INSTITUTIONAL PARTICIPATION EFFECTS ON INDIVIDUAL MARKET
FRAMING AMONG ENGINEERS

A dissertation presented to
the faculty of
the College of Arts and Sciences of Ohio University

In partial fulfillment
of the requirements for the degree

Doctor of Philosophy

Charles A. L. Pickering
June 2006
This dissertation entitled

INSTITUTIONAL PARTICIPATION EFFECTS ON INDIVIDUAL MARKET
FRAMING AMONG ENGINEERS

by

CHARLES A. L. PICKERING

Has been approved for
the Department of Psychology
and the College of Arts and Sciences by

Jeffrey B. Vancouver
Associate Professor of Psychology

Benjamin M. Ogles
Dean, College of Arts and Sciences
Abstract

PICKERING, CHARLES A. L., Ph. D., June 2006. Individual Interdisciplinary Program

INSTITUTIONAL PARTICIPATION EFFECTS ON INDIVIDUAL MARKET FRAMING AMONG ENGINEERS (108 pp.)

Director of Dissertation: Jeffrey B. Vancouver

Research on organizational sensemaking has focused on the employing organization’s influences and individual difference variables, yet the perceptions and attitudes of professional employees may be related to professional affiliations outside of the employment organization. This research investigates the ways that professional affiliation is related to the individual’s schema, framing and attitudes toward the organization’s competitive environment by examining professional engineers. It is posited that through various possible processes, participation in and identification with professional organizations encourages the individual to hold tightly to certain perspectives about the environment leading to a resistance in environmental change that threatens the profession’s protected markets. The individual’s identification with the profession was found to be related to their perspectives about the industry and tendency to perceive environmental cues as a threat; however, professional perspectives professed by the professional organization did not appear to mediate this relationship.

Approved:

Jeffrey B. Vancouver
Associate Professor of Psychology
Acknowledgments

As with all adventures that prompt personal growth, it is not the destination that is important but it is the insight and experiences that were gained on the journey and people that were touched along the way. During my journey challenges that were encountered became opportunities to learn about and expand myself. Herein I acknowledge those that helped me conceptualize, construct and launch my vessel, get through challenging times, bail the boat and give direction when I was lost.

As my traveling companion for most of my journey I thank Dr. Jeffrey Vancouver, who provided ongoing direction and mentoring, although I fear at times he was unsure exactly where I wanted to go. Thank you for always having an open door, prompt response and patience for the outsider who probably never fit but was always welcomed.

Thanks also goes to Dr. Hugh Sherman for helping me conceptualize the journey and giving me significant initial bearings. Dr. Tom Daniels has also been with me from the beginning, and though he took on new obligations he stuck with me through the journey. Dr. Paula Popovich has been very insightful along the way, helping me understand what I was seeing and how it played into a larger context. Dr. Amy Taylor-Bianco has been supportive of my efforts and offered kind words and wind in my sail when it was most needed.

During those dark and challenging times, I acknowledge those students, co-workers and friends who spent the time to run interference, provide time off, give direction, provide insight, give moral support, offer constructive criticism and often just provide a much needed smile or pat on the back.
To my family I acknowledge the time and patience you have allowed me for this journey, and the sacrifices that have gone unmentioned but were not unnoticed nor will be forgotten.

Finally but foremost, I acknowledge my help-mate, who has been waiting patiently on the shore for my return. Although she has not always understood my reasons for going she has always respected and supported my need to go. I anxiously anticipate her embrace upon my return (and to tackle the to-do list she has compiled over the last five years).
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Introduction

Individuals organize (i.e., create and join organizations) for the purpose of achieving common goals through the division of labor and function, to increase their returns in exchange for their efforts and to provide an improved social environment (Weick, 1979). Organizations, operating in a socially constructed environment, are most effective when they provide high value to their market, and they are best able to provide this value when they understand their market and are able to leverage technology and environmental opportunity.

According to Weick, organizations sense environmental change and opportunity through processes of 1) individuals noticing and interpreting environmental events and 2) communication in a sense-making process. Aspects of organizational membership tend to homogenize these processes by limiting the individual’s ability to accurately and creatively interpret the environment or sense opportunity. This restricted and homogenized interpretation of information by organizational members has been previously established (Weick, 1995).

Previous research has also considered that professionals are members of not only their employment organizations but also their professions, which influence the ways individuals view their relationship with their employment organization and the work environment (e.g., Larwood, Wright, Desrochers & Dahir, 1998). This research extends
these existing perspectives by examining the relationship between the individual’s participation in professional organizations and their response to environmental change.

To better understand these processes at work, the fourfold purpose of this research was first to investigate whether the individual’s perspectives about the industry were related to their membership in or identification with a professional organization. A relationship between organizational participation and the individual’s perspectives about the industry would suggest the salience of social influence processes through organizational participation on the individual’s perspectives.

The second purpose of this research was to investigate whether individuals’ perspectives about the industry influence their response to environmental change as a threat or opportunity. A strong relationship between individual perspectives about the industry and interpretation of environmental cues as a threat or opportunity would indicate that the perspectives that individuals develop, perhaps through social exchange processes, influence their responses to industry change. If this were found to be the case, organizations would need to be attentive to interpretation errors and response deficiencies related to these perspectives. Organizations might want to use a diversity of perspectives in order to balance these deficiencies.

