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EMOTION AND INDIVIDUAL REASONING ABOUT CRISES AND
DISASTERS

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For my amazing parents, Mike and Cyndi Ripberger, and मेरी जान, Kuhika Gupta

Ripberger.

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think about and respond to crises and disasters

Abstract

This dissertation advances our understanding of the way that individuals think about and respond to natural and anthropogenic disasters. I accomplish this by way of theoretical specification and empirical testing. With respect to theory, I build upon recent research on the relationship between affect, risk, and decision-making to hypothesize that the specific emotions (i.e., fear, anger, sadness) that individuals experience when confronted with a crisis or disaster orient the way in which they think about and respond to the situation. Moreover, I propose that the specific emotions people experience in response to a crisis or disaster are not entirely stochastic; rather, different groups of people are predisposed to experience different emotions when encountering the same situation.

After deriving these propositions from the literature I subject them to empirical testing by asking survey respondents to think about and respond to a hypothetical disaster wherein the United States suffers a devastating nuclear attack. In all, I find evidence in support of three propositions: 1) affect influences the way in which people think about disasters; 2) discrete emotions of the same valence (like anger, sadness, and fear) differentially impact individual responses to disasters; 3) different groups of people (as defined by shared cultural and socio-biological attributes) are predisposed to experience different emotions when given the same information about a crisis or disaster.

Chapter 1: Individual Responses to Crises and Disasters

1.1: Introduction

On May 22, 2011, one of the most devastating tornadoes in US history killed 159 people and injured thousands of others in Joplin, MO. According to the National Weather Service (National Weather Service 2011), this storm was a "warned" disaster in that the residents of Joplin received advance notice—via repeated tornado sirens— and critical information about the impending severe weather prior to the arrival of the tornado. Fortunately, a large fraction of Joplin residents reacted to these warnings by immediately seeking shelter. Others reacted by seeking additional information about the approaching storm (i.e., TV, radio, or Internet updates). A third subset of residents, by contrast, received the same set of warnings, but decided not to react. In other words, post-storm interviews indicate that this group of people received the same information (warning signals) but made different decisions about how to respond (National Weather Service 2011). The decisions that people made on that afternoon were extremely consequential— in some instances, unfortunately, making the difference between life and death.

In a broad sense, this dissertation attempts to explain why people make the decisions they do when confronted with information about a crisis or disaster. Why, for example, did some residents of Joplin seek shelter whereas others decided to ignore the tornado warnings?

1.2: Previous Research

Systematic research on individual responses to disasters began in the early 1950s when a relatively small group of researchers (primarily sociologists and psychologists) were commissioned by the US military to study the way in which US residents respond to disasters. These studies were undertaken because the military was worried that the public would resort to an uncontrollable state of panic and flight if a war was initiated on the mainland (Quarantelli 1987). Fortunately, war does not occur very frequently, so the military—by extension of this group of researchers—directed their study towards other sorts of "peacetime" disasters. Between 1950-1954, for example, a team of social scientists associated with the National Opinion Research Center (NORC) at the University of Chicago inventoried individual behavior at eight different disaster sites, ranging from an earthquake in Bakersfield, CA, a tornado in White County, AR, to airplane crashes in Elizabeth, NJ and Flagler, CO (e.g., Fritz and Marks 1954; Bucher 1957; and Quarantelli 1960).[1] Though each of these studies yielded a slightly different set of insights, their cumulative finding was rather clear—the panic, flight, and other types of uncontrolled asocial behavior (like exploitation and looting) that the military was worried about is relatively uncommon.

Having dispelled this myth, the growing group of scholars interested in individual responses to disaster began documenting other sorts of behavior, which again, contradicted conventional wisdom of the time. For instance, researchers

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[1] For a thoughtful review of this research, see Quarantelli 1987.

repeatedly witnessed "convergence behavior" in the immediate aftermath of disasters wherein concerned citizens migrated towards rather than away from the area that was impacted (e.g., Fritz and Mathewson 1957).[2] Similarly, scholars observed high levels social solidarity and altruistic behavior before, during, and after disasters (e.g., Fritz 1961; Wilmer 1958; Barton 1969).[3] Again, this account of individual behavior during crises reaffirmed the notion that individuals are not the self-interested and mindless beings that the military was worried about. Nevertheless, early research on individual reactions to disasters identified a number of anomalies that led some scholars to question public "rationality." Most notably, researchers found that large portions of the public took little if any precautionary/protective action to mitigate the impact of disasters as they approached (e.g., Blum and Klass 1956; Lachman, Tatsuoka, and Bonk 1961; Williams 1964). This observation persisted even if the victims received advanced warning of the disaster (Fritz and Marks 1954).

As the 1950-1960s waned, puzzling findings such as these stimulated a new era of disaster research, wherein scholars spent less time describing public responses to crises and more time answering specific questions about why individuals respond to disasters in different ways. In other words, description

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[2] For subsequent research on convergence behavior, see Scanlon 1992 and Tierney, Lindell, and Perry 2001.

[3] For subsequent research on altruistic behavior during and after disasters, see Dynes, Quarantelli, and Wenger 1990, O'Brien and Mileti 1992, and Mileti 1999.

gave way to causal inference, as social scientists sought to better explain variation in inter-individual decision-making during disasters. Research of this type tended to focus on the most basic decisions that individuals face in the moments leading up to a disaster, like whether or not they should evacuate. In their initial attempts to address these kinds of questions (the late 60's – early 70's), scholars advanced and tested hundreds of hypotheses about the various factors that might impact decisions to evacuate.

Over time, scholars subjected these hypotheses to repeated tests in order to derive a theoretically and empirically refined list of the variables that influence decision-making during disasters. For example, Baker (1979) waded through a pool of 75 variables to find that the most consistent predictors of hurricane evacuation (across multiple storms) were expectation of damage and residential location. People who were convinced that the incoming storm would produce dangerous wind speeds and storm surges tended to evacuate whereas the people who thought the storm would be less severe tended to stay in their homes. In other words, individuals were more likely to evacuate if they believed that the warning they received was valid. Second, evacuation was more common in lower elevations near the ocean, suggesting that individuals who live in these areas recognized the increased vulnerability and acted accordingly. In a separate study, Perry (1979) sorted his way through a mound of empirical evidence to come up with a similar set of conclusions. Decisions about evacuation, he found, are impacted by two individual-level factors—calculations about whether or not a

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threat is "real" and individualized assessments of risk (Perry 1979). Based on this finding, he argued that people ask themselves two questions when deciding how to respond to the incoming storm—is the warning credible and how likely is it that they (or their families) will be impacted?

In the 30+ years since these studies were published, Baker, Perry, and a variety of other scholars have continued to study individual-level decision-making during disasters (e.g., Baker 1988; 1991; Lindell and Perry 1992). In so doing, they have branched out from early studies of hurricane evacuation to different types of natural and man-caused disasters as well as different types of precautionary actions. Likewise, researchers have used multiple sources of information including surveys, in-depth interviews, and experiments to better explain variation in individual decision-making during disasters. Because of this collective research endeavor, most researchers would agree that we now have a relatively small list of factors that consistently impact decision-making during disasters. As summarized by Mileti and Sorensen (1990), Whitehead, Edwards, Van Willigen, Maiolo, Wilson, and Smith (2000), and many others, the factors that top this list can be grouped into three categories: information inputs (disaster warnings), perceived credibility and accuracy of information (including warning systems), and individual assessments of risk.[4] With respect to information, for example, repeated studies have shown that people who hear about a disaster prior

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[4] For other summaries of this literature, see Lindell and Perry 1992, Sorensen 2000, Tierney, Lindell, and Perry 2001.

to its occurrence (e.g., a warning was issued and they received it) and trust that the information they receive is credible tend to take more precautionary actions than people who do not receive or trust this information. Likewise, individuals who judge that a disaster directly threatens their health, safety, or property are more likely to take precautionary action than those who perceive lower levels of personal risk.

Based on these findings, we can start to answer the questions about individual decision-making during the Joplin disaster that motivated this chapter. For instance, when deciding whether or not to seek shelter as the storm approached, residents of Joplin explicitly or implicitly engaged in a set of questions and calculations that looked something like this:

1) Did I hear the warning?

2) [If yes] Is the warning credible? (Or do I think it is a false alarm?)

3) [If yes] How likely is it that a tornado will touch down at my current location?

4) [If deemed likely] If a tornado does touch down at my currently location, how much damage will it do?

If previous research is correct, the residents that answered *no* to questions 1 and/or 2 probably decided not to seek shelter. The group of residents that answered *yes* to questions 1 and/or 2, most likely went on to answer questions 3 and 4 about the relative risk (probability and consequences) of a tornado impacting them. All else equal, the people that perceived relatively low levels of

personal risk were less likely to take precautionary action (seek shelter) than the group of people who perceived high levels of risk.[5]

Though explanations like this—which are prominently featured in a number of post-disaster reports (including the National Weather Service report on Joplin and the "historic" Tornados of April 2011)—provide valuable insight into the way in which some individuals respond to disasters, I argue in this dissertation that these explanations tell only half the story. They overlook the possibility that affect and emotion, rather than (or in addition to) "rational" calculation based on systematic reasoning influence the way in which individuals think about and respond to disasters. Is it possible, for example, that some portion of Joplin residents sought shelter because they were *more frightened* by the possibility of a tornado than were other residents? What about *apathy* and *frustration*—how might these emotions have influenced individual decisions about what to do upon receiving the tornado warning? Unfortunately, we are (as yet) unable to answer questions of this sort because the story told by extant research on individual reasoning about crises and disasters incomplete.

1.3: Overview of the Dissertation

In a broad sense, this dissertation marks an initial attempt to rectify this theoretical lacuna by telling the affect side of the story. To accomplish this, the

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[5] The National Weather Service's "after-action" assessment of the Joplin tornado (National Weather Service 2011) reveals partial support for these propositions.

remaining sections of the dissertation proceed as follows. In Chapter 2, I borrow from research on risk and decision science to provide a short review of the literature on affect and decision-making. In so doing, I highlight the theoretical and empirical progress that scholars have made on this front and discuss a number of areas that require more research. Based on this discussion, I then propose a more complete model of human responses to crises and disasters that incorporates the role of emotion. From there I move on to Chapter 3, wherein I describe and empirically validate my approach to measuring emotion, which is a necessary first step in testing the model I propose. Along the way, I highlight the extent to which different people experience different types—and levels—of discrete emotion (fear, anger, and sadness) when given the same information regarding a crisis or disaster. I then move on to Chapter 4, which is motivated by a relatively straightforward follow-up question: do these differences matter? In other words, do discrete emotions of the same valance—like anger, fear, and sadness—differentially influence the individual reasoning about and respond to crises and disasters? After that, I proceed to Chapter 5, where I focus on an important yet understudied question in the literature—are the discrete emotions that individuals experience when contemplating a crisis or disaster randomly distributed across the population, or are certain groups predisposed to experience specific kinds of emotions when responding to different types crises and/or disasters? Chapter 6 concludes the dissertation with a brief summary of my findings and a discussion about the theoretical and practical implications of my work as well as some

remarks about directions for future research.

As a brief prelude to this discussion, it is important to note that this dissertation draws upon research from a variety of fields (i.e., social psychology and risk analysis) to achieve the essential yet *intermediate* goal of advancing our understanding of the way that individuals think about and respond to natural and anthropogenic disasters. The more important and *ultimate* goal of this research is to improve our capacity (as a society) to protect life and property by minimizing the impact of crises and disasters. Doing so, however, requires that policymakers design programs and communication strategies that are sensitive to and reflect the nuances of human cognition and behavior. This is exceedingly difficult if (as argued above) policymakers overlook or misunderstand the critical role that emotion plays in these processes. Thus, while I borrow from and contribute to research in other fields, this dissertation is firmly rooted in the interdisciplinary field of *public policy*, which (among other things) "speaks truth to power" by providing policymakers with the information they need to manage risk in a complex and uncertain world.

Chapter 2: Emotion and Decision-Making

2.1: The State of the Literature

Psychologists have long recognized that human decision-making and behavior are governed by a dual-process wherein affective experience and analytical reasoning interact to influence thinking, knowing, and information processing (e.g., Epstein 1994; Sloman 1996; Loewenstein, Weber, Hsee, and Welch 2001; Chaiken and Trope 1999; Kahneman 2003). Analytical reasoning characterizes the slow, systematic, deliberative, and effortful process by which people "rationally" sort through information to determine which decision or behavior maximizes their goals or preferences. Classic exercises like cost vs. benefit analysis or the weighing of pros and cons when making a decision provide some examples of analytical reasoning. Anyone that has engaged in these exercises understands that this sort of reasoning can be effortful and slow.

Affective cognition, by contrast, denotes the relatively fast, automatic, intuitive, and effortless process by which people—consciously or unconsciously—draw upon their emotions or feelings when deciding what to do in a given situation. Decisions that are made based upon "gut feelings", for example, represent one form of affective cognition. Again, anyone that has engaged in this sort of reasoning recognizes that is relatively fast and easy in that it requires little if any external information or systematic thought.

Though debate persists about the symbiotic relationship between these processes, the majority of biological, cognitive, and social psychologists agree

that many—perhaps even the majority—of decisions that humans make are influenced if not determined by some form of affective cognition (e.g., Schwartz and Clore 1988; Zajonc 1998; Loewenstein and Lerner 2003). This is especially likely, scientists say, when people have to make quick decisions in situations imbued with uncertainty (e.g., LeDoux 1996).

Despite early and widespread agreement among psychologists, decision scientists have been somewhat hesitant to incorporate affect into models of judgment and decision-making (Loewenstein, Hsee, Weber, and Welch 2001). Instead, mainstream risk and decision research in the 1970s and 1980s (like contemporary disaster research), tended to focus on analytical reasoning and/or the set of heuristics and cognitive biases that interrupt and misdirect individual pursuit of expected utility (e.g., Kahneman, Slovic, and Tversky 1982).

This began to change in the 1990s when Paul Slovic and his colleagues commenced their work on the relationship between imagery, affect, stigma, and decision-making (for examples of this work, see Flynn, Slovic, and Kunreuther 2001). In their first study, for example, Slovic, Layman, Kraus, Flynn, Chalmers, and Gesell (1991) found that affectively charged mental images influence decisions about where to vacation, relocate, and retire. All else equal, people are more likely to visit/reside in a location they associate with positive images. After that, Slovic and his colleagues extended their work on affect-laden mental images to a wide variety of judgments, decisions, and behaviors, including individual perceptions of the risks and benefits of nuclear power (Alhakami and Slovic

1994), adolescent decisions to smoke (Benthin, Slovic, Moran, Severson, Mertz, and Gerrard 1995), and individual support and opposition to new technologies (Peters and Slovic 1996).

As these results accumulated, Slovic and his collaborators noticed a more general pattern, wherein individuals regularly use feelings as a substitute or shortcut for analytical reasoning when making decisions. Giving name to this recognition, they began calling this pattern of reasoning the "affect heuristic" (Slovic, Finucane, Peters, and MacGregor 2007). In short form, decision-making by way of the affect heuristic looks something like this:[6]

1. An individual encounters a stimulus (e.g., an event, technology, hazard, image, narrative, etc.)

2. The stimulus evokes a "pool" of positive (good) and/or negative (bad) feelings

3. The individual consciously or unconsciously draws from this pool of affective information when making a decision about how to respond to the stimulus.

Since then, theorists have used the affect heuristic to predict and explain an impressive variety of decisions and behaviors in a number of substantive domains, ranging from decisions about charitable giving (Small, Loewenstein,

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[6] Slovic and his colleagues' notion of an "affect-heuristic" is quite similar to the "affect-as-information" model that was originally developed by Schwartz and Clore (1983).

and Slovic 2007), sensitivity to mass tragedies like genocide (Slovic 2010), and perceptions of environmental risk (Slovic and Slovic 2005; Leiserowitz 2005; 2006), to investment behavior (Shiv, Loewenstein, Bechara, Damasio, and Damasio 2005), judgments about the probability of terrorism (Sunstein 2003), and opinions about political leaders, events, and issues (Lodge and Taber 2005).

Based on this growing body of research, a considerable number of decision theorists now agree that emotion plays an important role in human judgment and decision-making. For example, noted theorist and Nobel laureate Daniel Kahneman referred to research on affect and decision-making as "the most important development in the study of judgment heuristics in the past few decades" (2003, 710). The current editors of *Risk Analysis* (the flagship journal for the Society for Risk Analysis) would probably agree with his assessment, as approximately half of the 20 most cited articles in the journal focus on the relationship between affect, risk perceptions, and human behavior (Greenberg, Haas, Cox, Lowrie, McComas, and North 2012). In light of this agreement, affective processes are prominently featured in most, if not all, "state of the art" models of human judgment, decision-making, and behavior (e.g., Kahneman 2011; Manktelow 2012; Holyoak and Morrison 2012).

2.2: Controversies and Empirical Soft Spots in the Literature

Valence-Based vs. Emotion-Specific Approaches

Despite this broad agreement, research on the role of affect in decision-

making is relatively immature. As recognized by Slovic and Peters (2006), our theories are fragmented and overly simplistic. Likewise, the pool of empirical evidence that scholars have mounted in support of their theories is broadening, but remains relatively shallow. As a result, there are a number of theoretical controversies and empirical soft spots[7] within the literature in need of resolution and/or fortification.

One of the most prominent controversies involves the distinction between *valence-based* and *emotion-specific* approaches to the study of affect and decision-making. Advocates of valence-based approaches—like the affect heuristic—argue that the positive or negative valence (e.g., hedonic pleasantness vs. unpleasantness) that individuals associate with their feelings is the most significant if not only piece of information they use when engaged in affective processing. In other words, global assessments of positive or negative affect drive human judgment and decision-making, rather than more specific emotions like anger, fear, sadness, and/or happiness. In partial support of this claim, scholars have amassed mounds of empirical support for the relatively general proposition that negative emotions (regardless of their type) elicit pessimistic expectations about the future, whereas positive emotions bring about relatively optimistic expectations (see Forgas 2003 for reviews).

Though parsimonious, critics argue that this approach confounds

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[7] An "empirical soft spot" is a portion of the literature where theory has outpaced empirical testing.

"common sense" and current research by implying that discrete emotions of the same valence, like sadness, anger, and fear, exert analogous influences on human thinking, preferences, decision-making, and behavior (Lerner and Keltner 2000). Almost anyone that has experienced this mix of emotions, they argue, could tell you that anger, fear, and sadness "feel" different. In line with this insight, current research in psychology and neuroscience indicates that sadness, anger, fear, and other basic emotions differ in their antecedent appraisals (e.g., Smith and Ellsworth 1985), facial expressions (Izard 1971; Ekman 1994), and physiological reactions (Panksepp 1982; Levenson, Ekman, & Friesen, 1990), despite their common valence. Given these differences, one would expect that discrete emotions of the same valence like sadness, anger, and fear, differentially impact human thinking, preferences, decision-making, and behavior.

