflict, as might be expected from Tetlock et al.'s (1986) value pluralism model.

There are a few possible explanations for this finding. First, it is important to consider the nature of two conflicting values. In this study, one of the two conflicting values, protecting the environment, is the Self-Transcendent value, and it is possible for those who endorsed the value strongly that the value was rather "sacred" in Tetlock et al.'s (2000) terminology, and "non-compensatory" in Lockwood's (1999) term, in that people are not willing to trade-off this value with other values. In a situation in which "sacred" values and more secular values are in conflict, people might choose sacred values over the secular values when they need to choose one.

One might argue, given that the ranking of the value, protecting the environment, among the 56 values were 22nd, that the value cannot possibly be a "sacred" value if the ranking among other values were so low; only the values that are at the top of the list could be sacred values.

However, it is important to remember that in my study, only two of the values, protecting the environment and pursuing economic gain, were contrasted with each other, and other values were not considered in the scenario. The value, protecting the environment, could be "sacred" WHEN it is contrasted with the other value, pursuing the economic gain. In fact, in contingent valuation contexts, a typical example of protected

values (which is a very similar concept to sacred value) that people refuse to trade-off with other values is the value people place on natural resources, such as endangered species and old-growth forests (Baron & Spranca, 1997). Thus, it is reasonable to consider the possibility that the value, protecting the environment, was treated as a sacred value.

Another possibility is that, as Tetlock's (1986) value pluralism model states, one tries to avoid the situation in which one is confronted with a difficult trade-off as much as possible. When the situation is merely presented in scenarios, it might be easy for him/her to escape to some easy processing modes, such as denial and bolstering, to solve the internal conflict he or she may be experiencing, without having to weigh carefully the situational differences.

Second, the results of the two studies showed that the situational value judgments of economic development were not strongly guided by the general rating of that value. Thus, it may be reasonable that those who endorsed both values strongly were in fact more influenced by the value, protecting the environment, in their judgments.

Third, the result of this study suggests that paying more attention to situational differences may not be the only way to solve possible internal value conflict one may experience, when he/she endorses both values strongly. Or, even if one pays more attention to situational differences as a means of solving the conflict, the present study might not have included the relevant situational differences for that case. Finding out what other means and what other situational differences one may use is a question for future studies.

Implications for Environmental Decision-making

The results of this study provide some useful guidance in investigating the influence of value priorities on decision-making in environmental issues in real-world settings. Although it has been used routinely in the environmental psychology literature, considering one's general level of endorsement for a particular value does not seem to be enough. There are a number of other factors involved that play an important role, such as: Which values are involved in a certain issue, and which ones are possibly in conflict with each other? Do most people involved perceive them to be in conflict? If some groups of people do not, why not? Which situational factors are involved that influence one's decision? Which situational factor exerts the strongest influence? Which value among other values that are involved in the issue is most influenced by which situational factor? How do situational factors interact with each other to produce new situations? Do individuals involved experience internal value conflict? How does the internal value conflict influence the susceptibility to the effect of situational variables? Identifying these factors would help policy makers understand how the public thinks, or decides which side to support, in an environmental issue.

Limitations of the Study

Some limitations of this study need to be addressed before closing. First, this study employed a paper-and-pencil questionnaire using scenarios. Thus, the generalizability of its results to the real world may be limited, as the results of such questionnaire studies in general are.

Second, there was a possibility of selection bias in both Study 1 and Study 2, in that most respondents endorsed the value, protecting the environment, higher than the

other value, and that they also tended to oppose lifting the moratorium in Study 2. The two measures taken in Study 2 to address this concern may have not been as effective as hoped. Selection bias can be often a problem when dealing with a rather sensitive issue like an on-going environmental debate as the one in Study 2. Future studies should try other methods to address this problem as much as possible.

Related to this issue is social desirability. As in any other sensitive issues, such as prejudice, respondents tend to answer in socially desirable ways. Future studies should include some kind of measure to check the degree of social desirability and to avoid its influence on respondents' answers. For example, Fisher (1993) and Hui (2001) reported that merely changing the question to indirect question (e.g., "What do you think?" to "What do you think most other people would think?") can bring out more honest answers from respondents.