Motivated by this recognition, a number of decision theorists have moved "beyond valence" to develop and test theories about affect and decision-making that explicitly incorporate the idea that discrete emotions of the same valance may have a different effect on human thinking, preferences, decision-making, and behavior (e.g., Bodenhausen, Sheppard, and Kramer 1994; Lerner and Keltner 2000, 2001; DeSteno, Petty, Wegener, and Rucker 2000; Lerner, Small, and Lowenstein 2004; Small and Lerner 2008). Most notably, Jennifer Lerner and her colleagues have developed and tested a theory they call the Appraisal-Tendency Framework (ATF) (Lerner and Keltner 2000). Inspired by research on cognitive-appraisal theory (Smith and Ellsworth 1985), the ATF argues that the events,

actions, and other stimuli that individuals encounter elicit a set of cognitive appraisals[8]—i.e., valence, certainty, responsibility, control—that trigger specific emotions which, although biologically tailored to help humans respond to the stimuli that evoked the initial appraisals/emotions, often persist beyond the eliciting situation to influence human judgment and behavior.

Anger, for example, arises from negative appraisals of (a) the responsibility of "other(s)" rather than the "self" for an unwanted or harmful situation, coupled with (b) a strong sense that individuals have control over the situation, and (c) a high degree of certainty about what caused the situation and what the result of that situation will be (e.g., Averill 1983; Betancourt and Blair 1992; Smith and Ellsworth 1985). Fear, by contrast, is triggered by (a) intense uncertainty about (b) an unwanted or harmful situation (in the present and in the future), combined with (c) a sense that the situation is beyond individual control (Smith and Ellsworth 1985). From a functional (evolutionary) perspective, the set of appraisals associated with anger prepare an individual to remove or attack the agent responsible for the situation (Izard 1977). By comparison, the pattern of appraisals associated with fear prepares a person to escape or avoid an unwanted or harmful situation. In other words, anger prepares the body to *fight* whereas fear prepares for *flight*, and the ATF argues that the set of appraisals associated with

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[8] For original expressions of appraisal theory, see Frijda (1986), Scherer (1984), and Smith and Ellsworth (1985). For useful reviews of this literature, see Scherer, Schorr, and Johnstone (2001) and Ellsworth and Scherer (2003).

these emotions carryover to motivate judgment and decision in a manner that is consistent with these action tendencies.

In recent years, scholars have amassed a large and growing body of evidence that supports the AFT and emotion-specific approaches more broadly. For example, Lerner and Keltner (2000) found that fear inflates and anger deflates perceptions of risk. Adding to this, Lerner and Keltner (2001) found that angry people tend to be optimistic about future risks whereas fearful individuals tend towards pessimism. In the same study, they also found that angry people are "risk-seeking" in that they tend to take risks when given the opportunity whereas fearful people are "risk-adverse" in that they avoid risk when possible. Having examined the differential impact of fear and anger on risk perceptions and decision-making, Lerner, Gonzalez, Small, and Fischhoff (2003) then turned to the relationship between emotions and preferences about how the government should deal with a specific kind of risk— that of terrorism. Upon doing so, they found that angry individuals tend to support vengeful policies whereas individuals that experience heightened levels of fear generally support more precautionary/conciliatory policies.

Despite these interesting and important findings, emotion-specific studies of affect and decision-making are vastly outnumbered by the exponentially increasing set of valance-based studies that populate mainstream journals in the field. Thus, the jury is still out about which approach better characterizes the way in which people think about and respond to the myriad of situations they face in

everyday life. More research is necessary if we want to solve this important debate.

Individual Differences

An even thinner spot in the literature involves our understanding of individual-level variation in affective responses to the same stimuli. Why is it, for example, that technologies like nuclear energy elicit positive images and feelings in some portions of the population and negative images and emotions in other portions of the population? Why does the thought of terrorism scare some groups of people and anger or sadden others?

With a few notable exceptions, risk and decisions-theorists have been relatively silent on this question.[9] In the few spots where scholars have implicitly addressed this issue, they suggest that emotional experience is governed by exposure to information (e.g., Finucane, Alhakami, Slovic, and Johnson 2000). People experience different emotions because they are exposed to different information. Nuclear energy, for example, elicits positive images in some portions of the population and negative images in other portions of the population because people are exposed to different sorts of information about the technology. Those that are exposed to positive information experience positive affect whereas the portions of the population that are exposed to negative information tend to

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[9] This research is rather scant in psychology as well. For a useful review, of the literature that does exist, see van Reekum and Scherer (1997).

experience negative feelings when thinking about nuclear energy (Finucane, Alhakami, Slovic, and Johnson 2000).

Though important, the aforementioned account is unable to explain differences among individuals that are exposed to (or have access to) the same set of information. Accordingly, Jenkins-Smith (2001) offers an updated model based on the idea that human beings are endowed with a fairly complex set of "filters" that direct our attention to certain types of information and away from other types of information.[10] By implication, people with different filters may be exposed to the same set of information, but focus on different subsets of that information that elicit different appraisals, and consequently, different emotional experiences. Thus, if we want to understand individual differences with respect to emotional experiences, we have to understand the different sets of cognitive filters that direct individual attention.

Cultural Worldviews

Jenkins-Smith (2001) found that cultural worldviews represent one such filter that varies systematically across individuals. Though culture is a multi-dimensional concept defined by a myriad of individual experiences, Jenkins-Smith follows the work that Mary Douglas, Aaron Wildavsky, and other "Cultural Theorists" in defining culture according to individual preferences with respect to

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[10] In some ways, this process is the affective analogue to confirmation bias, which effects analytical reasoning.

social interaction (e.g., Douglas 1970, 1982; Wildavsky and Dake 1990; Thompson, Ellis, and Wildavsky 1990).

More specifically, Cultural Theory (CT) argues that worldviews—and the biases that flow from them—are determined by individual orientations with respect to two dimensions of social interaction, group and grid.[11] The *group* dimension captures the degree to which a person identifies with a bounded unit or social group. At the low end of the group continuum, people stand outside group boundaries and are identified (by themselves and others) as autonomous actors who (for better or worse) are dependent upon their own devices. Individuals at the high end of the group continuum, by comparison, define themselves according to their group affiliations and allow the group to guide (and, in the extreme, determine) what they do and when they do it.

The *grid* dimension denotes the degree to which a person's life—including their relationships with others—is defined by externally imposed rules and regulations. Individuals at the low end of the grid continuum prefer few (if any) societally imposed limits (or rules) on how their relationships are to be transacted. At the high end of the grid continuum, by contrast, people prefer that their interactions with others be regulated by authoritative rules and guidance.

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[11] The theoretical and empirical literature on CT is vast. As such, this section provides an abbreviated overview of the theory. For a more complete description, see Douglas and Wildavsky 1982; Thompson, Ellis, and Wildavsky 1990; Ellis and Thompson 1997; and Swedlow 2002; 2011.

When these two dimensions are overlaid, they produce a finite set of four cultural worldviews—hierarchism, individualism, egalitarianism, and fatalism. In order to justify, preserve, and strive towards achieving their preferred "way of life" the individuals that subscribe to one of the four worldviews adopt a multi-dimensional bundle of normative and ontological beliefs that, in turn, filter the way in which individuals perceive, experience, and interpret the world around them: (Douglas 1982; Jenkins-Smith and Smith 1994; Coyle and Ellis 1994).[12] Among other things, these bundles contain individual beliefs (or myths) about human nature and the relative importance of basic values such as equality, liberty, and security.

Hierarchs prefer strong group attachments and binding external prescriptions (high group, high grid). They place substantial weight on the welfare of the group and are keenly aware of whether other individuals are members of the group or outsiders. Likewise, they place great value on procedures, lines of authority, social stability, tradition, and order. Because of this, hierarchs are constantly scanning their environment for risks that threaten the traditions, organization, and/or security of their group, like abortion (Kahan, Braman, Gastil,

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[12] Consistent with the vast majority of empirical studies that use CT, the theory presented in this dissertation explicitly assumes that cultural worldviews are latent predispositions that exist within individuals. It is important to note, however, that some advocates of CT argue that worldviews inhibit institutions, not people (e.g., Rayner 1992).

Slovic, and Mertz 2007), terrorism (Ripberger, Jenkins-Smith, and Herron 2011), and the HPV vaccine (Kahan, Braman, Cohen, Gastil, and Slovic 2010).

Individualists, by comparison, tend to attach little if any weight to group affiliation and are loath to except externally defined prescriptions (low group, low grid). They prefer a society with few rules and regulations, which allows them to bid, bargain, and negotiate their way through life. Because of this, individualists look out for risks that threaten industry, commerce, and/or individual liberty, like environmental regulations (Douglas and Wildavsky 1982) or homeland security policies that infringe upon individual privacy (Ripberger, Jenkins-Smith, and Herron 2011).

Egalitarians seek strong group identities but prefer minimal prescriptions imposed from outside the group (high group, low grid). They reject differentiation on the basis of status and believe that everyone in the group should be treated equally. Because of this, egalitarians are particularly attentive to risks that threaten equality and the collective welling being of the group (now and in the future), like global warming (Kahan, Jenkins-Smith, and Braman 2011), nuclear energy (Peters and Slovic 1996), and the proliferation of guns (Kahan, Braman, Gastil, Slovic, and Mertz 2007).

Lastly, fatalists consider themselves subject to binding external constraints, yet excluded from membership in important social groups (low group, high grid). They believe that they have little control over their lives and that one's fate is much more a matter of chance than choice. In other words, the things that

happen in life are essentially random or (at the very least) beyond human control. This makes it extremely difficult to generate a priori expectations about the risks that fatalists will attend to.

Given their propensity to focus on different threats when scanning their environment, it is quite likely that hierarchs, individualists, and egalitarians will attend to different subsets of information when encountering a risk/stimulus. If these subsets of information elicit different appraisals then these groups will experience different emotions.

Gender and Race

Beyond culture, pervasive stereotypes backed by empirical evidence suggest that socio-biological attributes like gender and race/ethnicity represent additional factors that may mediate the relationship between information exposure and emotional experience. Though scholars have advanced a number of social and biological theories that purport to explain this phenomenon (e.g., Hochschild 1975; Fischer 1993; Ridgeway and Cornell 2004), the current consensus seems to be that historical and persistent power imbalances in society predispose women and minority groups towards experiencing higher levels of uncertainty and lower levels of control (power) than men and majority groups that are faced with the same situation (Brody and Hall 2008). As a result, women and minority groups tend to experience fear and sadness in response to the same situation that disproportionately elicits anger among men and majority groups.

As interesting and important as these arguments are, the empirical record is rather mixed. With respect to gender, for example, some research has found that women are indeed more likely to experience fear (anxiety) and sadness than men (Brody 1999; Simon and Nath 2004), whereas men are more inclined than women to experience anger (Ross and Van Willigen 1996). Other studies have found that women experience all types of emotion—including anger—more often and more intensely then men (Gross and John 1998). Finally, a number of scholars that have studied the link between gender and emotion report that there is little if any difference between men and women (Brody 1985; Brody and Hall 2008). The same lack of consensus is found in research on emotional responses by race/ethnicity—some scholars have found that race and ethnic differences explain some variation in emotional experience (Simon and Nath 2004), whereas other scholars have found few if any differences across groups (Matsumoto 1993).

Nevertheless, the importance of the question (where do emotions and perceived risks come from?) and the mixed empirical evidence, demand that new research must be undertaken focusing on the relationships between gender, race and ethnicity and emotions.

2.3: Theoretical Implications for Research on Disasters

Applying insights from this literature to the way in which people think about and respond to disasters yields a number of propositions. First and foremost, risk and decision theorists now agree that many if not all of the

judgments and decisions that humans make are subject to and therefore influenced by some form of affective reasoning. This insight yields the following proposition:

Proposition 1: Affect systematically influences the ways in which people think about and respond to disasters.

More specifically, however, recent research suggests that discrete emotions of the same valence, like sadness, anger, and fear motivate different perceptions of risk, judgments, and decisions. This insight motivates a critical sub-proposition about the relationship between affect and individual responses to disasters:

Proposition 1.1: Discrete emotions of the same valence will differentially impact the way in which people think about and respond to disasters.

This sub-proposition is particularly important to research on crises and disasters because events of this sort are likely to induce overwhelmingly negative emotions in large portions of the population, thus limiting variation on positive-negative valence and, consequently, our ability to explain differences in individual responses to crises and disasters.

Second, recent research indicates that the emotions individuals experience when confronted with the same stimulus vary from person to person. What makes

one person feel angry, for instance, might make another person feel sad. More importantly, scholars are beginning to understand that this variation is not random; rather, it appears that complex sets of cognitive filters—like cultural worldviews, gender, and race—systematically influence the emotions that individuals experience in response to a stimulus. This insight generates a second proposition:

Proposition 2: Different groups of people are predisposed to experience different types of emotions when responding to the same set of information.

Again, this proposition is critical for research on crises and disasters. If we know which groups of people are more likely than others to experience specific emotions, then we can generate a priori predictions about which portions of a population are likely to do what in the event of a crisis or disaster.

When combined and considered in tandem with previous research on individual responses to disasters, these propositions suggest the "hierarchical" model of decision-making illustrated in Figure 2.1. At the lower (proximate) level, decision-making is governed by dual-process wherein parallel systems of information processing—an emotionally driven experiential system (affect) and a more systematic rational system (reason)—interact to influence the way in which individuals think about and respond to disasters. In other words, people engage in two different styles of thought—one that is based on reason (line 4) and

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calculation and one that is driven by affect/emotion (line 5)—when making choices about how they should respond to a disaster.

At the higher (distal) level, relatively abstract social orientations like cultural worldviews and socio-biological group identities (i.e., race and gender) anchor the calculations (line 1) and filter the emotional experiences (line 2) that drive individual responses to a disaster at the proximate level. As a result, emotions that people experience and the ends that individuals "rationally" pursue when confronted with a disaster are neither random nor idiosyncratic; rather, certain groups of people are systematically predisposed to experience different emotions and pursue different goals (maximize different utilities) when encountering the same disaster.
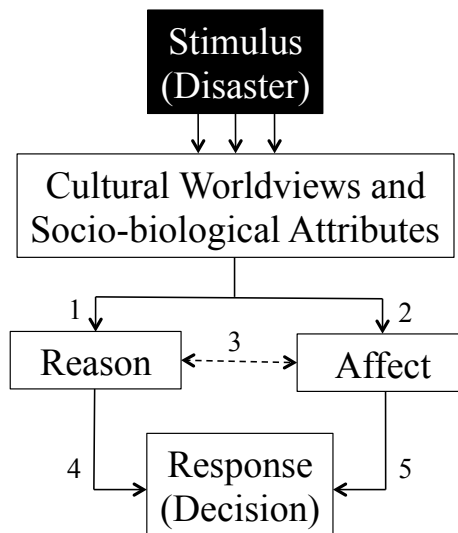
Figure 2.1: A hierarchical model depicting the way in which individuals think about and respond to crises and disasters

Though this model better comports with contemporary theories of risk and decision-making, it is relatively complex and therefore difficult to test within the confines of a single project. Accordingly, this dissertation focuses on the underdeveloped left-hand (affect) side of the model. More specifically, Chapter 4 tests the link (line 5) between affect and decision-making and Chapter 5 explores the link (line 2) between cultural worldviews, socio-biological attributes, and the emotional experience.

In order to do this, however, I have to employ valid and reliable measures of the emotions that individuals experience in response to a crisis or disaster. Then, I have to demonstrate that different people experience different emotions when responding to the same crisis or disaster. If it turns out that everyone experiences the same emotional response to a particular scenario, there would be little, if any, reason to proceed to the testing phase. Accordingly, the next chapter addresses these issues—measurement and variation.

Chapter 3: Measurement and Variation of Individual-Level Emotional Responses to Disasters

3.1: Introduction

As explained in the previous chapter, this dissertation builds upon recent research on the relationship between affect, risk, and cognition to argue that the discrete emotions (fear, anger, sadness, etc.) that individuals experience when confronted with a crisis or disaster will influence the ways in which they think about and respond to that disaster. Taking this argument one step further, I also contend that the emotions that individuals experience in response to such a situation are not entirely stochastic; rather, different groups of people will be predisposed to experience different emotions when encountering the same situation.

Before I am able to empirically test these propositions, I have to do two things. First I must demonstrate that I can measure (and have measured) the discrete emotions that individuals experience in response to a crisis or disaster. Then I have to demonstrate that different people experience different kinds of emotions when responding to the same crisis or disaster. If it turns out that everyone experiences the same emotional response to a particular scenario, there would be little, if any, reason to proceed to the testing phase.

My ability to test for systematic individual-level variation in emotional responses to crises depends upon my ability to measure emotion, which is a difficult concept to define, let alone measure. Nonetheless, researchers from a variety of disciplines have spent many years developing and testing a wide variety

of instruments that purport to measure specific emotions. In this chapter I briefly describe these instruments with a particular emphasis on the strengths and weakness of each approach. Drawing from this discussion I then introduce the nominal and interval measures of discrete emotions that I use in this dissertation. From there, I subject my measures to a battery of empirical tests designed to evaluate their validity and reliability. Throughout this discussion I look for evidence that different people experience different emotions when responding to the same crisis or disaster. I then conclude with a brief discussion of my findings and their implications for the remaining portions of this dissertation.

3.2: General Approaches to Measuring Discrete Emotions

Objective Measures

Generally speaking, the instruments that researchers employ to measure discrete emotions can be sorted into one of two categories—"objective" or "subjective" (Izard 1982; Desmet 2003). [13] "Objective" measures are designed to capture the *preconscious ("mind-independent")* substrates of emotion that individuals are not capable of recognizing and/or expressing. For example, a number of psychologists have developed measures that are based on the pattern of facial, vocal, and postural expressions that individuals exhibit when reacting to a particular stimulus (e.g., Ekman and Friesen 1975, 1978; Izard 1979). Similarly,

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[13] I use the terms "objective" and "subjective" to remain consistent with the literature in the field.

other groups of scientists have been working to develop objective measures of emotion by tracking the wide variety of physiological responses—like changes in blood pressure, pupil dilation, body temperature, skin conductivity, and heart rate—that are thought to accompany the experience of emotion (e.g., Picard 1998; Ahn 2010).

Objective metrics such as these are valuable in that they provide an unobtrusive measure of emotion that is not influenced by an individual's ability or inability to recognize and then express the complex mix of emotions that they are experiencing at a given point in time. Despite this advantage, there are some rather serious limitations associated with objective measures. Foremost among these is that emotion is generally considered to be a subjective or "constructed" state that each and every individual experiences in a slightly different way. In other words, the combination of psychological and physiological reactions that I perceive to be fear might be different than the combination of reactions that you associate with the same emotion.

Subjective Measures

Because of this limitation, a large group of scholars advocate the use of perception-based "subjective" measures that are explicitly designed to capture the emotions that individuals consciously associate with a given set of physiological and psychological reactions. In order to accomplish this, they have developed a suite of self-report measures that typically rely upon surveys or interviews to

document an individual's assessment of his or her own emotional state. Generally speaking, this is done in one of three ways—free association, affect-adjective rating scales, or pictograms. Measures based on free or "continued" association simply ask individuals to write down the feelings that come to mind when thinking about a particular prompt or stimulus. Open-ended measures of this sort are quite common in the literature because they allow researchers to capture individual emotions in a way that is not biased by differential interpretations of question wording or a limited list of preselected emotions.

The well-known weaknesses associated with the free association approach are manifold, but three are particularly problematic for this project and therefore worth mentioning. First, the approach gives complete discretion to the individual that is participating in the study, which often results in large amount of unusable data because the participant ignores the question or misunderstands it and writes something that is tangential or irrelevant. Second, the data that is usable can be very difficult to quantify which can lead to challenges associated with statistical modeling and/or other analytical procedures. Third, and perhaps most importantly, measures of this sort force individuals to respond as if they are experiencing only one emotion at a time, when in reality they are experiencing some combination of emotions at any given time. For example, a person may say that they are feeling sad in response to the open-ended question, when in reality they are mostly sad, but also a little bit scared and angry.

Due in part to the weaknesses associated with the free association method, a number of researchers use affect-adjective rating scales in order to measure the subjective experience of emotion. Measures of this sort ask study participants to read and react to series of adjectives that are thought to be indicators for a smaller set of latent emotions. For example, one version of the Differential Emotions Scale (DES) that was developed and iteratively refined by Carroll Izard and his colleagues, asks respondents to indicate the extent to which the following adjectives describe the way they feel: happy, joyful, delighted, scared, afraid, fearful, enraged, mad, angry (see Izard 1971, 1977). Responses to this question are then used to position participants with respect to three different emotions— enjoyment, fear, and anger (respectively).[14] When compared to the free association technique, this approach is appealing because it typically generates more usable data that is easier to quantify. More importantly, it allows researchers to detect the experience of multiple emotions at once. However, there are some limitations associated with the use of affect-adjective rating scales. Most notably, their reliance on specific adjectives that are likely to mean different things to different groups of people makes them somewhat difficult to apply across diverse populations. The language that a highly educated doctor in New Hampshire will use to describe anger, for instance, is likely to be different than the language that a

[14] A number of other researchers use similar metrics based on affect-adjective rating scales. For examples, see Zukerman (1960), Nowlis (1965), Plutchik and Kellerman (1974), and Watson, Wiese, Vaidya, and Tellegen (1988).

less educated poor farmer from rural Mississippi will use. The same can be said about differences between generations, countries, and across time—language is rarely a constant and precision can be lost in translation.

In an effort to overcome this limitation, scholars have developed a third approach to the subjective measurement of emotion that uses images (pictograms) as opposed to words to capture the variety of emotions that individuals might experience in response to a particular stimulus. For example, Margret Bradley and Peter Lang (1994) developed a frequently used measure of "generalized emotional states" they call the Self-Assessment Manikin (SAM). In short form, the SAM (and similar) method asks participants in a study to indicate the extent to which a series of pictograms describe the way they feel. These pictograms include things like smiling, happy figures, frowning, unhappy figures, and/or yawning, sleepy figures that are closing their eyes. The theory underlying this technique is that facial expressions are a universal indicator of emotion that people from all walks of life will be able to identify with. Accordingly, this approach to measuring emotions is not affected by variation with respect to population characteristics making it an ideal choice for research that incorporates heterogeneous groups of people.

3.3: Measuring Emotions in this Dissertation

In this dissertation I am interested in the way in which conscious emotional experiences orient individual thoughts about and responses to crises

and disasters. As such, I decided that the subjective approach to measurement based on self-report was the most appropriate.[15] After making this decision, I faced a choice between the use of free association, affect-adjective rating scales, and/or pictograms. After some deliberation, I decided that a pictogram-based measure was unnecessary because the sample of participants that I rely upon in this study (undergraduate students at the University of Oklahoma) is fairly homogenous. This left me with free association and affect-adjective rating scales, both of which were included on the survey instrument I used to measure emotion.

Survey Instrument

In order to answer a number of questions about the relationship between emotion and individual reactions to disasters, I created a survey instrument that contains 59 questions and takes approximately 22 minutes to complete.[16] The first part of the instrument is designed to capture data on the demographic characteristics of the survey respondent. The second portion of the instrument contains a battery of questions designed to gauge risk perceptions and attitudes about nuclear weapons and US national security, as well as number of questions designed to measure individual attitudes, values, and core beliefs (like cultural

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[15] In future work, I plan to incorporate pre-conscious emotion (and objective measures) into my understanding of individual thoughts and reactions to crises and disasters.

[16] The survey instrument is included in Appendix 1.

worldviews). In order to induce the emotional experiences on which this dissertation is based, the third part of the instrument begins by asking participants to carefully read the hypothetical scenario[17] described below (which includes a picture of the map listed in Figure 1) and imagine how they would feel if the events that are described were to happen in the near future.[18]

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[17] This scenario was inspired by (and is therefore similar to) one of the three scenarios that Herron, Jenkins-Smith, and Silva developed in a separate study of public opinion about nuclear weapons (Herron, Jenkins-Smith, and Silva 2011).

[18] The use of hypothetical scenarios to induce emotional reactions from survey participants is common in social psychology (i.e., Roseman 1991; Smith and Lazarus 1993; Weiner 1985) as well as research on crises and disasters (i.e., Schultz, Gruntfest, Hayden, Benight, Drobot, and Barnes 2010). For a discussion about the convergent relationship between emotional reactions to "real" (online) and hypothetical (imagined) stimuli, see Robinson and Clore 2001.

SCENERIO: The year is 2013. In an effort to assert his military prowess, Kim Jung Un—the newly appointed leader of North Korea—begins shelling Seoul (the capital of South Korea), bombing South Korean air bases, and invading South Korea. U.S. and South Korean forces slow the invasion and conduct airstrikes on military targets in North Korea using conventional munitions. Within a week, the North Korean invasion is reversed, and U.S. and South Korean ground forces regain South Korean territory and prepare to invade North Korea. Without warning, two advanced models of the Taepodong-2 missile are launched from North Korea. One strikes Honolulu, Hawaii with a nuclear explosion producing at least 40,000 fatalities and unknown numbers of injured and missing persons. U.S. naval facilities at Pearl Harbor are heavily damaged. The second North Korean missile is intercepted off the coast of Alaska and destroyed by U.S. missile defenses before it reaches its intended target of Seattle, Washington. Chinese and Russian nuclear forces are brought to their highest levels of alert, and both countries call on all parties to cease hostilities. North Korea warns that if American and South Korean forces invade North Korea, it will launch additional nuclear missile strikes against cities in the United States and South Korea.

Figure 3.1: The map used on the survey instrument to induce emotional reactions from the participants

After the scenario is presented, the instrument prompts respondents to answer a series of free association and affect-adjective questions that are designed to measure the emotional reactions that they experience when thinking about the events depicted in the scenario. The free association question simply directs respondents to write down the first feeling that comes to mind "as you think about the events depicted in the aforementioned scenario." The affect-adjective questions ask respondents to indicate (using a scale from zero to ten) the degree to which a set of nine adjectives "describe how you feel" when thinking about the events depicted in the hypothetical scenario. The nine adjectives—which were borrowed from the Izard's Differential Emotions Scale—are: mad, angry, enraged, sorrowful, sad, heartbroken, scared, fearful, and afraid.[19] The first three adjectives were meant to gauge anger; the second three items were intended to capture sadness; and the last three adjectives were included as an indicator of fear.[20] After this set of questions, the fifth and final portion of the instrument

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[19] I employ the adjectives used in Izard's scale because they have been repeatedly validated in a wide variety of studies. For an excellent review of this literature, see Kotsch, Gerbnig, and Schwartz (1982).

[20] The other emotions tapped by Izard's Differential Emotions Scale are interest, joy, and disgust. Given the content of my scenario, I assumed that these emotions would be less prevalent then anger, fear, and sadness. As such, I did not include items designed to tap these emotions on this survey.

contains a set of questions designed to measure individual opinions about how the government should respond to the scenario.

3.4: Present Study

Participants and Procedure

In order to evaluate the instrument and the items used to measure emotion, I asked undergraduate students from nine different Political Science classes at the University of Oklahoma if they would be willing to fill out an in-class survey about nuclear weapons. In total, 585 students agreed and completed the survey. Of these, 45% were female and 55% were male. The majority of them were in their first or second year of college (55% were first year students, 23% were in their second year). In terms of race and ethnicity, 76% of the participants identified themselves as "white," whereas 24% of the students selected another racial or ethnic category from the following list: Native American, Asian, Black, Hispanic, Something else. With regard to education, 73% of the students that completed my survey came from relatively educated families where at least one of their parents graduated from college. As is the case with most non-probability or "convenience" samples that are drawn from a college population, 93% of the students who completed the survey fell between the ages of 18 and 23, resulting in a mean age of approximately 20 years old.

Social scientists have long recognized the pitfalls that accompany the use of non-probability samples, like the sample I employ in this study. Samples of this

sort, for example, make it difficult—if not impossible—to make inferences about the distribution of a particular variable within broader populations or to comment on the magnitude of associations between different variables in the general population (e.g., Sears 1986; Peterson 2001; Henry 2008). Nevertheless, researchers generally agree with David Yeager and his colleagues in noting that the use of non-probability samples is "quite reasonable if one's goal is not to document the strength of an association in a population but rather to reject the null hypothesis that two variables are completely unrelated to each other throughout the population" (Yeager, Krosnick, Chang, Javitz, Levendusky, Simpser, and Wand 2011; see also Berrens, Bohara, Jenkins-Smith, Silva, and Weimer 2003). In other words, sampling strategies like the one I employ in this dissertation are justified when used to assess the extent to which two or more variables are related to one another in a theoretically predictable fashion—as I do in this and subsequent chapters.

3.5: Nominal Measure of Discrete Emotion

As described in the previous section, the instrument contains two different sets of questions that are designed to capture emotional reactions to the scenario—one based on free association and one based on the use of affect-adjective scales. This study (and the dissertation as a whole) uses individual responses to the free association question in order to create a nominal (categorical) measure of emotion. Construction of this measure was a two-step

process. First, participants were asked to write down the first feeling that came to

mind when thinking about the events depicted in the aforementioned scenario.

Then, content analysis was used to categorize individual responses into one of the

six categories—interest, joy, sadness, anger, disgust, and fear—that Carroll Izard

has documented in his repeated study of "basic" emotions (see Table 3.1).[21]

Upon doing so, I found that roughly 40% (n = 217) of the responses that

participants gave could *not* be coded into one of these six categories. This

relatively large proportion was unsurprising given the previously noted tendency

of free association measures to produce large amounts of unusable data.

Limitations aside, nearly 60% (n = 308) of the responses to this question could be

used to further investigate the relationship between emotion and individual

responses to crises and disasters. Before doing so, however, it was necessary to

evaluate the reliability and validity of the measure.

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[21] Note that each respondent was assigned to the category that best matched their

association. As a result, no respondents were assigned to more than one category.

Table 3.1: Responses to the free association question by emotion category

Category	Responses to the Free Association Question
Anger	aggravated, anger, angry, enraged, frustration, irritated, mad, outrage, outraged, pissed, upset
Fear	anxiety, anxious, apprehension, concern, concerned, danger, fear, fearful, fright, frightening, horror, nervous, panic, paranoia, scared, scary, terrified, worried, worry
Sadness	devastating, disappointed, disappointment, grief, heartache, heartbroken, hurt, mournful, sad, saddened, sadness, sorrow, sorrowful, sorry
Disgust	disgust, hate, hatred
Interest	curiosity, interest
Joy	N/A

Reliability

In measurement theory, reliability denotes "the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials" (Carmines and Zeller 1979, p. 11). When applied to the sort of content analysis that I used to construct this measure of emotion, reliability generally focuses on the degree to which multiple researchers yield consistent results when coding the same set of data. Methods for assessing "inter-coder" agreement vary depending on the features of the data that are coded, but generally follow a two-step set of procedures wherein two or more researchers independently code the data (or some portion of the data) and then compare their results using a statistical measure of consistency like Cohen's kappa, which is calculated by way of the following equation:

$$k = \frac{p(a) - p(e)}{1 - p(e)}$$

where $p(a)$ is the probability of observed agreement between coders and $p(e)$ is

the probability that the coders will agree by chance alone given the number of categories in the data.[22] If the two coders are completely consistent, kappa *(k)* will be one. If the coders are completely inconsistent *k* will be zero. Though there are no universally accepted criterion, *k* values that exceed 0.75 are said to be excellent, values between 0.40 and 0.75 are fair to good, and values of 0.40 or lower are generally considered poor (Fleiss, Levin, and Paik 2004).

In order to evaluate the reliability of the nominal measure that was just described, a separate researcher independently coded the responses that participants gave according to the procedure that was outlined above. I then compared her results to my results and found that we agreed with one another more than 95% of the time, which translates to a kappa value of 0.94 [0.91, 0.96]. By any standards—including those listed above—this indicates a high degree of consistency, which suggests that this measure of emotion is indeed reliable.

Validity

Having evaluated the reliability of this measure, we turn now to the issue of validity, which denotes the extent to which an instrument "measures what it is supposed to measure rather than reflecting some other phenomenon" (Carmines and Zeller 1979, p. 16). As with reliability, there are a number of different ways

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[22] There are a variety of other statistics that purport to measure inter-coder reliability. Cohen's kappa was used because it is the most commonly used measure in the behavioral sciences (Dewey 1983).

to evaluate the validity of a measure. One of the most common techniques involves the establishment of *face validity*. Evaluation by way of face validity provides an assessment of the degree to which a particular measure "looks like" it is accurately reflecting the concept it is designed to measure. For example, if previous experience (and/or basic logic) indicates that the concept you are trying to measure behaves in a particular way in a given situation, and your measure is behaving in a way consistent with that experience, then your measure is said to have face validity.

Applying this test to the concept that I am trying to measure, logic suggests that the distribution of emotions that individuals will experience when thinking about the use of a nuclear weapon against the US with exhibit a specific pattern. Most people will experience negative emotions like anger, fear, sadness, and/or disgust, whereas relatively few people will experience positive emotions like interest and/or joy. If the measure of emotion that is based on free association is valid, we should witness this sort of pattern in student response to the open-ended question.
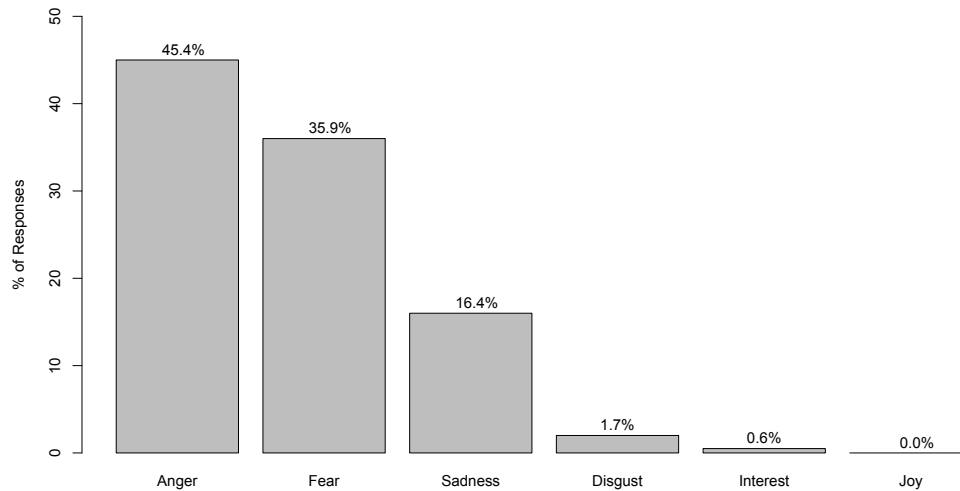
Figure 3.2: The distribution of free association responses to the hypothetical scenario by emotion category.

As demonstrated by the distribution of responses that is depicted Figure 3.2, this is precisely what I found. Of the 308 responses that fell within one of these six categories, 0% (n = 0) were coded as *joy*, less than 1% (n = 2) were coded as *interest*, approximately 2% (n = 5) were coded as *disgust*, roughly 16% (n = 50) were coded as *sadness*, a little more than 35% (n = 109) were coded as *fear*, and the remaining 47% (n = 138) of responses were coded as *angry*. Accordingly, it is reasonable to say that this measure of emotion exhibits face validity. Moreover, this distribution of responses clearly indicates that different people experienced different emotions when responding to the same crisis or disaster. Unfortunately, variation and face validity offer necessary but not sufficient evidence that a particular measure is valid. As such, many researchers attempt to establish a second form of "convergent" validity by comparing newly

created measures to separate measures that were designed to gauge similar

concepts. In the section that follows, I will evaluate the convergent validity of the

measures by comparing the nominal measure of emotion to the interval measures

constructed using affect-adjective rating scales. Before doing so, however, it is

necessary to evaluate the reliability of my interval measures.

3.6: Interval Measures of Discrete Emotion

In addition to the nominal measure that was just described, this study (and

the dissertation as a whole) employs a series of interval measures of emotion

based on public responses to the affect-adjective rating scales. These measures

were created by averaging individual orientations on the zero-to-ten affinity scales

for each of the nine adjectives (mad, angry, enraged, sorrowful, sad, heartbroken,

scared, fearful, and afraid) described above. The *Anger Index* averaged across the

"angry" adjectives (mad, angry, enraged), the *Sadness Index* across the "sad"

adjectives (sorrowful, sad, heartbroken), and the Fear Index averaged across the

"fear" adjectives (scared, fearful, afraid). A high score on any one, two, or all

three of these indices indicated a relatively strong affinity with that (or those)

emotion(s).

Compared to the nominal strategy that was descried above, the interval

measurement strategy yielded scores on all three indices for almost all of the

respondents that completed the survey (93%; n = 540). This makes the interval

measures particularly promising for exploring the relationships among emotions

and responses to crises and disasters. Before turning to that analysis, however, it is important to assess whether these indices provide reliable and valid indicators of anger, sadness, and fear.

Reliability

There are a number of different ways to evaluate the reliability of composite indices, the most common of which is a test for *internal consistency*. Roughly speaking, internal consistency gauges the extent to which multiple items that purport to measure the same latent construct produce consistent scores. To test for internal consistency, researchers generally use one of several statistics that are estimated by comparing the pairwise correlations of different items in a composite index. The most popular such statistic is called Cronbach's alpha, which provides a reliability estimate that ranges between zero and one, where higher values indicate higher levels of internal consistency.