Having said that, relatively high endorsement levels for values (especially for social values, such as "a world at peace") are often reported in other studies (e.g., Braithwaite, 1998). Especially, high level of support for environmental protection or pro-environmentalism has been reported elsewhere (e.g., Dunlap, Van Liere, Mertig, & Jones, 2000) as a trend in North American society. Thus, it is reasonable to think that, when asked as their ideal, many people would answer that they support environmental protection, and that their answer reflects the truth.

Another point that is more specific to this study is the use of median-split to create the four groups to represent the value endorsement pattern of the two conflicting values. Because the rating of protecting the environment was higher than pursuing economic gain in general, even in the HH group, there might have been many who in fact

rated protecting the environment higher than pursuing economic development. Although I tried to reflect the differential distributions of the two values, one might argue that using some absolute values for a cut-off point, regardless of the specific distribution found in a sample, may be more ideal. Future studies can certainly explore how to best capture the difference in value endorsement pattern.

This use of median-split grouping might not have been ideal for the measurement of internal value conflict, either, for the same reason. Although the difficulty of decision rating employed in Study 2 was an attempt to capture better the internal value conflict, it did not seem to be optimal. Ideally, as employed in the analysis of integratively complex information processing (e.g., Lavallee & Suedfeld, 1997; Tetlock, et al., 1986), qualitative analysis may be used. Especially, think-aloud method (e.g., Backlund, Skanuer, Montgomery, Bring, & Strender, 2003) should reveal one's possible internal value conflict better.

However, when researchers measure public opinion using a large sample, this method may not be feasible. Future studies should use and/or develop a better way of capturing one's internal value conflict to investigate its relation with and influence on her decision-making.

Directions for Future Investigation

This study also points toward some new directions for future investigation. First, concerning the situational variables, there are a number of things to consider.
For example, in the manipulation of the situational variable, respondents were "told" that environmental damage was going to be immediate or not. However, in reality, whether environmental damage is perceived to happen immediately or not itself is an individual

difference with various moderating factors, as is the case with global climate change. People tend to interpret the same information differently depending on their pre-existing beliefs and preferences, as known in motivated reasoning (e.g., Ditto, Munro, Apanovitch, Scepansky, & Lockhart, 2003; Redlawsk, 2002). Thus, whether one perceives that an environmental damage is immediate or not itself can provide information as to the person's value orientation. Moreover, people may vary in the degree of trust in the information given from some authorities, such as government (e.g., Slovic, 1997). In the similar vein, people may differ in the degree that they perceive two values are in conflict in a given situation.

In addition to these individual difference factors, another thing to consider is the selection of situational variables; they can be selected by conducting a qualitative analysis of community residents' opinions to truly reflect what situational variables are perceived to be relevant in a given situation.

Especially in the present study, there was a possibility that two situational variables, self-interest and immediacy of impact, were confounded in that one variable simply adds weight to the other. The selection of and method for manipulating situational variables need to be improved in future studies.

Second, there are a few ways to extend the present investigation. For example, in this study, only individual's value endorsement level in general was used as a factor that provides a framework for value importance change across situation. Future studies can include even higher order factors (e.g., country differences) that provide a higher-degree framework for the situational changes. Because factors, such as which specific values exert what degree of influence, may well be different depending on different cultures,

such investigation should prove meaningful. Use of multi-level model analyses, for example, hierarchical linear modeling, would facilitate the analyses.

Another way to extend this study is to investigate more fully the influence of situational variables. In this study, the effect of value endorsement pattern was mainly examined only in terms of the differential degree of effects among situational variables. However, more detailed relationships among situational variables can be investigated, including causal relationships among them. Such relationships may vary according to the value endorsement pattern. Multiple group models using structural equation modeling may be used for such analysis.

Also, future studies can examine the effect of other possible individual differences besides general value ratings on the effects of situational variables. For example, self-monitoring (Snyder & Cantor, 1980) should be a relevant individual difference to include in that self-monitors may be more likely to be influenced by situational differences (e.g., Kristiansen & Hotte, 1996).