With this in mind, I calculated Cronbach's alpha estimates for each of the emotion indices that I described above. Doing so yielded alpha values of 0.87, 0.94, and 0.92 for the sadness index, fear index, and angry index, respectively. Though scholars have been hesitant to define a universal standard of acceptability, most would agree that alpha values in excess of 0.7 indicate an "acceptable" degree of internal consistency (Lattin, Carroll, and Green 2003). Accordingly, one could say that my measures of fear, sadness, and anger are internally consistent and therefore reliable. Unfortunately, social scientists and statisticians have long

recognized that Cronbach's alpha is of limited value when one is dealing with multidimensional and/or latent constructs—as I am with these measures (i.e., Cortina 1993; Schmitt 1996). In light of this recognition the literature suggests that researchers use of other tools—like confirmatory factor analysis (aka measurement models)—to evaluate the reliability of composite indices that tap multiple and/or latent concepts.

Similar to exploratory factor analysis (EFA), confirmatory factor analysis (CFA) is a multivariate statistical procedure that helps researchers examine patterns of association among observed and latent variables in a given set of data. Despite this similarity, EFA and CFA are statistically and conceptually distinctive forms of analysis that are used to accomplish different tasks. EFA is a data reduction technique that researchers use in order to identify the factor solution that accounts for as much variation in their data as possible.

When using EFA, the researcher is not required to make specific hypotheses about the number of factors that will emerge from the analysis or which items will correspond with which factors. In other words, the data—not the researcher—suggest the model structure. If prior notions do exist, they are not incorporated into the analysis and they do not affect the results. Because of this, EFA cannot be used to test specific hypotheses about the relationship between observed and latent variables in a given set of data. CFA, by comparison, is a theory driven analytical procedure that requires the researchers to make specific hypotheses about the number of latent factors contained in their data, the

relationship among those factors (whether or not they are correlated), and which items will correspond with which factors. In other words, CFA is a relatively demanding technique that requires an in-depth understanding of expected model structure prior to estimation. The payoff that accompanies the costs associated with added information, however, is relatively high. Unlike EFA, CFA can be used to test hypotheses about how well a hypothesized model fits a given set of data, to assess the reliability (internal consistency) of a latent construct, and to evaluate the validity of multidimensional measures.

With this distinction in mind, I used CFA to evaluate my interval measures of emotion (fear index, sadness index, and anger index) that were constructed by equally weighting responses to the set of nine affect-adjective items listed above. Before doing so, I hypothesized the following: 1) that I would obtain a three factor solution (one factor per latent emotion); 2) that these three factors would only correspond with the set of three items that they were intended to produce; 3) that these three factors would be correlated with one another. Likewise, because it is impossible to simultaneously estimate the variance of a common factor and the value of the loadings for all of the items that load on that factor, the variance of the common factors were set to one.[23] Doing so produced

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[23] This is a common way to handle this problem. A second approach is to set at least one of the loadings for each factor to some arbitrary value (usually 1.0). I chose the former approach because it facilitates interpretation (Lattin, Carroll, and Green 2003).

the results depicted in Figure 3.3.
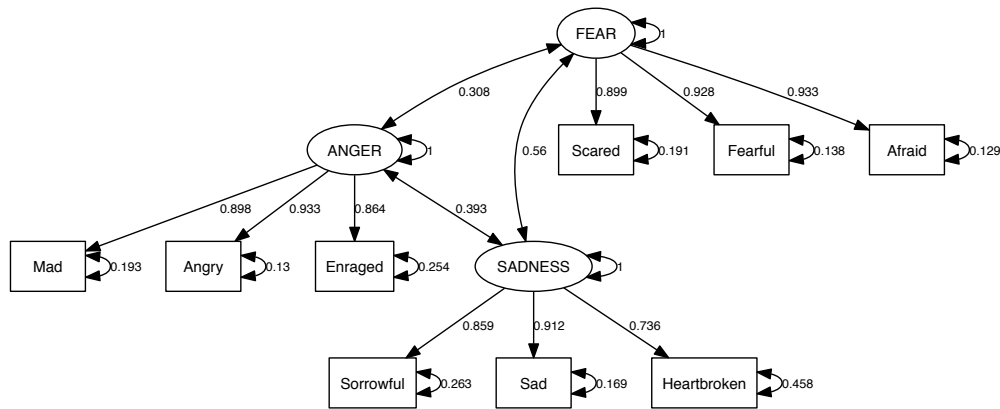
Figure 3.3: Confirmatory factor analysis of responses to the affect-adjective rating scales; GFI = 0.96; AGFI = 0.92; NNFI = 0.97; CFI = 0.98; RMSAE = 0.08.

As indicated by the goodness-of-fit statistics, the CFA model fits the data rather well.[24] The goodness-of-fit index (GFI) is 0.96 and the adjusted goodness-of-fit index is (AGFI) is 0.92, both of which exceed the generally agreed upon rules of thumb (0.95 and 0.90) denoting of a good fit (Lattin, Carroll, and Green 2003). Likewise, the Non-Normed Fit Index (NNFI) and Comparative Fit Index (CFI) values are greater than 0.95, which is the generally agreed upon benchmark for an acceptable fit. Finally, the root mean square error of approximation (RMSAE) index is 0.08, which is right on the cutoff value of ≤ 0.08 (Schreiber, Nora, Stage, Barlow, King 2006). More importantly, the standardized loadings

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[24] A series of models with different numbers of factors and different patterns of covariation were tested against this model. The model presented in Figure 3 out preformed the alternatives.

coefficients listed next to the unidirectional arrows in Figure 3 suggest a high degree of internal consistency. All of them are above the standard threshold of 0.70. These results suggest that this set of interval measures reliably capture the emotions that individuals experience when thinking about the scenario.

Validity

Having established the reliability of the interval measures, we turn now to the issue of validity. Do the indices measure the emotional experiences that they were intended to measure rather than some other phenomenon? As mentioned during the validation of my nominal measure, face validity provides researchers with one tool for assessing the validity of their measures. Measures are said to demonstrate face validity if they behave in a way that is consistent with logic or a priori expectations based on previous research. In the context of my research, for example, logic suggests that individuals will experience a variety of predominantly negative feelings when thinking about the use of nuclear weapons against the US. Within this array of negative feelings, previous research (see Figure 2 above) suggests that anger, fear, and sadness will feature rather prominently. Thus, valid indicators of emotion would reflect this pattern of experiences.
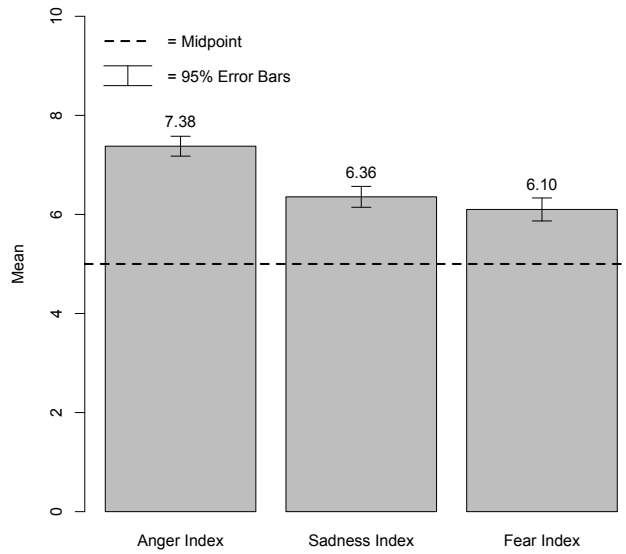
Figure 3.4: Mean scores on the emotion indices.

The results shown in Figure 3.4 suggest that my interval measures of

emotion achieved this standard. When measured in this way, we see that the

participants who completed the survey experienced relatively high levels of anger,

sadness, and fear when thinking about the hypothetical nuclear attack. The mean

scores on all three indices were well above the midpoint of 5. In fact, more than

76% of the respondents scored a 6 or higher on the Anger Index; roughly 62%

scored a 6 or higher on the Sad Index; and, almost 59% of the respondents scored

a 6 or higher on the Fear Index. In other words, the measures behaved as I

expected them to, thus achieving some degree of face validity. At the same time,

however, there was a reasonable amount of variation within the data around the

mean score on each of these indices. For example, the sample standard deviation

of the zero-to-ten Anger Index was 2.47, the standard deviation of the Sadness

Index was 2.60, and the standard deviation of the Fear Index was 2.86. In other words, these distributions provide additional evidence that different people experience different combinations of emotion when responding to the same crisis or disaster. Again though, variation and face validity offer necessary but not sufficient evidence that a new measure is valid. As such, researchers often try to establish other forms of validity, like discriminant and/or convergent validity.

Discriminant validity gauges the extent to which a set of measures is able to distinguish between the different concepts that they are designed to measure. With respect to this project, for example, are my emotion indices able to differentiate between fear, sadness, and anger? Or, does one of the indices account for two, or even all three emotions? As one might expect, there are a number of different ways to answer these questions, many of which use confirmatory factor analysis. For instance, the most popular technique for assessing discriminant validity focuses on the correlation between the different factors in a CFA model. If two (or more) of the factors are highly correlated, they may be capturing similar constructs and are therefore said to demonstrate poor discriminant validity.

A second look at Figure 3 allows one to conduct this test with relative ease. Because I fixed the factor variances to one when estimating that model, the little numbers next to the bidirectional arrows (slings) that connect the factors to one another represent the correlations between the respective factors. For example, the correlation between the SADNESS and ANGER factors is 0.39.

Similarly, the correlation between the FEAR and ANGER factors is 0.31. The SADNESS and FEAR factors, by comparison, are correlated at 0.56. In other words all of the factors are moderately correlated with one another, indicating (unsurprisingly) that there are relationships among the different emotions. To determine whether or not these correlations are strong enough to cause alarm, I followed Farrell (2009) in comparing each correlation to the average amount of variance extracted from each factor (AVE). For discriminant validity to be supported, he argues, the square root of each AVE should exceed the correlations between each factor.

As it turns out, the square roots of the AVE values for the CFA model depicted in Figure 3 are 0.89, 0.84, and 0.91 for the ANGER, SADNESS, and FEAR factors (respectively). None of the correlations in the model even approach these levels. As such, it is fair to say that the different factors are able to distinguish between the distinct concepts that they are intended to measure. It follows, then, that the indices for these latent factors are valid indicators of the distinctive emotions—fear, sadness, and anger.

Convergent Validity: A Comparison of the Nominal and Interval Measures

In the previous sections, the nominal and interval measures were evaluated in isolation. Doing so provided evidence suggesting that both measures were reliable and valid indicators of emotional experience. In this third and final section the interval and nominal measures are pitted against one another in order

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to test for convergent validity. Roughly speaking, convergent validity gauges the extent to which two measures that were developed in different ways indicate the same things when subjected to the same sets of data. For example, one might validate a newly designed digital thermometer by comparing the temperature reading it yields to the reading a mercury thermometer yields when subjected to the same atmospheric conditions. If both measures yield the same results, we can be more confident that the two measures are measuring what they are supposed to measure.

In the context of this project, the nominal and interval measures were compared to one another by estimating three single-factor (one-way) ANOVA models, where the emotional indices (Fear Index, Anger Index, and Sadness Index) served as the outcome (dependent) variables and the nominal measures of emotion served as the grouping (independent) variables. If the measures are valid, the respondents that were assigned to the various categories of emotion should score differently on the emotional indices. More importantly, these differences should demonstrate a specific pattern, wherein the respondents who were placed in the anger, sadness, and fear categories should score higher than the other groups on their respective indices. For example, the people that were placed into the anger category based on their response to the free association question should score highly on Anger Index relative to those who were placed in the fear or sadness categories.

With respect to the first test, the omnibus statistics from my analysis indicated that the mean differences across the emotional categories in all three models were significant (p < 0.001 in all three models). More importantly, the post-hoc Tukey tests indicated that the pattern of differences among the groups were consistent with my expectations. As illustrated in Figure 3.5(a), for example, the Anger group scored significantly higher on the Anger Index than did the other two groups. Panels (b) and (c) in Figure 3.5 demonstrate similar patterns, wherein the Sadness and Fear groups scored significantly higher on the Sadness and Fear Indices, respectively.
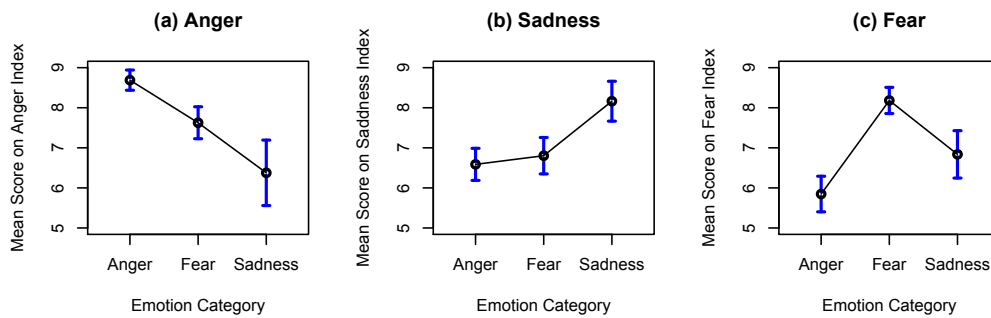
Figure 3.5: Mean scores on the emotion indices (interval measures) by emotion category (nominal measure). Vertical bars represent 95% confidence intervals.

These findings indicate that my nominal and interval measures of emotion are tapping similar constructs, which provides strong supporting evidence that the two measures are, in fact, valid indicators of the emotions that individuals experience when confronted with a disaster like the one I presented in my instrument.

3.7: Conclusion

In the previous chapter, I presented a model suggesting that emotions influence the way in which people think about and respond to natural and anthropogenic disasters. I also argued that different groups of people are predisposed to experience different emotions when encountering the same crises or disasters. In the next two chapters, I test these propositions. In order to undertake those analyses, however, I had to come up with a way (or multiple ways) to measure emotions and then demonstrate that different people experience different emotions, or combinations of emotions, when faced with the same crisis or disaster.

Inspired by previous attempts to measure emotion, this chapter described the development of a nominal indicator, based on free association, and an interval indicator of emotional experience based on affect-adjective scales. These measures were subjected to a battery of tests, which demonstrated that they are valid and reliable indicators of subjective emotional experience. Lastly, I used these measures to corroborate the notion that different people experience different emotions. When given the exact same information about a hypothetical nuclear attack, some people experience sadness, whereas others experience anger and/or fear.

With this in mind, the chapter that follows addresses an important follow-up question. Do these differences matter? Do they influence the way in which individuals think about and respond to crises disasters?

Chapter 4: The Impact of Discrete Emotions on Individual Responses to a Hypothetical Disaster

4.1: Introduction

In the previous chapter I presented evidence that different people experience different types—and levels—of negative emotion (fear, anger, and sadness) when faced with the same crisis or disaster. This chapter is motivated by a relatively straightforward follow-up question: do these differences matter? In other words, do discrete emotions of the same valance—like anger, fear, and sadness—differentially affect the way in which individuals think about and respond to crises and disasters?

4.2: Theoretical Overview

Chapter 2 of this dissertation, proposed a model of individual decision-making that explicitly incorporates the notion that affect influences the way in which people think about and respond to disasters. In and of itself, this is an important yet neglected proposition that is worthy of empirical investigation. Investigation, however, requires some degree of specificity about the nature of the relationship between affect and decision-making. Unfortunately, the record of scholarship advanced by risk and decision theorists is divided in a way that inhibits such specificity.

On one side of the divide, scholars advocate a valence-based approach to the relationship between affect and decision-making, which suggests that individuals collapse their emotions onto a unidimensional positive-negative scale

before drawing upon them to make decisions (e.g., Finucane, Alhakami, Slovic, and Johnson 2000; Peters and Slovic 2000; Lowenstein, Weber, Hsee, and Welch 2001; Slovic, Finucane, Peters, and MacGregor 2004). As a result, the differences between emotions like anger, fear, and sadness are ignored—the important thing (for purposes of cognition) is that all three of these emotions are negative and therefore have the same effects on opinions, decisions, and behaviors. On the other side of the divide, scholars suggest that individuals differentially experience and draw upon specific emotions of the same valance—like anger, fear, and sadness—when making decisions (e.g., DeSteno, Petty, Wegener, and Ruker 2000; Lerner and Keltner 2000, 2001; Tiedens and Linton 2001). As a result, the differences between discrete emotions of the same valance are quite important because they motivate different opinions, decisions, and behaviors.

The end result of this debate is particularly important for research on crises and disasters because events of this sort are likely to induce overwhelmingly negative emotions in large portions of the population. For example, when students were asked to reflect upon the hypothetical nuclear disaster that was described in the previous chapter, less than 1% of them reported positive feelings. Rather, almost all of the students experienced some sort of negative feeling. This lack of variation leaves advocates of valance-based theories little room for explaining divergent patterns of individual decision-making. The practical and theoretical implications of this seemingly trivial note are actually quite important—if valance-based theories of affect and decision-making are

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correct, and almost everyone experiences negative emotions in response to a crisis or disaster, then adding emotion to our models of individual decision-making will result in little if any added value. To paraphrase an old adage, you can't explain a variable with a constant.

A more promising pattern of variation emerges when one considers the different types of negative emotions that individuals experience when confronted with a disaster. Referring back to the previous chapter, for example, the students that reflected upon the hypothetical nuclear disaster experienced a range of discrete emotions, most notably anger, fear, and sadness—all of which share a negative valence. If emotion-specific theories of affect and decision-making are correct, then this variation is quite important and it may help us to explain the decisions that different people make when confronted with the same crisis or disaster.

In sum, valence-based and emotion-specific theories offer divergent views about the nature of the relationship between affect and decision-making. Resolving this difference is theoretically and practically important to advancing our understanding of the role that affect plays in guiding individual behavior before, during, and after disasters. With that said, the next section of this chapter attempts to resolve this debate by subjecting the two theories to empirical test. Do discrete emotions of the same valance—like anger, fear, and sadness— *differentially* or *uniformly* affect the way in which individuals think about and respond to crises and disasters?

4.3: Present Study

To answer this question, the present study uses the survey data that were described in Chapter 2. As a brief reminder, these data include student responses to an original survey that was designed to illicit and then measure the emotions that people experience when thinking about a hypothetical disaster—a nuclear attack on the US (from North Korea) that kills 40,000 Americans and injures countless others.[25] After capturing these responses, the survey goes on to gauge individual opinions about how the government should respond to the disaster as well as the amount of confidence that respondents have in the opinion they express.

Of the 585 students that participated in the study, 45% were female and 55% were male. The majority of respondents were in their first or second year of college (55% were first year students, 23% were in their second year). As is the case with most samples that are drawn from a college population, 93% of the participants who completed the survey fell between the ages of 18 and 23, resulting in a mean age of approximately 20 years old. In terms of race and ethnicity, 76% of the participants identified themselves as "white," whereas 24% of the students selected another racial or ethnic category from the following list: Native American, Asian, Black, Hispanic, or Something else. All of the participants were students at the University of Oklahoma and most (73%) of them

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[25] See Chapter 2 for a detailed description of the survey instrument.

came from relatively well-educated families where at least one of their parents graduated from college.

4.4: Measures

Dependent Variables

To characterize the systematic influence of affect on the way in which individuals think about disasters, the analysis that follows focuses on respondent opinions about how the government should respond to the hypothetical disaster as well the amount of confidence that respondents have in their opinions about how the government should respond. More specifically, individual responses to two different survey questions represent the dependent variables in this study.

First, respondents were asked to indicate which of the following actions the US should pursue in response to the hypothetical nuclear attack:[26]

1. *Diplomacy and negotiations*: Demand an immediate cease-fire and warn that further nuclear attacks from North Korea will result in full-scale U.S. nuclear retaliation.

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[26] These response options, like the scenario presented in Chapter 3, were inspired by (and are therefore similar to) one of the scenarios and response options that Herron, Jenkins-Smith, and Silva developed in a separate study of public opinion about nuclear weapons (Herron, Jenkins-Smith, and Silva 2011).

2. *Airstrikes using conventional armaments*: Conduct air attacks using precision guided conventional munitions against known and suspected nuclear facilities and missile launch sites in North Korea.

3. *Invasion using conventional armaments*: Conduct air, land, and sea attacks against North Korea using conventional armaments against known and suspected nuclear facilities and missile launch sites in North Korea.

4. *Retaliation using nuclear weapons*: Conduct nuclear strikes against North Korea using U.S. intercontinental ballistic and cruise missiles against known and suspected nuclear facilities and missile launch sites in North Korea.

Using data gathered from responses to this question, an ordinal measure of opinion was created that ranges from relatively pacific (diplomacy and negotiations) to relatively militant (nuclear retaliation) response options. As indicated by Figure 4.1, diplomacy was the most populated category (n = 226), followed by airstrikes (n = 125), nuclear retaliation (n = 88), and then ground invasion (n = 74).
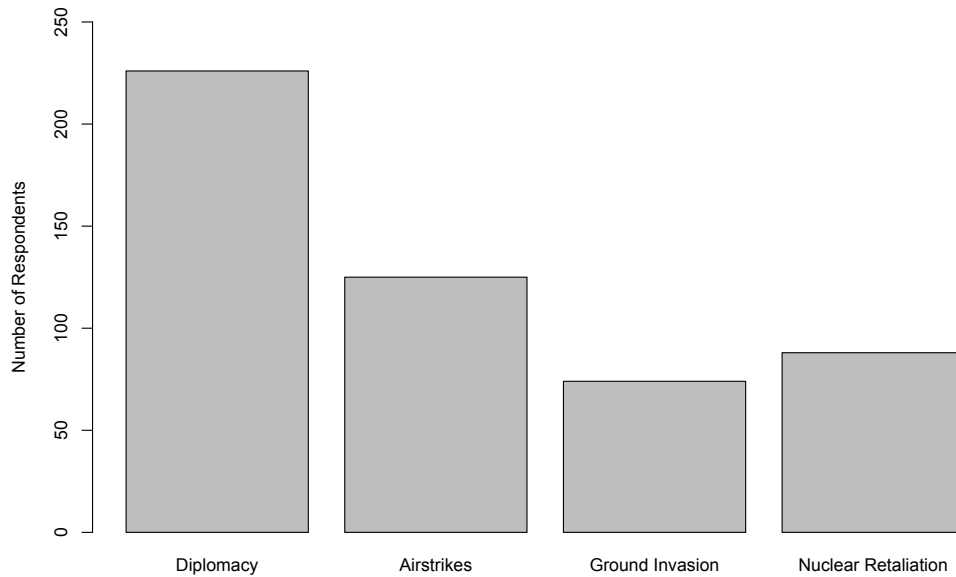
Figure 4.1: Distribution of opinions about how the government should respond to the hypothetical nuclear strike.

Second, respondents were asked to indicate how confident they were (using a zero to ten scale) that the option they selected is the "best possible course of action" considering the circumstances listed in the scenario. Using data gathered from responses to this question, an interval measure of confidence was created that ranges from zero, which indicates little if any confidence, to ten, which indicates high levels confidence in the opinion expressed when answering the question listed above.
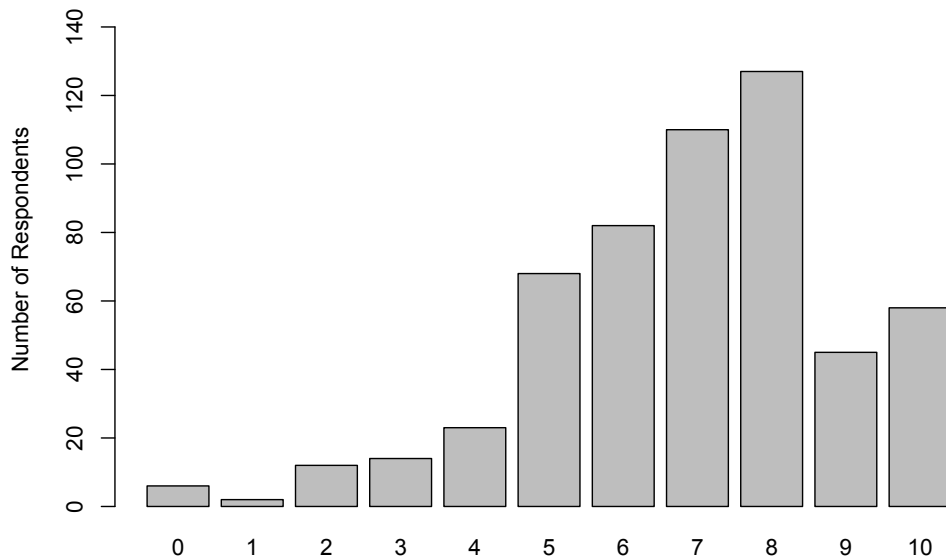
Figure 4.2: Distribution of confidence that respondents have in their opinions about how the government should respond to the hypothetical nuclear strike.

As indicated by Figure 4.2, the participants in this study were, on average, fairly confident in their opinions about how the government should respond to the disaster (mean = 6.88), but there was some variation around the mean (standard deviation = 2.04).

Independent Variables

The interval measures of fear, anger, and sadness that were introduced in Chapter 3 were used to create the independent variables in this study. As a brief reminder, these measures were inspired by a reduced version of the Differential Emotions Scale (DES) developed and iteratively refined by Carroll Izard and his colleagues (Izard 1971, 1977; Kotsch, Gerbing, and Schwartz 1982). Specifically,

respondents were asked to indicate the extent to which each of the following adjectives "describe how you feel" when thinking about the events depicted in the hypothetical scenario: mad, angry, enraged, sorrowful, sad, heartbroken, scared, fearful, and afraid.

Given the negative valence associated with each of these adjectives, an equally weighted *valence index* was created by averaging responses to all nine of these items (alpha = 0.87; mean = 6.61; sd = 2.04). Though theoretically appropriate, it is important to remember that the multivariate analysis summarized in Chapter 3 does not support the construction of this unidimensional scale.

As such, *emotion-specific indices* were also created. Specifically, responses to the first three items (mad, angry, and enraged) were averaged in order to create an equally weighted Anger Index (alpha = 0.92), responses the second three items (sorrowful, sad, and heartbroken) were averaged to create a Sadness Index (alpha = 0.87), and responses to the final three adjectives (scared, fearful, and afraid) were averaged in order to create a Fear Index (alpha = 0.94). In aggregate, anger was the most intense emotion that participants experienced when thinking about the scenario (mean = 7.38; sd = 2.47), followed by sadness (mean = 6.36; sd = 2.60), and then fear (mean = 6.10; sd = 2.86).

4.5: Hypotheses

If valance-based theories of emotion are correct, then the *valence index* described above will best characterize the relationship between emotion and

respondent opinions about how the government should respond to the hypothetical nuclear attack as well as individual confidence in those opinions. Moreover, because fear, anger, and sadness are all negative, they will exert roughly uniform effect (positive, negative, or null) on opinions and confidence. If emotion-specific theories are correct, by contrast, then the *emotion-specific indices* will better characterize the relationship between emotion and respondent opinions about how the government should respond to the nuclear attack as well as individual confidence in those opinions. Furthermore, fear, anger, and sadness will exert a differential effect on respondent opinions and confidence.

For example, because anger is triggered by and elicits appraisals of certainty, individual control, and responsibility, it creates a desire ("action tendency") in individuals to remove/punish the entity responsible for the unpleasant situation (e.g., Lerner and Keltner 2001; Betancourt and Blair 1992; Smith and Ellsworth 1985). As such, one would expect that respondents who experienced high levels of anger when asked to think about the hypothetical nuclear strike will express relatively militant opinions about how the government should respond to the strike and they will be relatively confident in those opinions.

Fear arises from and evokes appraisals of uncertainty and a lack of control, which are associated with the implicit goal of avoiding future harm by removing one's self from the unpleasant situation (e.g., Lerner and Keltner 2001; Lazarus 1991; Smith and Ellsworth 1985). Accordingly, respondents that

experienced high levels of fear will tend to favor less militant and more diplomatic responses to the nuclear attack because they are less likely incite future conflict. Given their fear, however, these respondents will relatively little confidence in their opinions.

Similar to fear, sadness is elicited by and projects appraisals of helplessness—situational rather than individual control (e.g., Lerner, Small, and Lowenstein 2004; Keltner, Ellsworth, and Edwards 1993). As such, respondents that experienced high levels of sadness will tend to favor less militant responses because the situation is beyond individual control and military action could prolong the unpleasant situation. Unlike fear, sadness does not evoke intense levels of uncertainty; nor however, does it evoke the sort of certainty that is typically associated with anger. As such, it is not clear that there will be a relationship between the experience of sadness and the levels of confidence that respondents express in their opinion about how the government should respond to the hypothetical nuclear attack.

4.6: Analytical Strategy

To test these hypotheses, the analysis that follows proceeds in two stages. In stage one, I estimate two ordered logit (proportional odds) models that predict opinions about how the government should respond to the disaster as a function of 1) the valence index and 2) the emotion-specific indices described above.[27] In

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[27] To make sure that this approach to modeling was appropriate, I ran a variety of

stage two, I use ordinary least squares (OLS) to estimate two linear models where confidence is regressed on 1) the valence index and 2) the emotion-specific indices.

4.7: Findings

Stage 1

Results from the first stage of this analysis are summarized in Table 4.1, which reveals several interrelated pieces of evidence that support the emotion-specific (rather than the valence-based) model of affect and decision-making. First, there is no statistically discernable relationship between individual scores on the valence index and opinions about how the government should respond to the hypothetical disaster. Second, a comparison of the AIC statistics associated with each model suggests that the emotion-specific model better fits to the data. Third, a look at the coefficients in the emotion-specific model indicates that fear, anger,

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tests to ensure that these models do not violate the parallel regression assumption that is made when estimating ordered models. For example, I estimated a binary regressions model for each level of y; upon doing so I found that my coefficient estimates were relatively consistent across the levels—suggesting that the assumption was not violated and that an ordered logit model is appropriate. Just to be sure, however, I also estimated a multinomial logit model. As expected, the estimates I derived via multinomial regression were almost identical to the estimates I got when using ordinal regression.

and sadness exert a differential (rather than uniform) effect on respondent

opinions.

Table 4.1: Summary of an ordered logit model that estimates the effect of affective valence and then discrete emotions on individual opinions about how the government should respond to the hypothetical nuclear attack.

	Valence-Based Model		Emotion-Specific Model	
	Estimate	Std. Error	Estimate	Std. Error
Coefficients				
Valence Index	-0.008	0.016	—	—
Sadness Index	—	—	-0.052$^{\wedge}$	0.040
Fear Index	—	—	-0.126***	0.035
Anger Index	—	—	0.333***	0.044
Intercepts				
1|2	-0.326	0.262	0.346***	0.346
2|3	0.675***	0.264	0.356***	0.356
3|4	1.451***	0.272	0.368***	0.368
n-size	483		483	
AIC	1242.983		1174.389	

*Notes: $^{\wedge}$ p < 0.10 and *** p < 0.001 in one-tailed t-tests; parameter estimates are listed as ordered log-odds*

Specifically, there was a strong, positive, and statistically significant

relationship between anger and support for a relatively militant governmental

response. In marked contrast, there was an equally strong and significant negative

relationship between scores on the Fear Index and support for militant

governmental responses. Lastly, there was a substantively subtle but negative

relationship between sadness and militancy.
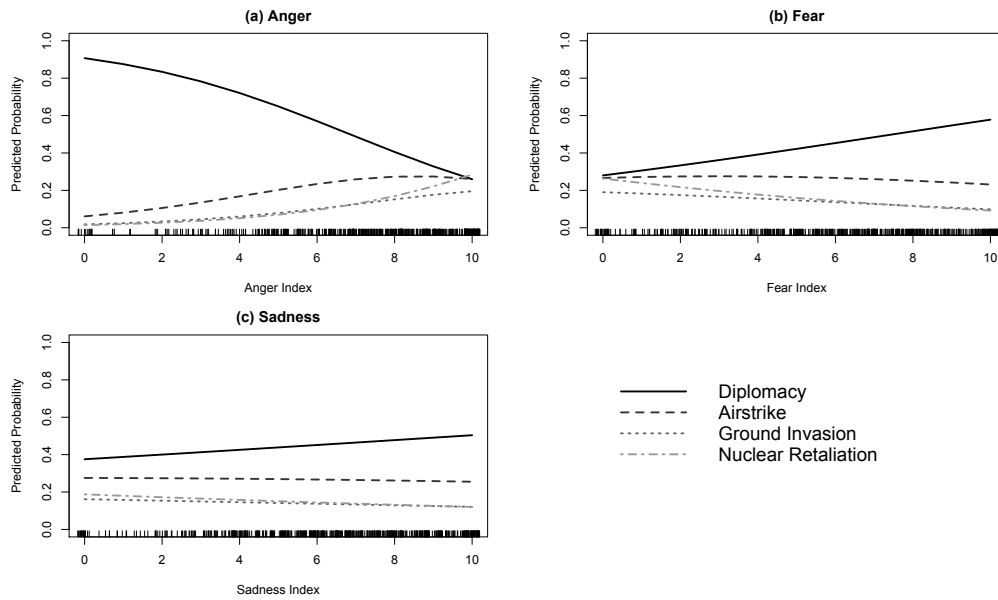
Figure 4.3: The predicted probability that a hypothetical respondent would support diplomacy, airstrikes, ground invasion, and nuclear retaliation given their levels of fear, anger, and sadness. Note: predictions were calculated by setting the non-moving coefficient estimates in Table 1 to their sample means.

To better demonstrate these effects, Figure 4.3 graphically illustrates a set of predicted probabilities that were derived from the parameter estimates summarized in Table 1. According to these predictions, for example, a shift from low (0) to high (10) on the Anger Index dramatically decreases the probability that an individual will support diplomacy ($\Delta p = -0.648$)[28] and increases the likelihood that an individual will support airstrikes, ground invasion, or nuclear retaliation ($\Delta p = 0.200, 0.178,$ and $0.270,$ respectively). This pattern in reversed when looking at the association between fear and opinion, which is depicted in panel (b). A shift from low (0) to high (10) on the Fear Index substantially

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[28] Δp denotes a change in probability.

increases the likelihood of that an individual will support diplomacy ($\Delta p = 0.298$) and decreases the probability that a person will support airstrikes, ground invasion, or nuclear retaliation ($\Delta p = $ -0.035, -0.092, and -0.171, respectively). A similar but fainter pattern characterizes the relationship between sadness and opinion, wherein a shift from low (0) to high (10) on the Sadness Index moderately increases the probability that an individual will support diplomacy ($\Delta p = 0.128$) and decreases the predicted probability that a person will support airstrikes, ground invasion, or nuclear retaliation ($\Delta p = $ -0.020, -0.041, and -0.067, respectively).

In short, these results provide strong evidence that discrete emotions of the same valence differentially rather than uniformly impact public opinions about how the government should respond to the hypothetical disaster. In other words, the results are consistent with an emotion-specific rather than valence-based understanding of the relationship between affect and decision-making. As such, I turn now to a second test. Do fear, anger, and sadness differentially impact the amount of confidence that individuals have in the opinions they expressed?

Stage 2

Results from stage two of this analysis are numerically summarized in Table 4.2. Again, the evidence supports the emotion-specific (rather than the valence-based) model of affect and decision-making. First, the relationship between confidence and individual scores on the valence index is statistically

indistinguishable from zero, which explains the insignificant F-statistic associated with the valence-based model. Second, a rough comparison of the R^2 associated with each model (0.004 vs. 0.075) suggests that the emotion-specific model explains more variation in the confidence that individuals expressed in their opinions about how the government should handle the disaster. Last but not least, the partial regression coefficients in the emotion-specific model indicates that fear, anger, and sadness exert a differential (rather than uniform) effect on confidence.

Table 4.2: Summary of a linear (OLS) model that estimates the effect of affective valence and then discrete emotions on the confidence that individuals have in their opinions about how the government should respond to the hypothetical nuclear attack.

	Valence-Based Model		Emotion-Specific Model	
	Estimate	Std. Error	Estimate	Std. Error
Coefficients				
Valence Index	-0.024	0.018	—	—
Sadness Index	—	—	0.008	0.041
Fear Index	—	—	-0.156***	0.036
Anger Index	—	—	0.199***	0.039
Intercept	7.265***	0.281	6.334***	0.314
n-size	516		516	
F-stat	1.824		13.880***	
R^2	0.004		0.075	

Note: ***$p < 0.001$ in one-tailed t-tests.*

Specifically, there was a strong, positive, and statistically significant relationship between scores on the Anger Index and variations in confidence, when controlling for fear and sadness. By contrast, there was an equally strong and significant negative relationship between scores on the Fear Index and the

confidence that respondents expressed in their opinions about how the

government should respond. Lastly, the estimated relationship between sadness

and confidence was slightly positive, but not distinguishable from zero.
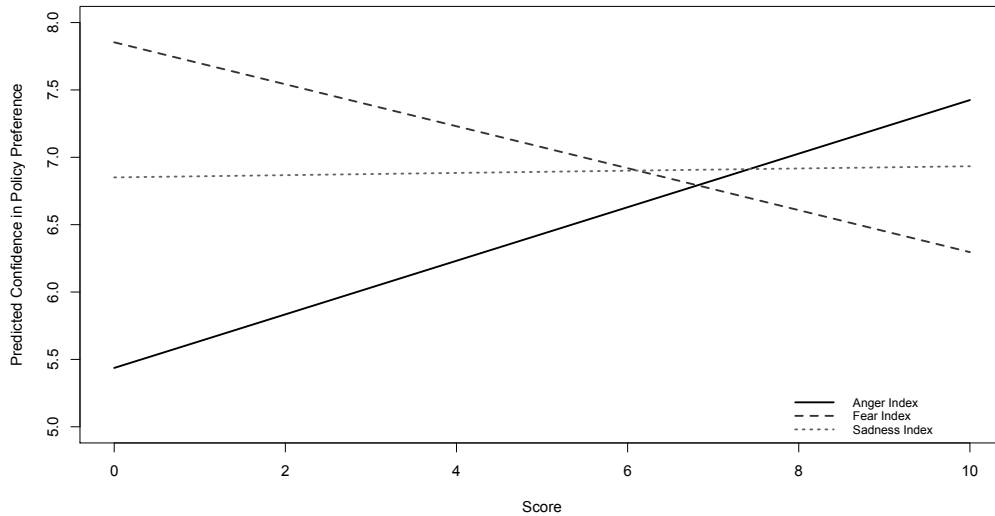
Figure 4.4: The predicted amount of confidence that a hypothetical respondent
would have in their opinion about how the government should respond to the
nuclear strike given their levels of fear, anger, and sadness. Note: predictions
were calculated by setting the non-moving coefficient estimates in Table 2 to their
sample means.