In the present study, the effect of gender difference was included in the analysis to examine whether males and females were differentially influenced by the situational variables included in this study. Although none of the results of Study 1 replicated in Study 2, the results from both studies seem to point to one direction. In study 1, females were more likely to rate protecting the environment higher than males, but no difference was found on the rating on pursuing economic development. In Study 2, males tended to rate pursuing the economic development higher than females, although no difference was found on the rating of protecting the environment. Thus, it is possible that females in

general tend to value protecting the environment more than pursuing economic gain, whereas for males, the opposite could be the case.

With respect to the effect of situational variables, females were also more influenced by the approval of significant others, even in a private decision-making context in Study 1. However, this interaction did not replicate in Study 2, in that both males and females were influenced by approval of significant others in a public decision-making context. These results of the present study suggest that females tend to seek for the approval of significant others more than males do across various situations, which confirms Gilligan's (1982) argument that females tend to attend to needs of people involved in the situation more than males. Future studies should examine further the moderating influence of gender difference on the influence of situational variables to see whether this result replicates.

Lastly, future studies can explore more on possible boundary conditions of situational value importance judgment change to identify the situations in which individuals stop being influenced by situational variables. Such boundary condition may be in terms of one's value endorsement level; when one endorses a certain value strongly enough, he or she may not be influenced by situational differences any longer, as seen in the HH group in this study, or in the case of sacred values. On the other hand, boundary conditions can be in terms of situation itself. For example, when an environmental damage became too severe, that situation may dominate to influence people's judgment without being influenced by any other situational factors. Or such severe environmental situation may force people to pay attention to an ultimate value, such as saving life, and nothing else may matter any longer.

These points should be investigated in future research to explore more fully the dynamics of the interaction between one's value endorsement levels and situational information to produce situational value importance changes. The present study is a first step toward elucidating such interactions in a systematic way to pave a road to further investigation.

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APPENDIX I

Scenario questionnaire

Please read the following paragraph, and answer the questions below.

> Please imagine that there is an ecologically significant wilderness area in B.C., which is not designated as a provincial park. Environmental groups have been lobbying government to make it a provincial park so that the nature and biodiversity the wilderness offers can be conserved in perpetuity. However, a powerful mining company also has been strongly lobbying the government, demanding it reconsider the plan to create a park in the area and try to attract mining investment to B.C. Mining development in the area will ensure economic progress and prosperity to the province in general. In this case, it is clear that mining development and natural area conservation cannot coexist; it is a matter of either-or. A BC government committee is now creating a land and resource management plan for the area, and now is the time to let your voice be heard. Imagine that you are about to write a letter to an MP, expressing your support to one side or the other (and assume your letter will make a powerful influence on the committee's plan).

When you make a choice between the two options in the situations below, how much importance would you place on each of the conflicting values as your guiding principle for your decision? Please rate each value separately in each of the following situations (please circle one number for each). Rating ranges from: 1 (not important at all) to 10 (very important).

Situation 1

You have stock in the mining company, and expect that the price of the stock will go up substantially if the company acquires the mining right in the area. Also, all of your friends and relatives are writing to support the mining company, and they told you that we ought to support economic activities in that area. However, you understand that, if the mining development starts, the impact upon the sensitive environment will be immediate and significant. On the other hand, the depressed economic conditions of the area will be only progressively alleviated over the next twenty years as the mining operation ramps up.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 2

You have stock in the mining company, and expect that the price of the stock will go up substantially if the company acquires the mining right in the area. Also, all of your friends and relatives are writing to support the mining company, and they told you that we ought to support economic activities in that area. You also understand that, if the mining development starts, a substantial economic progress in the area will be attained in a short term, while the damage to the natural environment, although significant, will happen only gradually.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 3

You have stock in the mining company, and expect that the price of the stock will go up substantially if the company acquires the mining right in the area. However, you learned that all of your friends and relatives are writing to support the wilderness conservation, and they made it clear to you that what we should do is to conserve the wilderness area. You also understand that, if the mining development starts, the impact upon the sensitive environment will be immediate and significant. On the other hand, the depressed economic conditions of the area will be only progressively alleviated over the next twenty years as the mining operation ramps up.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 4