To better illustrate the substantive impact of discrete emotions, Figure 4.4

graphically presents a set of predictions that were derived from the parameter

estimates summarized in Table 4.2. According to these predictions, for example, a

shift from low (0) to high (10) on the Anger Index results in a two-point (~18%)

increase on the zero to ten indicator of confidence. A similar shift from low (0) to

high (10) on the Fear Index has the opposite effect—it results in a 1.5-point

(~14%) decrease in predicted confidence. Lastly, we see that changes on the

Sadness Index had little if any effect in the amount of confidence that respondents had in their opinions about how the government should respond to the hypothetical nuclear strike.

4.8: Conclusion

In the previous chapter I found that different people experience different types—and levels—of negative emotion (fear, anger, and sadness) when faced with the same crisis or disaster. This chapter was motivated by a relatively straightforward follow-up question that was designed to test Proposition 1.1, which was laid out in Chapter 2: do these differences matter? In other words, do discrete emotions of the same valance—like anger, fear, and sadness—differentially affect the way in which individuals think about and respond to crises and disasters? In short, my answer to this question is *yes*. Anger, fear, and sadness, had divergent effects on opinions about how the government should respond to the crisis as well as the level of confidence that individuals had in their own opinions.

By implication, these results also support the first proposition that was articulated in Chapter 2. As a general phenomenon, affect systematically influences the ways in which people think about and respond to disasters. Therefore, if we want to understand the decisions people make when confronted with a disaster—i.e., the decisions not to take protective action after hearing a tornado warning—then we should consider the emotional state of the decision-

maker when the decision was made. People who are angered (or frustrated) by the inconvenience of (and opportunity costs of actions implied by) a tornado warning, for example, are likely to make different decisions than individuals who are scared by that warning.

If this is the case, the critical next step in advancing our understanding of the way in which people think about and respond to disasters is developing our understanding of individual-level variation in the emotions that people experience in response to the same crisis. Returning to the example listed above, why is it that some people are angered by an event (or piece of information) whereas others are scared by it? The next chapter provides an initial look at exactly this question.

Chapter 5: Explaining Individual-Level Variation in Emotional Experience

5.1: Introduction

Chapter 3 demonstrated that different people experience different types—and levels—of negative emotion (fear, anger, and sadness) when given the same information about a crisis or disaster. The analysis provided in Chapter 4 confirmed that these difference matter. Despite their common valances, fear, anger, and sadness differentially affect the ways in which individuals think about and respond to crises and disasters. This chapter takes a step back to reflect upon a critical yet understudied foundational question—where do these emotions come from in the first place? More specifically, what explains the individual-level variation in emotional experience that we observed in Chapter 3? Why is it that some people experienced fear whereas other people experienced sadness and/or anger when thinking about the hypothetical nuclear disaster?

5.2: Theoretical Overview

As outlined in Chapter 2, there are essentially two ways that scholars have gone about answering these questions. On one side of the debate, scholars have argued (often implicitly) that the emotions humans experience in response to a stimulus are a function of the information they receive about that stimulus (e.g., Finucane, Alhakami, Slovic and Johnson 2000). If this argument is correct, then two (or more) people that are exposed to the same information will, on average,

experience the same emotions.[29] Deviations from this pattern will be rare and due to idiosyncratic differences in individual ability to process and then translate information into an "appropriate" emotional response.[30] As a result, individual-level variation in the emotions people experience when reacting to the same information is essentially stochastic and therefore unpredictable.

On the other side of the debate, scholars have noted that individuals are endowed with a fairly complex set of cognitive filters that direct our attention towards certain types of information and away from other types of information (Jenkins-Smith 2001). For example, cognitive filters steer attention away from information that threatens an individual's cultural worldview and/or social identities and towards information that confirms or reinforces them (Kahan, Braman, Gastil, Slovic, and Mertz 2007). People with different worldviews and/or identities may be exposed to the same set of information but attend to different aspects or components of that information. If this is the case, then two (or more) people that are exposed to the same information may well respond on the basis of completely different emotional reactions. The broader implication of this argument is that individual-level variation in the emotions people experience

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[29] Or, put differently, they will share a common emotional response plus random variation.

[30] For an introduction to a variety of disorders and psychopathologies that inhibit an individual's ability to process and then translate information into an "appropriate" emotional response, see Post (2003).

when reacting to the same information is (to some extent) systematic and therefore predictable.

The resolution of this debate is particularly important because, in a disaster related emergency, saving lives and property hinges upon the ability of practitioners and policymakers to generate a priori predictions about how different portions of a population are likely to respond. If (as suggested by the findings presented in the previous chapter) these responses are systematically influenced by discrete emotions, then practitioners and policymakers will need to know who is likely to feel what as a potential crisis approaches. Whether or not this is possible depends on which of the abovementioned camps is correct—are the discrete emotions that individual experience when given the same information about a crisis idiosyncratic and unpredictable or systematic and somewhat predictable given our understanding of cognitive filters?

5.3: Present Study

To answer this, I use the survey data that were described in Chapter 2. As a brief reminder, these data are comprised of student responses to an original survey that was designed to elicit and then capture the discrete emotions that people experience when thinking about a hypothetical nuclear attack on the US that kills 40,000 Americans and injures countless others.[31] Before capturing these experiences, the survey asks respondents to identify their demographic

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[31] See Chapter 2 for a detailed description of the survey instrument.

characteristics and to answer two sets of questions designed to measure individual

orientations with respect to the worldviews posited by Cultural Theory (CT).

Of the 585 students that participated in the study, 45% were female and

55% were male. The majority of respondents were in their first or second year of

college (55% were first year students, 23% were in their second year). As is the

case with most samples that are drawn from a college population, 93% of the

participants who completed the survey fell between the ages of 18 and 23,

resulting in a mean age of approximately 20 years old. In terms of race and

ethnicity, 76% of the participants identified themselves as "white," whereas 24%

of the students selected another racial or ethnic category from the following list:

Native American, Asian, Black, Hispanic, or Something else. All of the

participants were students at the University of Oklahoma and most (73%) of them

came from relatively educated families where at least one of their parents

graduated from college.

5.4: Measures

Dependent Variables

The dependent variable in this chapter is the set of emotional reactions that

respondents experienced when asked to think about the hypothetical disaster. As

explained in Chapter 3, these reactions were measured in two different ways.

First, respondents were asked to write down the first feeling that came to mind

when thinking about the events depicted in the scenario. This technique—which is

often called "free" or "continued" association—is quite common in the literature on affect and risk perceptions because it allows researchers to capture individual associations in a way that is not biased by the imposition of closed-ended questions (Leiserowitz 2005). After these responses were collected, content analysis was used to categorize individual reactions into one of the six categories—interest, joy, sadness, anger, disgust, and fear—that Carroll Izard has outlined in his repeated study of "basic" emotions (e.g., Izard 1977).

Doing so revealed a somewhat predictable breakdown of emotional reactions, in which the overwhelming majority of respondents indicated a negative (anger, fear, disgust, or sadness) rather than positive (joy or interest) emotional reaction to the scenario. Of the 308 responses that fell within one of these six categories, 0% (n = 0) of were coded as *joy*, less than 1% (n = 2) were coded as *interest*, approximately 2% (n = 5) were coded as *disgust*, roughly 16% (n = 48) were coded as *sadness*, a little more than 35% (n = 109) were coded as *fear*, and the remaining 47% (n = 144) of responses were coded as *anger*. Because there were so few observations that were coded as joy, interest, or disgust, the analysis that follows excludes the seven cases that fell into those categories.

In addition to free association, a reduced version of the Differential Emotions Scale (DES) was used to measure individual orientations with respect to three of the six basic emotions: anger, sadness, and fear. Developed and iteratively refined by Izard and his colleagues, the DES lists a series of adjectives—each of which correspond to one of the basic emotions—and asks

respondents to indicate the degree to which each adjective describes their feeling state after receiving the stimulus. In this study, for instance, respondents were asked to indicate the extent to which each of the following adjectives "describe how you feel" when thinking about the events depicted in the hypothetical scenario: mad, angry, enraged, sorrowful, sad, heartbroken, scared, fearful, and afraid.

Responses to the first three items were averaged in order to create an equally weighted Anger Index (alpha = 0.92), responses the second three items were averaged to create a Sadness Index (alpha = 0.87), and responses to the final three adjectives were averaged in order to create a Fear Index (alpha = 0.94). In all, anger was the most intense emotion that participants experienced when thinking about the scenario (mean = 7.38; sd = 2.47), followed by sadness (mean = 6.36; sd = 2.60), and then fear (mean = 6.10; sd = 2.86).

Independent Variables

Cultural Worldviews. Individual orientations with respect to the "active" worldviews posited by CT—hierarchy, egalitarianism, and individualism—were also measured in two different ways. First, a nominal measure was created by presenting participants with three different statements and asking them to select the statement that *best* describes their outlook on life. The statements, which are listed in Table 5.1, were designed to mimic the way in which an archetypal individualist, hierarch, and egalitarian would think about the world around them.

Table 5.1: The statements used to categorize participants by cultural worldview

Hierarch Statement: I am more comfortable when I know who is, and who is not, a part of my group, and loyalty to the group is important to me. I prefer to know who is in charge and to have clear rules and procedures; those who are in charge should punish those who break the rules. I like to have my responsibilities clearly defined, and I believe people should be rewarded based on the position they hold and their competence. Most of the time, I trust those with authority and expertise to do what is right for society.

Individualist Statement: Groups are not all that important to me. I prefer to make my own way in life without having to follow other peoples' rules. Rewards in life should be based on initiative, skill, and hard work, even if that results in inequality. I respect people based on what they do, not the positions or titles they hold. I like relationships that are based on negotiated "give and take," rather than on status. Everyone benefits when individuals are allowed to compete.

Egalitarian Statement: Much of society today is unfair and corrupt, and my most important contributions are made as a member of a group that promotes justice and equality. Within my group, everyone should play an equal role without differences in rank or authority. It is easy to lose track of what is important, so I have to keep a close eye on the actions of my group. It is not enough to provide equal opportunities; we also have to try to make outcomes more equal.

When measured in this way, approximately 46% (n = 205) of the sample was classified as individualist, 37% (n = 165) as hierarch, and 17% (n = 74) as egalitarian.

Second, interval indicators of the individualism, egalitarianism, and hierarchy were created by asking participants to denote the extent to which they agree with the set of nine statements listed in Table 5.2.[32] The first three statements were designed to detect an egalitarian orientation; the second set of

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[32] For a theoretical and empirical comparison of these two measures, see Ripberger (2012).

three statements an individualistic orientation; and the final three statements an

orientation towards hierarchy.

Table 5.2: The 9 statements I used to measure individual orientations with respect to the worldviews posited by CT

1. What society needs is a fairness revolution to make the distribution of goods more equal.
2. Society works best if power is shared equally.
3. It is our responsibility to reduce differences in income between the rich and the poor.
4. Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own.
5. Even the disadvantaged should have to make their own way in the world.
6. We are all better off when we compete as individuals.
7. The best way to get ahead in life is to work hard and do what you are told to do.
8. Society is in trouble because people do not obey those in authority.
9. Society would be much better off if we imposed strict and swift punishment on those who break the rules.

Principal component analysis (PCA) and tests of scale reliability were used to

evaluate the psychometric performance of these metrics. As expected, the PCA of

this set of nine questions extracted three components that were highly correlated

with the appropriate statements. Likewise, the alpha values of the egalitarianism,

individualism, and hierarchy scales were moderately high—0.70, 0.63, 0.59,

respectively. Accordingly, indices for each orientation were created by average

responses to the set of indicators associated with each worldview. When measured

in this way, individualism was the most prominent worldview in the sample

(mean = 4.22; sd = 1.23), followed by hierarchy (mean = 4.14; sd = 1.14), and

then egalitarianism (mean = 3.75; sd = 1.38).

Gender and Race. Gender was measured by way of self-report, wherein participants were asked to indicate their gender by selecting male or female. Similarly, race was documented by asking participants to indicate which of the following best describes their race or ethnic background: Native American (American Indian), Asian, Black, Hispanic, White, Something else. Responses to this question were then dichotomized, by coding participants that selected "white" as *white*, and coding the remaining participants as *nonwhite*.[33]

5.5: Hypotheses

If the discrete emotions that different individuals experience when given the same information are idiosyncratic and unpredictable then there should be little if any relationship between the dependent and independent variables described above. If emotional experiences are systematic and partially predictable, then the opposite will hold—there will be a statistically discernable and theoretically consistent relationship between the emotions participants experienced in response to the scenario and the set of cognitive filters they possess.

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[33] In an alternative coding scheme, I created a dichotomous variable "minority" variable by coding, self-descried Blacks, Hispanics and American Indians as minorities (1s) and everyone else (Asians included) as non-minorities (0s). The results presented below remain the same regardless of the scheme used.

For example, because each of the cultural types is expected to constantly

scan their environment for threats to relevant to their identity, hierarchs will focus

on the parts of the scenario that disrupt security and order. As such, they are (in

comparison to other groups) expected to experience higher levels of anger and

fear in response to the hypothetical disaster. Egalitarians, by comparison, will

attend to the parts of the scenario that threaten their key values, one of which is

the collective wellbeing of their compatriots (group). As such, they are (in

comparison to other groups) expected to experience higher levels of sadness when

reflecting on the hypothetical disaster that killed 40,000 people and injured

countless others. It is somewhat more difficult to predict individualist reactions to

this particular scenario, which says nothing about the explicit loss of liberty (a key

value for individualists). Nevertheless, if individualists anticipate that an event of

this sort would (in the longer run) lead to additional restrictions and governmental

intrusion upon personal privacy, then they like the hierarchs may experience

increased levels of anger when reflecting upon the scenario.

As outlined in Chapter 2, the empirical literature on gender, race,

ethnicity, and emotion is decidedly mixed. The primary theoretical propositions,

however, are fairly clear. Due in part to their vulnerability vis-à-vis more

powerful groups in society, female and minority groups are predisposed to

experience heightened levels of fear when faced with a threatening situation. If

this is the case, then the female and non-white participants are likely to experience

higher levels of fear than male and white respondents when thinking about the

hypothetical nuclear attack described in the survey.

5.6: Analytical Strategy

To test these hypotheses, the analysis that follows proceeds in two stages. The first stage follows Keller, Visschers, and Siegrist (2012) in using multiple correspondence analysis (MCA) to evaluate the relationship between the set of nominal variables listed above. The second stage extends this analysis by looking at the extent to which the findings in stage one hold when emotional reactions to the scenario and cultural worldviews of the respondents are measured by way of interval rather than nominal measures.

5.7: Findings

Stage 1

MCA—which is an extension of correspondence analysis—is a multivariate statistical technique that allows researchers to detect and visually represent associations among three or more nominal variables (or categories) in a given data set. Similar to PCA, it works by reducing multidimensional data to a relatively small number of dimensions (usually two) that account for as much of the variation within the data as possible. Once reduced, the data can be projected onto a two-dimensional map. The interpretation of MCA is then based upon the Euclidian proximity between points on this map—points that are close to one another demonstrate a high degree of correspondence, whereas points that are

relatively distant demonstrate a low degree of correspondence.

To identify latent patterns in emotional responses to the hypothetical attack, a data set containing the nominal indicators of emotion, cultural worldview, gender, and race (white vs. non-white) was subjected to MCA. Doing so produced the two-dimensional solution that is visually represented in Figure 5.1. A brief look at the way in which the points cluster in this map reveals a number of interesting and important findings.

Foremost among these is the finding that the emotional reactions that people wrote down in response to the hypothetical attack were not entirely stochastic. Instead, the patterning of clusters in Figure 5.1 suggests that different types (or groups) of people were predisposed to experience specific emotions when confronted with the same stimulus. For example, the cluster on the left side of Figure 5.1 suggests that male and white participants as well as those who indicated that the individualist or hierarch statement "best described their outlook on life" were more likely to experience anger than sadness or fear when confronted with the stimulus. The cluster of points in the top right corner, by comparison, suggests that participants who identified with the egalitarian worldview tended towards sadness when presented with the same information. Finally, the cluster of points in the lower right panel of Figure 5.1 suggests that female and nonwhite participants disproportionately indicated a feeling of fear when contemplating the hypothetical nuclear attack.
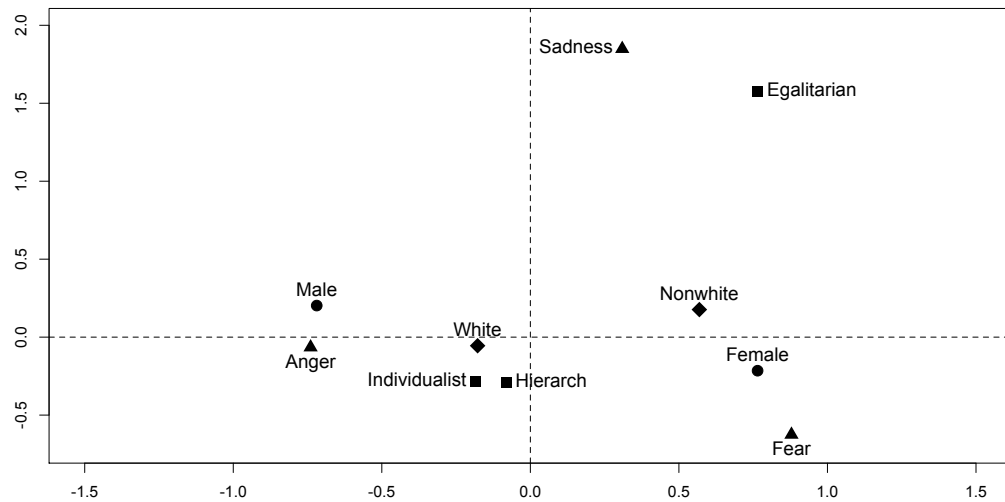
Figure 5.1: An MCA map of the relationship between gender, cultural worldview, race, and the emotional reactions that participants experienced in response to the scenario.

These findings support the general proposition that individual dispositions with respect to gender, race, and culture influence the emotions that people experience when confronted with a situation that is imbued with risk and uncertainty. In so doing, they also support the broader and perhaps more important contention that emotional experiences vary in systematic and predictable ways. However, MCA is generally considered an exploratory (visual) technique that is not designed for the testing of probabilistic or structural hypotheses. As such, the section that follows uses interval indicators of emotion to estimate a series of linear models that will help to validate and expand upon these findings by way of hypothesis testing.

Stage 2

To "formally" test the hypotheses that emotional reactions to the hypothetical nuclear attack vary as a function of gender, race, and cultural worldview, ordinary least squares (OLS) regression was used to estimate linear models with three different dependent variables—the fear index, sadness index, and the anger index that were explained above. The set of independent variables used to estimate each model were the same; they included the egalitarianism index, hierarchism index, and individualism index; as well as dichotomous indicators of race and gender.

Table 4 (above) and Figure 2 (below) summarize the results from this stage of the analysis. A brief look at these objects reveals a number of findings, many of which corroborate the findings in stage one and others call them into question. With respect to corroboration, these results confirm the most important finding in stage 1—the distributions of the emotional responses that respondents experienced when thinking about the hypothetical attack were not simply stochastic. Rather, the coefficient estimates and model statistics presented in Table 5.3 and Figure 5.2 indicate that some people were more likely than others to experience specific types of emotions. Notably, the partial regression coefficients in Table 5.3 indicate that the average female scored higher on the sadness and fear indices than did the average male participant. With respect to cultural worldviews, participants who were inclined towards hierarchism experienced a bit more fear and a lot more anger than did participants who scored relatively low on that index.

Participants with a penchant for egalitarianism, by comparison, experienced

higher levels of fear but significantly lower levels anger than their non-egalitarian

peers.

Table 5.3: Summary of linear (OLS) models that estimate the relationship between gender, cultural worldview, race, and the emotional reactions that participants experienced in response to the hypothetical attack

	Sadness Index	Fear Index	Anger Index
Intercept	-0.016	-0.004	-0.004
	(0.043)	(0.040)	(0.043)
Individualism index	-0.027	-0.044	-0.018
	(0.051)	(0.048)	(0.051)
Hierarchism index	0.025	0.074*	0.208***
	(0.048)	(0.044)	(0.047)
Egalitarianism index	0.075*	0.148***	-0.126**
	(0.048)	(0.044)	(0.048)
Gender (1 = Female)	0.177***	0.374***	-0.030
	(0.044)	(0.041)	(0.043)
Race (1 = Nonwhite)	0.036	-0.006	-0.029
	(0.045)	(0.042)	(0.044)
R^2	0.046	0.181	0.062
N	512	520	512

Notes: *p < 0.100, **p < 0.010, ***p < 0.001 in one-tailed t-tests.
Standard errors are listed in parentheses.
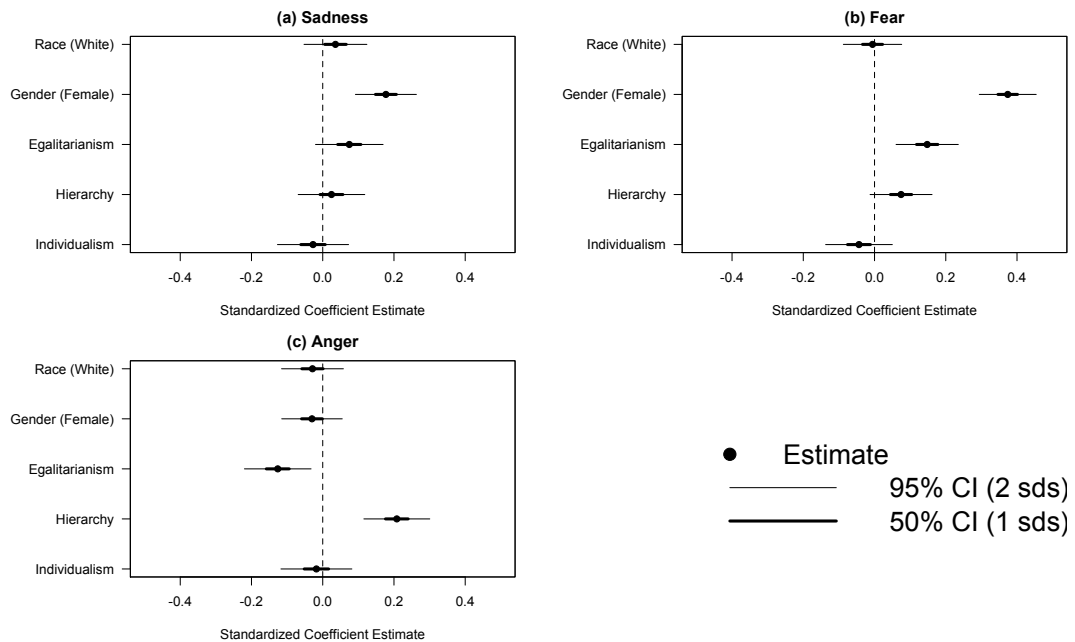
Figure 5.2: The standardized coefficient estimate (and confidence intervals) derived from linear (OLS) models that estimates the relationship between gender, cultural worldview, race, and the emotional reactions that participants experienced in response to the hypothetical attack

Again, these findings are largely consistent with the findings presented in the first stage of the analysis. Nevertheless, there are some interesting and important differences between this stage and the previous stage that are worth noting. First, this stage of the analysis suggests that race—after controlling for the effect of gender, risk perceptions, and cultural orientation—had little if any impact on the discrete emotions that respondents experience when thinking about the hypothetical nuclear strike. This contradicts the finding in stage one, which suggested that non-white (minority) respondents were disproportionately likely to experience fear when they are compared to white respondents who tended to experience anger when thinking about the hypothetical attack. Second, the

findings in this stage of the analysis suggest that individual orientations with respect to individualism have little if any impact on the emotions that people experienced in response to the disaster. Again, this contradicts the analysis in stage one, which suggested that self-identified individualists disproportionately experienced anger when reflecting on the scenario. On the whole, these discrepancies are unsurprising given mixed record of empirical scholarship on the relationship between race/ethnicity and emotion and the guesswork associated with deriving a hypothesis for individualists that was described in the "hypotheses" section of the chapter.

5.8: Conclusion

In the previous chapter, I found that discrete emotions of the same valance—like anger, fear, and sadness—differentially affect the way in which individuals think about and respond to crises and disasters. This chapter was motivated by an important follow-up question: are the discrete emotions that individuals experience when given the same information about a crisis idiosyncratic and unpredictable or systematic and somewhat predictable given our understanding of cognitive filters? In accordance with the second proposition established in Chapter 2, the empirical evidence analyzed in this chapter support the latter argument by illustrating that certain groups of people were predisposed to experience different combinations of discrete emotions when responding to the same information about a disaster.

The broader and more important implication of this finding is that policymakers and practitioners can use this sort of information to make predictions about how information about a crisis or disaster is likely to affect different groups within a given population. Who is likely to experience what emotion and what does that mean with respect to their behavior? When thinking about the hypothetical disaster presented in this study, for example, female respondents consistently experienced higher levels of fear and sadness than did male participants who received the same information. The group of respondents that identified with an egalitarian worldview consistently experienced lower levels of anger and higher levels of fear than did hierarchs.

Given my findings in the previous section, this means that females and egalitarians are likely to think about and respond to crises in a different way than are males and hierarches, and that the mechanism responsible for these differences is affective reasoning driven by specific rather than global emotions.

Chapter 6: Conclusions, Implications, and Directions for Future Research

6.1: Conclusions

This dissertation was motivated by the pressing need to better understand the way that people think about and respond to natural and man-caused crises and disasters. As with most dissertations, I commenced the project by examining previous research on the subject. Doing so revealed a portrait of individual responses to disasters that does not comport with contemporary models of cognition advanced by psychologists and decision theorists. Most notably, extant research on crises and disasters paints individuals as calculated evaluators of risk that base their decisions about what to do when confronted with a crisis or disaster on systematic logic and reason. Though explanations like this provide valuable insight into the way in which idealized individuals (and possibly *some* portion of the population) respond to disasters, they neglect the well-confirmed finding in psychology and decision science that many (if not all) of the decisions that humans face are influenced by some form of affective reasoning.

Driven by this discovery, I turned to recent research on risk and decision-making to develop a model of individual decision-making in response to crises and disasters that explicitly incorporates affective reasoning. Upon doing so, I found that scholars in the field are generally united in support of the proposition that emotion (in addition to analytical reasoning) systematically influences human judgment and decision-making, but are divided on a number of more specific propositions about the nature of this relationship. For example, some theorists

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argue that the positive-negative valence of an emotion is the only thing that humans consider when making choices. Others suggest that specific emotions of the same valence (like anger, sadness, and fear which are all negative) differentially affect decision-making. There are also disagreements about the forces responsible for variation in the emotions that different people experience when responding to the same stimulus. Some scholars imply that these forces are idiosyncratic and, by implication, that inter-individual variation is stochastic and unpredictable. Others suggest that individual-level variation is systematically related to the set of cognitive filters that individuals possess, and by extension, is somewhat predictable. Moreover, a growing body of research suggests that these filters may be grounded in deeply held beliefs, such as cultural worldviews.

Encouraged by the commonalities and intrigued by the disagreements, I then combined elements of this literature with previous research on the way that people think about and respond to crises and disasters to propose a "hierarchical" model of decision-making, as illustrated in Figure 6.1. At the lower level (proximate to the decision), the model hypothesizes that decision-making is governed by a dual-process wherein parallel systems of information processing—an emotionally driven experiential system (affect) and a more systematic rational system (reason)—interact to influence the way in which individuals think about and respond to disasters. In other words, the model suggests that people engage in two different styles of thought—one that is based on reason and calculation (line

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4) and one that is driven by affect/emotion (line 5)—when making choices about how to respond when confronted by a crisis or disaster.
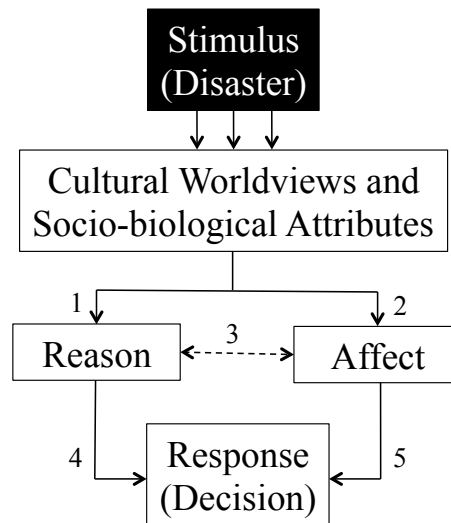
Figure 6.1: A "hierarchical" model depicting the way in which individuals think about and respond to crises and disasters

At the higher (more abstract) level, the model hypothesizes that relatively abstract social orientations like cultural worldviews and socio-biological group identities (i.e., race and gender) anchor the reasoned calculations (line 1) and filter the emotional experiences (line 2) that drive individual responses to a disaster at the proximate level. As a result, the ends that individuals "rationally" pursue and the emotions that people experience when confronted with a disaster are not entirely idiosyncratic; rather, certain groups of people are predisposed to pursue different goals (i.e., maximize different values) and experience different emotions when encountering the same disaster.

Equipped with an updated model that better comports with contemporary theories, the empirical portion of the dissertation used survey responses to a hypothetical disaster (nuclear attack) to test the updated model. Chapter 3, for example, demonstrates that my instruments provided reliable and valid measures of emotion, and that subjects differed in the emotions they experienced when confronted with the same crises or disasters. The hypothetical nuclear attack, for example, elicited fear in some respondents and anger or sadness in others. This finding marked an important point of departure because inter-individual variation is a critical assumption that one makes when arguing that a particular variable, like emotion, explains discrepancies in human judgment and decision-making.

The findings described in Chapter 4 provide empirical support for the general proposition that emotions influence the way that people think about disasters (line 5 in Figure 6.1). The analysis in Chapter 4 also supports the more specific sub-proposition that discrete emotions of the same valence (like anger, sadness, and fear) differentially impact individual responses to disasters. In the context of this study, for example, anger motivated relatively militant and confident opinions about how the US government should respond to the hypothetical nuclear attack. Fear, by comparison, provoked less militant and less confident opinions about how the government should respond.

Chapter 5 moved up (to the more abstract level) in the model to present evidence in support of the proposition that individuals with different background characteristics and cultural worldviews are predisposed to experience different

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emotions when given the same information about a crisis or disaster (line 2 in Figure 6.1). When asked to think about the hypothetical nuclear attack, for instance, female subjects experienced heightened levels of sadness and fear whereas male subjects responded with higher levels of anger. Cultural worldviews marked another point of departure—survey respondents that were inclined towards hierarchism experienced more fear and a lot more anger than the participants who scored relatively low on that index. Participants with a penchant for egalitarianism, by comparison, reacted to the hypothetical disaster with similar amounts of fear but significantly lower levels of anger.

In all, these findings reveal a strong and original body of evidence consistent with the assumptions and propositions posited by the right-hand (affect) side of model 6.1. As such, this dissertation provides theoretical and empirical support for the conclusion that affective reasoning (emotion) systematically influences individual reasoning about crises and disasters.

6.2: Implications

The most obvious implication of this conclusion is that scholars, policy makers, and practitioners who are interested in how individuals and groups respond to crises and disasters should reconsider their understanding of human decision-making. The findings presented in Chapter 4 indicate that individual differences with respect to the kinds of emotions elicited by a crisis or disaster are responsible (in part) for some variation in the choices that people make when

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confronted with such an event. Though important, this finding complicates a

priori efforts to identify who is likely to do what in the event of a disaster, which

is a critical first step in the dissemination of information about risk. In addition to

knowing which portions of the population perceive themselves to be at risk, we

need to know who is likely to feel what if a crisis or disaster were to occur.

Fortunately, the results presented in Chapter 5 indicate that this is not an

impossible task—if we know the predominant set of cognitive filters (i.e., cultural

worldviews or combinations of demographic attributes) that drive individual

reasoning in a given population, then we can generate informed propositions

about the pattern of emotions that population is likely to experience, and, in turn,

the kinds of responses and behaviors that population is likely to exhibit when

faced with a particular crisis or disaster.

In addition to advancing the literature on individual responses to crises

and disasters, the findings presented in this dissertation speak to important yet

unresolved theoretical debates in a number of other fields, including decision

science, risk analysis, and policy theory. With respect to the former, for example,

the findings presented in Chapter 4 provide empirical evidence that sheds light on

the ongoing feud between advocates of valance-based and emotion-specific

approaches to studying affect and decision-making. In this case, the emotion-

specific approach clearly outperformed the valence-based approach, suggesting

that "mainstream" models of emotion and decision-making (like the "affect

heuristic") must be refined so as to incorporate the differences between discrete emotions of the same valence.

Chapter 5 speaks to another important debate in decision science about the nature and causes of individual-level variation in emotional reactions to the same stimuli (information). Is this variation idiosyncratic and unpredictable or systematic and therefore predictable? Again, the evidence presented in this dissertation supports the relatively small subset of scholars who have eschewed "mainstream" models by arguing that variation in emotional experience is systematic and therefore predictable.

Chapter 5 also speaks to important questions in the field of risk analysis. Most notably, it adds to a growing body of research on the social and cognitive mechanisms responsible for cultural polarization in public opinion about risk and risk management (e.g., Kahan, Braman, Cohen, Gastil, and Slovic 2010). Why is it that egalitarians, hierarchs, and individualists persistently and vehemently disagree about how the government should respond to hazards like global warming, nuclear energy, and even nuclear warfare? The results presented in Chapter 5 provide strong evidence that emotion represents one answer to this question. When given the same information about a specific hazard, egalitarians, hierarchs, and individualists experienced different types and levels of emotional responses, that, as found in Chapter 4, can lead to divergent opinions about how the government should respond to a hazard.

A similar argument can be made about the forces that underlie the well documented but theoretically perplexing "white-male" effect that confounds research on risk perception (e.g., Flynn, Slovic, and Mertz 1994). Why do men (particularly white-men) and women differ in their opinions about risk and risk management? Again, one approach to answering this question would involve an examination of the different emotions that men and women (and possibly different racial groups) experience when confronted with the same hazard. Knowing that a particular risk elicits anger in men and fear in women (or vice-a-versa) may help to explain divergent views about how the government should manage that risk.

Last but not least, this project as whole serves as an important note to policy theorists that emotions (perhaps in addition to attitudes, values, and preferences) orient the way that people think about public policy. Thus, in addition to studying the belief systems that motivate coalition formation, behavior, and policy change (e.g., Sabatier and Jenkins-Smith 1993), it is important that scholars address the role of emotion in these processes. For instance, is it possible that shared emotions (in addition to or in lieu of common beliefs) provide the glue that binds and/or the fuel that fires some advocacy coalitions or social movements (i.e., the "Tea Party" or the "Occupy Wall St." movements)? If so, do the emotions that bind or fuel a coalition/movement impact the strategies, rhetoric, and policy proposals advanced by that movement? More importantly, what happens when the prevailing emotions in such a

coalition/movement subside or change—which is quite likely given the transient and ephemeral nature of some emotions (Frijda, Mansted, and Bem 2000) vis-à-vis deep and policy core beliefs, which are difficult and slow to change (Sabatier and Jenkins-Smith 1993)? These questions have not been addressed by extant research on the policy process and therefore provide ample fodder for future research. Engaging in this sort of research, however, will require that policy theorists update their models of individual and group behavior so as to include the hitherto neglected role of affect and emotions.

6.3: Directions for Future Research

As discussed in the previous section, the theory and findings presented in this dissertation offer answers to a number of important questions that have direct and indirect implications for multiple fields of research. Nevertheless, the results presented here should—like all ongoing research programs—be subjected to future testing/refinement using additional data and alternative research designs/methods. As a first step in this direction, a study of this sort should be replicated using survey responses from a randomly (or semi-randomly) selected representative sample of the US population, rather than a convenient sample of college students at a single university. Though there are no *a priori* reasons to believe that such a study would yield different results, it would allow researchers to generalize these findings to the broader population.

Second, future research on the relationship between emotion and individual responses to crises and disaster should move beyond correlational analysis so that we can be more confident in the causal relationships stipulated by the model introduced in this dissertation. Survey experiments that randomly manipulate emotional experiences via targeted treatments represent one vehicle for accomplishing this task. Natural experiments based on "actual" rather than "hypothetical" crises and disasters represent another alternative. To accomplish this, however, one would need longitudinal data on individual emotions and decisions/behaviors before and after a disaster. Five or ten years ago this sort of data would be extremely difficult if not impossible to collect. Fortunately, recent advances in the collection and processing of "big data" (i.e., "tweets" on Twitter or "updates" on Facebook) make this sort of research more plausible. What if researchers could use these kinds of data to compare the expressed emotions and stated actions of a given individual before and after they experienced a crisis or disaster?