You have stock in the mining company, and expect that the price of the stock will go up substantially if the company acquires the mining right in the area. However, you learned that all of your friends and relatives are writing to support the wilderness conservation, and they made it clear to you that what we should do is to conserve the wilderness area. On the other hand, you also know that, if the mining development starts, a substantial economic progress in the area will be attained in a short term, while the damage to the natural environment, although significant, will happen only gradually.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 5

You love recreational activities in the wilderness area, and you have actually visited that area before and enjoyed the area very much. It will be very disappointing if the area is lost to mining development. However, all of your friends and relatives are writing to support the mining company, and they told you that we ought to support economic activities in that area. You also understand that, if the mining development starts, the impact upon the sensitive environment will be immediate and significant. On the other hand, the depressed economic conditions of the area will be only progressively alleviated over the next twenty years as the mining operation ramps up.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 6

You love recreational activities in the wilderness area, and you have actually visited that area before and enjoyed the area very much. It will be very disappointing if the area is lost to mining development. However, all of your friends and relatives are writing to support the mining company, and they told you that we ought to support economic activities in that area. You also understand that, if the mining development starts, a substantial economic progress in the area will be attained in a short term, while the damage to the natural environment, although significant, will happen only gradually.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 7

You love recreational activities in the wilderness area, and you have actually visited that area before and enjoyed the area very much. It will be very disappointing if the area is lost to mining development. As well, all of your friends and relatives are writing to support the wilderness conservation, and they made it clear to you that what we should do is to conserve the wilderness area. You also understand that, if the mining development starts, the impact upon the sensitive environment will be immediate and significant. On the other hand, the depressed economic conditions of the area will be only progressively alleviated over the next twenty years as the mining operation ramps up.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Situation 8

You love recreational activities in the wilderness area, and you have actually visited that area before and enjoyed the area very much. It will be very disappointing if the area is lost to mining development. As well, all of your friends and relatives are writing to support the wilderness conservation, and they made it clear to you that what we should do is to conserve the wilderness area. On the other hand, you also understand that, if the mining development starts, a substantial economic progress in the area will be attained in a short term, while the damage to the natural environment, although significant, will happen only gradually.

Economic gain: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important
Protecting the environment: Not important at all 1 2 3 4 5 6 7 8 9 10 Very important

Thank you so much for your cooperation.

APPENDIX II

Schwartz Value Survey

Please rate each value listed below AS A GUIDING PRINCIPLE IN YOUR LIFE, on the scale below, ranging from –1 (opposed to my value), to 0 (not important), to 7 (of supreme importance). There are no "correct" answers; just give your own opinion. Please circle the appropriate number for each value.

Value	Brief explanation	Rating **Opposed ——————> Important**
Equality	equal opportunity for all	-1 0 1 2 3 4 5 6 7
Inner harmony	at peace with myself	-1 0 1 2 3 4 5 6 7
Social power	control over others, dominance	-1 0 1 2 3 4 5 6 7
Pleasure	gratification of desires	-1 0 1 2 3 4 5 6 7
Freedom	freedom of action and thought	-1 0 1 2 3 4 5 6 7
Spiritual life	emphasis on spiritual not material matters	-1 0 1 2 3 4 5 6 7
Sense of belonging	feeling that others care about me	-1 0 1 2 3 4 5 6 7
Social order	stability of society	-1 0 1 2 3 4 5 6 7
An exciting life	stimulating experiences	-1 0 1 2 3 4 5 6 7
Meaning in life	a purpose in life	-1 0 1 2 3 4 5 6 7
Politeness	courtesy, good manners	-1 0 1 2 3 4 5 6 7
Wealth	material possessions, money for self	-1 0 1 2 3 4 5 6 7
National security	protection of my nation from enemies	-1 0 1 2 3 4 5 6 7
Self-respect	belief in one's own worth	-1 0 1 2 3 4 5 6 7
Reciprocation of favors	avoidance of indebtedness	-1 0 1 2 3 4 5 6 7
Creativity	uniqueness, imagination	-1 0 1 2 3 4 5 6 7
A world at peace	free of war and conflict	-1 0 1 2 3 4 5 6 7