This brings up a third direction for future research. In addition to studying the impact of emotion on decision-making and opinion formation (as I did in this dissertation), scholars should explore the influence of different emotions on individual behavior before, during, and after crises and disasters. One could assume (as many do) that because emotions influence judgment, decisions, opinion, and even stated behavior, they also influence actual behavior. As reasonable as it sounds, this assumption is an important theoretical conjecture

worthy of empirical investigation (Dollard 1948; Wicker 1969). Such an investigation would require data on individual behavior in response to actual rather than hypothetical crises and disasters because real incidents may induce different types and intensities of emotion and behavior than the sort of hypothetical scenario used in this dissertation. Again, however, such data are extremely difficult to collect via traditional instruments like surveys and interviews. As such, scholars wishing to pursue this line of research will have to be innovative and flexible in the sort of data they bring to bear on the question.

Last but not least, it is important to point out that this dissertation focuses exclusively on the assumptions and propositions posited by the right-hand (affect) side of model 6.1. This decision was made because previous research on individual responses to crises concentrates on the left (reason) side of the model. Future applications of this model should study the relationship and interactions between the two sides. For example, how do discrete emotions impact systematic reasoning and vice versa (line 3)? Are angry people more or less likely than fearful people to engage in systematic reasoning? Do *ex ante* assessments of risk (both real and perceived) influence the emotions people experience in the event of an actual crisis or disaster?

This list future research is merely the tip of the iceberg. Suffice it to say that the relationship between emotion and individual reasoning about crises and disasters is a sparse and therefore rich area of research that scholars (myself included) are only beginning to understand. My hope is that this dissertation will

guide and inspire future research on this practically and theoretically important relationship. More importantly, I hope that this dissertation and the research it inspires will be used to improve upon our capacity (as a society) to protect life and property by minimizing the impact of crises and disasters.

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Appendix 1: Survey Instrument

To begin, I would like to ask you some basic demographic questions.

How old are you (in years)? _____

How many years have you been in college? _____

Are you male or female?

    a. Male
    b. Female

Did your parents graduate from college?

    a. Yes, they both did.
    b. Yes, my mom did.
    c. Yes, my dad did.
    d. No, my parents did not graduate from college.
    e. Not sure.

Are you a Political Science major?

    a. Yes
    b. No

Are you an International and Area Studies major?

    a. Yes
    b. No

Are you an international student?

    a. Yes
    b. No

Are you now, or have you ever been, a member of the U.S. military?

    a. Yes
    b. No

Which of the following *best* describes your race or ethnic background?

a. Native American (American Indian)
b. Asian
c. Black (African American)
d. Hispanic
e. White
f. Something else _____ (please specify)

Next, I would like to ask you some questions about your political beliefs.

With which political party do you *most* identify?

a. Democratic
b. Republican
c. Independent
d. Other Party _____ (please specify)

Do you completely, somewhat, or slightly identify with that party?

a. Completely
b. Somewhat
c. Slightly

On a scale of political ideology, individuals can be arranged from strongly liberal to strongly conservative. With of the following best describes your views?

a. Strongly liberal
b. Liberal
c. Slightly liberal
d. Middle of the road
e. Slightly conservative
f. Conservative
g. Strongly conservative

Now, I want to ask you some questions about nuclear weapons.

Using a scale from zero to ten, where zero means *no risk* and ten means *extreme risk*, how much risk do you believe nuclear weapons pose to human health, safety, or prosperity?

No Risk									Extreme Risk	
0	1	2	3	4	5	6	7	8	9	10

Using a scale from zero to ten, where zero means *not at all likely* and ten means *extremely likely*, please assess the likelihood that the following countries will attack the U.S. with a nuclear weapon in the next 10 years.

Not at all likely   Extremely likely

China	0	1	2	3	4	5	6	7	8	9	10
Iran	0	1	2	3	4	5	6	7	8	9	10
North Korea	0	1	2	3	4	5	6	7	8	9	10
Russia	0	1	2	3	4	5	6	7	8	9	10

Using a scale from zero to ten, where zero means *limited damage* and ten means *catastrophic damage,* please assess the likely consequences of a nuclear attack on the U.S. from the following countries in the next 10 years.

Limited damage   Catastrophic damage

China	0	1	2	3	4	5	6	7	8	9	10
Iran	0	1	2	3	4	5	6	7	8	9	10
North Korea	0	1	2	3	4	5	6	7	8	9	10
Russia	0	1	2	3	4	5	6	7	8	9	10

When making decisions about how to protect the U.S., policymakers are forced to prepare for two types of events: high consequence but low probability events (like a nuclear or terrorist attack) and low consequence but high probability events (like everyday criminal acts). If you were given 100 hours and asked to allocate the appropriate amount of time to preparing for each type of event, how would you allocate your time (total hours should add up to 100)?

High consequence but low probability events (such as nuclear or terrorist attacks): _____ (hours)

Low consequence but high probability events (such as everyday crime): _____ (hours)

Using a scale from zero to ten, where zero means *not at all important* and ten means *extremely important*, how important is it for the U.S. to retain nuclear weapons today?

Not at all important   Extremely important

0	1	2	3	4	5	6	7	8	9	10

Using a scale from zero to ten, where zero means *not at all effective* and ten means *extremely effective,* how effective do you believe U.S. nuclear weapons are for the following:

	Not at all effective									Extremely effective	
Preventing other countries from using nuclear weapons against the U.S. today?	0	1	2	3	4	5	6	7	8	9	10
Preventing other countries from providing nuclear weapons or nuclear materials to terrorists today?	0	1	2	3	4	5	6	7	8	9	10
Preventing other countries from using chemical or biological weapons against the U.S. today?	0	1	2	3	4	5	6	7	8	9	10
Preventing terrorist groups from using nuclear weapons against the U.S. today?	0	1	2	3	4	5	6	7	8	9	10
Preventing terrorist groups from using chemical or biological weapons against the U.S. today?	0	1	2	3	4	5	6	7	8	9	10

Using a "feeling thermometer" that ranges from 0 degrees to 100 degrees, please indicate how you feel about the *government* in the following countries. As you do so, keep the following key in mind:

- Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward that government.
- Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the government and that you don't care too much for that government.
- You would rate the group at the 50 degree mark if you don't feel particularly warm or cold toward that government.

The government in China: _____

The government in India: _____

The government in North Korea: _____

The government in France: _____

The government in Iran: _____

The government in Russia: _____

The government in Australia: _____

Using the same "feeling thermometer" that ranges from 0 degrees to 100 degrees, please indicate how you feel about the *people* in the following countries.

- Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the people.
- Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the people and that you don't care too much for that government.
- You would rate the group at the 50 degree mark if you don't feel particularly warm or cold toward the people.

The people in China: _____

The people in India: _____

The people in North Korea: _____

The people in France: _____

The people in Iran: _____

The people in Russia: _____

The people in Australia: _____

Next, I would like to you to respond to some statements that are designed to measure your beliefs about how the world should work.

Please respond to each of the following statements using a scale from one to seven, where one means *strongly disagree* and seven means *strongly agree*.

	Strongly disagree						Strongly agree
Even though allies are important, the U.S. must be willing to act alone to protect American interests.	1	2	3	4	5	6	7
Like the citizens of many other countries, officials and citizens of the U.S., including members of the military, should be subject to criminal proceedings under the International Criminal Court in Europe.	1	2	3	4	5	6	7
Unless directly attacked, we should not use U.S. military force without authorization from the United Nations.	1	2	3	4	5	6	7
The U.S. can never entrust its security to international organizations such as the United Nations.	1	2	3	4	5	6	7
The U.S. should agree to accept internationally established limits on the production of carbon dioxide and other greenhouse gasses thought to cause global warming.	1	2	3	4	5	6	7
The U.S. must be willing to act preemptively by using military force against those that threaten us *before* they can attack us.	1	2	3	4	5	6	7

Again, please respond to each of the following statements using a scale from one to seven, where one means *strongly disagree* and seven means *strongly agree*.

	Strongly disagree						Strongly agree
What society needs is a fairness revolution to make the distribution of goods more equal.	1	2	3	4	5	6	7
Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own.	1	2	3	4	5	6	7
The best way to get ahead in life is to work hard and do what you are told to do.	1	2	3	4	5	6	7
For the most part, succeeding in life is a matter of chance.	1	2	3	4	5	6	7
Society works best if power is shared equally.	1	2	3	4	5	6	7
Even the disadvantaged should have to make their own way in the world.	1	2	3	4	5	6	7

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It is our responsibility to reduce differences in income between the rich and the poor.	1	2	3	4	5	6	7
No matter how hard we try, the course of our lives is largely determined by forces beyond our control.	1	2	3	4	5	6	7
We are all better off when we compete as individuals.	1	2	3	4	5	6	7
Society would be much better off if we imposed strict and swift punishment on those who break the rules.	1	2	3	4	5	6	7
Most of the important things that take place in life happen by random chance.	1	2	3	4	5	6	7
Society is in trouble because people do not obey those in authority.	1	2	3	4	5	6	7

Again, please respond to each of the following statements using a scale from one to seven, where one means *strongly disagree* and seven means *strongly agree*.

	Strongly disagree						Strongly agree
Society should not punish murderers just to avenge the victims.	1	2	3	4	5	6	7
For a terrible crime, there should be a terrible punishment.	1	2	3	4	5	6	7
We should show mercy to those who have done wrong.	1	2	3	4	5	6	7
Those who hurt others deserve to be hurt in return.	1	2	3	4	5	6	7
Punishment should fit the crime.	1	2	3	4	5	6	7

In this section, I would like you to compare each of the two statements about international affairs and place a *checkmark* next to the statement that best describes your answer to the following questions.

What is *more* important to you?

a. □ Promoting human rights abroad …or… □ Improving security at home

b. □ Protecting American corporations …or… □ Upholding international law

c. □ Opening up trade with foreign countries …or… □ Increasing American military might

d. □ Restricting the flow of weapons of mass destruction …or… □ Encouraging the spread of democracy abroad

In your opinion, countries...

a. □ Are inherently aggressive …or… □ Are inherently

		cooperative

b. ☐ Can often be persuaded by international organizations (like the United Nations) …or… ☐ Can only be persuaded by the use of force

c. ☐ Should never trust other countries …or… ☐ Should be able to trust other countries

d. ☐ Should only use military force for defensive purposes …or… ☐ Should be prepared to use military force for any purpose

e. ☐ Should pay less attention to treaties and institutions …or… ☐ Should pay less attention to power and arms races

In your opinion, war...

a. ☐ Usually occurs because different countries have different values …or… ☐ Usually occurs because different countries have clashing interests

b. ☐ Is usually unavoidable …or… ☐ Can usually be avoided

c. ☐ Tends to make problems worse …or… ☐ Often fulfills a useful purpose

d. ☐ Is a legitimate way to settle disputes …or… ☐ Should always be the last resort

Now, I would like you to rank the following four statements in terms of which one most accurately describes you. A ranking of "1" means that statement best describes the way you look at the world and a ranking of "4" means that statement least describes the way that you look at the world.

Rank
1=Most Accurate
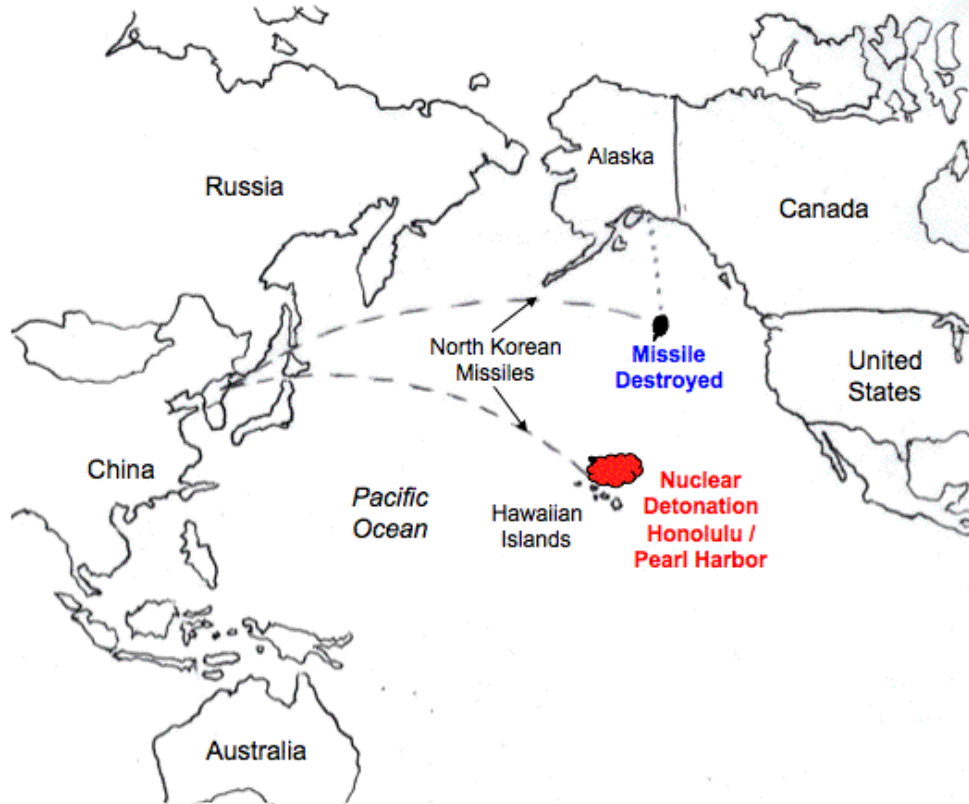4=Least Accurate

I am more comfortable when I know who is, and who is not, a part of my group, and loyalty to the group is important to me. I prefer to know who is in charge and to have clear rules and procedures; those who are in charge should punish those who break the rules. I like to have my responsibilities clearly defined, and I believe people should be rewarded based on the position they hold and their competence. Most of the time, I trust those with authority and expertise to do what is right for society.	
Groups are not all that important to me. I prefer to make my own way in life without having to follow other peoples' rules. Rewards in life should be based on initiative, skill, and hard work, even if that results in inequality. I respect people based on what they do, not the positions or titles they hold. I like relationships that are based on negotiated	

"give and take," rather than on status. Everyone benefits when individuals are allowed to compete.	
Society today is unfair and corrupt, and my most important contributions are made as a member of a group that promotes justice and equality. Within my group, everyone should play an equal role without differences in rank or authority. It is easy to lose track of what is important, so I have to keep a close eye on the actions of my group. It is not enough to provide equal opportunities; we also have to try to make outcomes more equal.	
Life is unpredictable and I have little control. I have to live by lots of rules, but I don't get to make them. My fate in life is determined mostly by chance. I can't become a member of the groups that make most of the important decisions affecting me. Getting along in life is largely a matter of doing the best I can with what comes my way, so I focus on taking care of myself and the people closest to me.	

In next part of the survey, I will give you some information about a fictional scenario that involves a military crisis between the U.S. and North Korea. Though the scenario is fictional, please read it carefully and imagine how you would feel if the events that are described were to happen in the near future.

SCENERIO: The year is 2013. In an effort to assert his military prowess, Kim Jung Un—the newly appointed leader of North Korea—begins shelling Seoul (the capital of South Korea), bombing South Korean air bases, and invading South Korea. U.S. and South Korean forces slow the invasion and conduct airstrikes on military targets in North Korea using conventional munitions. Within a week, the North Korean invasion is reversed, and U.S. and South Korean ground forces regain South Korean territory and prepare to invade North Korea.

Without warning, two advanced models of the Taepodong-2 missile are launched from North Korea. One strikes Honolulu, Hawaii with a nuclear explosion producing at least 40,000 fatalities and unknown numbers of injured and missing persons. U.S. naval facilities at Pearl Harbor are heavily damaged. The second North Korean missile is intercepted off the coast of Alaska and destroyed by U.S. missile defenses before it reaches its intended target of Seattle, Washington. Chinese and Russian nuclear forces are brought to their highest levels of alert, and both countries call on all parties to cease hostilities. North Korea warns that if American and South Korean forces invade North Korea, it will launch additional nuclear missile strikes against cities in the United States and South Korea.

As you think about the events depicted in the aforementioned scenario, please write down the first three feelings that come to mind:

1. _____
2. _____
3. _____

Now I am going to give you a list of feelings. Using a scale from zero to ten, where zero means *not at all* and ten means *extremely*, please indicate how you feel as you continue to think about the events depicted in the aforementioned scenario.

	Not at all										Extremely
Mad	0	1	2	3	4	5	6	7	8	9	10
Scared	0	1	2	3	4	5	6	7	8	9	10
Sorrowful	0	1	2	3	4	5	6	7	8	9	10
Helpless	0	1	2	3	4	5	6	7	8	9	10
Fearful	0	1	2	3	4	5	6	7	8	9	10
Sad	0	1	2	3	4	5	6	7	8	9	10
Powerless	0	1	2	3	4	5	6	7	8	9	10

Angry	0	1	2	3	4	5	6	7	8	9	10
Heartbroken	0	1	2	3	4	5	6	7	8	9	10
Enraged	0	1	2	3	4	5	6	7	8	9	10
Hopeless	0	1	2	3	4	5	6	7	8	9	10
Afraid	0	1	2	3	4	5	6	7	8	9	10

Next, I would like you to rank some feelings in terms of which one most accurately describes how you feel as you continue to think about events depicted in the aforementioned scenario. A ranking of "1" means that feeling best describes how you feel and a ranking of "4" means that feeling least describes how you feel when thinking about the events depicted in the aforementioned scenario.

Rank
1=Most Accurate
4=Least Accurate

Sad	
Scared	
Angry	
Helpless	

Now, I am going to list several actions that the United States could pursue in response to the aforementioned scenario. Though this list is not exclusive and you might not agree completely with any one of the options, please indicate which course of action you favor the most.

a. *Diplomacy and negotiations*: Demand an immediate cease-fire and warn that further nuclear attacks from North Korea will result in full-scale U.S. nuclear retaliation.
b. *Airstrikes using conventional armaments*: Conduct air attacks using precision guided conventional munitions against known and suspected nuclear facilities and missile launch sites in North Korea.
c. *Invasion using conventional armaments*: Conduct air, land, and sea attacks against North Korea using conventional armaments against known and suspected nuclear facilities and missile launch sites in North Korea.
d. *Retaliation using nuclear weapons*: Conduct nuclear strikes against North Korea using U.S. intercontinental ballistic and cruise missiles against known and suspected nuclear facilities and missile launch sites in North Korea.

Using a scale from zero to ten where zero means *not at all confident* and ten means *extremely confident*, how confident are you that the option you selected in the previous question is the best possible course of action under these circumstances?

	Not at all confident							Extremely confident			
	0	1	2	3	4	5	6	7	8	9	10

Using a scale from zero to ten, where zero means *not at all likely* and ten means *extremely likely*, please assess the likelihood that the aforementioned scenario (where North Korea uses a nuclear weapon against the U.S.) will occur in the next 10 years.

	Not at all likely							Extremely likely			
	0	1	2	3	4	5	6	7	8	9	10

Lastly, would you, ***in exchange for extra credit in this class***, be willing to participate in a group discussion about the topics mentioned in this survey?

a. Yes
b. No

If yes, please write your email address below so that I can contact you with further details. Any email address will work, as long as you check it regularly.

Email address: _____