Value	Brief explanation	Rating
		Opposed ——————> Important
Respect for tradition	preservation of time-honored customs	-1 0 1 2 3 4 5 6 7
Mature love	deep emotional and spiritual intimacy	-1 0 1 2 3 4 5 6 7
Self-discipline	self-restraint, resistance to temptation	-1 0 1 2 3 4 5 6 7
Detachment	from worldly concerns	-1 0 1 2 3 4 5 6 7
Family security	safety for loved ones	-1 0 1 2 3 4 5 6 7
Social recognition	respect, approval by others	-1 0 1 2 3 4 5 6 7
Unity with nature	fitting into nature	-1 0 1 2 3 4 5 6 7
A varied life	filled with challenge, novelty, and change	-1 0 1 2 3 4 5 6 7
Wisdom	a mature understanding of life	-1 0 1 2 3 4 5 6 7
Authority	the right to lead or command	-1 0 1 2 3 4 5 6 7
True friendship	close, supportive friends	-1 0 1 2 3 4 5 6 7
Economic development	having greater economic progress and prosperity for the nation and province in general	-1 0 1 2 3 4 5 6 7
A world of beauty	beauty of nature and the arts	-1 0 1 2 3 4 5 6 7
Social justice	correcting injustice, care for the weak	-1 0 1 2 3 4 5 6 7
Independent	self-reliant, self-sufficient	-1 0 1 2 3 4 5 6 7
Moderate	avoiding extremes of feeling and action	-1 0 1 2 3 4 5 6 7
Loyal	faithful to my friends, group	-1 0 1 2 3 4 5 6 7
Ambitious	hardworking, aspiring	-1 0 1 2 3 4 5 6 7
Broad-minded	tolerant of different ideas and beliefs	-1 0 1 2 3 4 5 6 7

Value	Brief explanation	Rating Opposed ——————> Important
Humble	modest, self-effacing	-1 0 1 2 3 4 5 6 7
Daring	seeking adventure, risk	-1 0 1 2 3 4 5 6 7
Protecting the environment	preserving nature	-1 0 1 2 3 4 5 6 7
Influential	having an impact on people and events	-1 0 1 2 3 4 5 6 7
Honoring of parents and elders	showing respect	-1 0 1 2 3 4 5 6 7
Choosing own goals	selecting own purposes	-1 0 1 2 3 4 5 6 7
Healthy	not being sick physically or mentally	-1 0 1 2 3 4 5 6 7
Capable	competent, effective, efficient	-1 0 1 2 3 4 5 6 7
Accepting my portion in life	submitting to life's circumstances	-1 0 1 2 3 4 5 6 7
Honest	genuine, sincere	-1 0 1 2 3 4 5 6 7
Preserving my public image	protecting my "face"	-1 0 1 2 3 4 5 6 7
Obedient	dutiful, meeting obligations	-1 0 1 2 3 4 5 6 7
Intelligent	logical, thinking	-1 0 1 2 3 4 5 6 7
Helpful	working for the welfare of others	-1 0 1 2 3 4 5 6 7
Enjoying life	enjoying food, sex, leisure, etc.	-1 0 1 2 3 4 5 6 7
Devout	holding to religious faith and belief	-1 0 1 2 3 4 5 6 7
Responsible	dependable, reliable	-1 0 1 2 3 4 5 6 7
Curious	interested in everything, exploring	-1 0 1 2 3 4 5 6 7
Forgiving	willing to pardon others	-1 0 1 2 3 4 5 6 7
Successful	achieving goals	-1 0 1 2 3 4 5 6 7
Clean	neat, tidy	-1 0 1 2 3 4 5 6 7

Appendix III

Scenario Questionnaire

The Government of British Columbia has asked the federal government to consider lifting the moratorium on oil and gas development off the shores of British Columbia (Queen Charlotte Basin: QCB). This issue has been controversial, creating a conflict between the oil and gas industry, which emphasizes the potential economic profit of the development, and environmental groups, which are concerned with the protection of ecosystems.

Here is some information that supports each side:

Economic potential

Although there has not been any actual commercial discovery, the QCB has potential for oil and gas. Current estimates suggest that there are enough fields of oil that produce 1.3 billion barrels, worth approximately C$50 billion, and 9.8 trillion cubic feet of recoverable gas, worth about C$60 billion. This hydrocarbon potential of the Basin is similar to that of mature Cook Inlet oil and gas fields in Alaska, and to that of the currently developed or developing fields in the Jeanne d'Arc Basin off the shores of Newfoundland.

Precious ecosystems

The QCB offers a habitat for more than 20 ecologically sensitive species (16 of them are designated as "endangered," "threatened," or "of special concern"), such as whales, sea otters, and seabirds (for some, this area is the only place on earth for their colonies). The basin also contains a series of sponge reefs that is unique in the world. Exploration and production of oil and gas is considered to have serious negative effects on these ecosystems. For example, seismic surveys use air gun acoustic sources, which are seriously harmful to marine mammals and fish. Exploratory and production drilling will produce harmful waste that is detrimental to organisms on the seabed. The transportation of oil poses another concern, because of the possibility of major or minor oil spills.

Now, please imagine that you are at one of the public hearings to provide policy makers with information of public reaction to this issue. You are going to **voice your opinion in public** whether you support or oppose the lifting of the moratorium.

Please imagine also that you are in each of the following situations. For each of them, please answer the same set of questions below.

Situation 1:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 2:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 3:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- However, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 4:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- On the other hand, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 5:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- It is also estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 6:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- However, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

Protecting the environment:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?

Strongly support lifting it ←----------→ Strongly oppose lifting it

5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?

Not at all difficult ----------Very difficult

1 2 3 4 5 6 7 8 9 10

Situation 7:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- However, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 8:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- On the other hand, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.

- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 9:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- On the other hand, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

Protecting the environment:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?

Strongly support lifting it ←----------→ Strongly oppose lifting it

5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?

Not at all difficult ----------Very difficult

1 2 3 4 5 6 7 8 9 10

Situation 10:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 11:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 12:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that the QCB oil and gas development will produce, in the short-term, many jobs and a large profit annually.
- However, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

Protecting the environment:

Not at all important ---------- Very important

1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?

Strongly support lifting it ←----------→ Strongly oppose lifting it

5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?

Not at all difficult ----------Very difficult

1 2 3 4 5 6 7 8 9 10

Situation 13:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- On the other hand, it is estimated that even at the exploration stage, serious damage to the ecosystem will happen almost immediately.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ---------- Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 14:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ----------Very difficult
1 2 3 4 5 6 7 8 9 10

Situation 15:

- You have no prospect of receiving any profit from the oil development. Moreover, you have been thinking about visiting that area for ecotours and water sports, such as kayaking and fishing. You would rather keep the area unspoiled.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

Protecting the environment:

Not at all important ----------Very important

1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?

Strongly support lifting it ←----------→ Strongly oppose lifting it

5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?

Not at all difficult ----------Very difficult

1 2 3 4 5 6 7 8 9 10

Situation 16:

- You own stock in the oil and gas company that will develop the QCB, and it is certain that its stock price will go up once the development starts.
- It is estimated that oil is unlikely to be produced for at least 15 years, and the economic conditions in the area will be improved only over the long term as the oil and gas production increases.
- At the same time, it is estimated that the damage to the ecosystem should occur only gradually, giving time for animals and plants to adjust to the environmental changes.
- Several of your friends and significant others are present at the public hearing and all of those present clearly support NOT lifting the moratorium, and they tell you that is what you should do too.

In this particular situation, how much importance would you place on each of the following values as the guiding principle of your decision? (Please circle one number for each item.)

Economic development and prosperity:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

Protecting the environment:
Not at all important ----------Very important
1 2 3 4 5 6 7 8 9 10

What would be your decision about the moratorium?
Strongly support lifting it ←----------→ Strongly oppose lifting it
5 4 3 2 1 0 1 2 3 4 5

Was it difficult for you to make this decision?
Not at all difficult ---------- Very difficult
1 2 3 4 5 6 7 8 9 10

Thank you so much for your cooperation!!
I realize that this was a long questionnaire, and I deeply appreciate your completing it.