The third purpose of this research was to identify other major relationships between individual, professional and organizational influence and the individual’s response to environmental information. Specifically, an individual difference variable, regulatory focus, was investigated to determine whether it is related to a leaning toward or away from conservatism.
The final purpose was to investigate whether the results of this research support or explain other existing theories on individual response within the organizational environment. First, does the attraction/selection/attrition (ASA) model provide any deeper understanding or perspectives to the results obtained through this research? The ASA research model, proposed by Schneider, poses the perspective that “organizations are functions of the people that they contain and further, that the people there are functions of an attraction-selection-attrition (ASA) cycle” (Schneider, 1987, p.40). This alternative paradigm to the dominant socialization theory presents a different perspective for understanding the structures and processes of organizations.

Secondly, the results of this research were analyzed to determine whether they validate or reinforce the cosmopolitan-local research perspective? The widely accepted cosmopolitan-local perspective, based upon the work of Gouldner (1957), describes the individual’s latent roles within the organization. “Local persons are individuals who are identified with and committed to the institution in which they work. Alternatively, cosmopolitans are those individuals committed to maintaining the skill and values of the profession to which they belong.” (Wright & Larwood, 1997, p.897).

The understanding of the contribution of these various influences can help an organization understand its information gathering and interpretation processes and allows it to maximize its ability to sense and adapt to environmental change through a better understanding of the information gathering and interpretation processes of its members.

The following sections introduce the concept that business organizations are a product of, and operate within, their environments, and that their ability to sense and adapt to the effects of environmental change is vital to their survival.
Strategies of Business Organizations

One view of business organizations is that they operate in socially determined, competitive environments from which they need to obtain resources (Hannan & Freeman, 1988). As a general rule, the more resources that they obtain the more advantage and security they can have in their markets that they can use as leverage to provide more benefits to their organizational members and stakeholders. Organizational theory, and specifically business management theory, has a strong interest in maximizing the effectiveness of these business organizations. This is especially important in the area of change management, which includes the processes associated with identifying environmental change and correctly developing and implementing strategies for adaptation to environmental change.

On the organizational level of analysis, change management begins with the accurate interpretation of environmental information. Modern theories about environmental information processing include organizational learning (Crossan, Lane, & White, 1999), sensemaking (Weick, 1995), strategic learning and knowledge management (Thomas, Sussman & Henderson, 2001). Within these theories are both cognitive and social processes that are focused on the interactions at the nexus of the individual, the organization, and the environment (Maitlis, 2005).

In addition to the individual’s employment organization, this research examines the individual’s participation in a professional organization. The professional organization represents the institutional ideas and traditions of a profession. It is posed that members of the institutional organization 1) reflect the culture and tradition of the institutional organization, 2) possess a schema related to the organization’s culture, and
3) interpret environmental information in ways consistent with the perspectives of the institutional organization. Additionally, individual differences associated with regulatory focus were examined to determine whether this individual difference variable is related to the individual’s perspectives about the industry or response to environmental change as a threat or opportunity.

As the following section indicates, the study of the professional organization’s relationship to the individual’s perspectives is important to understanding group processes and the effectiveness of the business organization.

*Research Value to Management Studies*

Management studies are interested in increasing the value and return of business organizations, and have recently focused on the links between diversity, team performance and innovation in increasing organizational effectiveness (i.e., Hayashi, 2004). “Effective individual contributions are increasingly defined by how well employees can exchange knowledge and information and offer distinct competencies for completing group tasks” (Chatman & Spataro, 2005, p.321). This research project will provide insight into organizational theory by testing the relationship between an individual’s participation in an institutional organization and 1) their perception of environmental information and events, and 2) their attitude toward environmental change. This research provides management studies with additional insight into the role of group diversity, and an anticipation of the mental frames that may be formed through this participation (as called for in Sethi, Smith & Park, 2002) and the ways that this diversity affects the organization’s viability and adaptivity in its environment.
To this end, this research examines 1) the ways that environmental information is interpreted by individuals within a profession, and 2) the relationship between professional organizational membership, identification and the individual’s response to environmental information. This research is important because it is through the recognition of environmental opportunities and change that organizations are able to adapt to environmental change, maintain their effectiveness in the market, and provide the highest value to their stakeholders.

Business Organizations

The goal of the business organization is to develop the organization’s capabilities to effectively compete with its rivals within the market (i.e., its competitive environment; Porter, 1980). Organizations must provide a structure that is effective in its environment and yet develop unique competencies that are not easily duplicated. The organization must not only maintain its long-term strategy in its current environment in accordance with its strategic competencies and market, but also be able to identify evolutionary, technological and radical change in the environment and develop adaptive strategies in line with their conceptualized strategic trajectory.

Organizations are effective and thrive through two processes: innovation (through the creation of new opportunities and markets within industries) and adaptation (to market changes). Innovation and creativity are linked to the organizational members’ ability to develop or understand emergent technological opportunities in the context of environmental circumstances and to create new and innovative ways for their application. Adaptation can only be effective when the organizational members can sense changes in the organization’s environment and conceptualize adaptive strategies. The effective
organization’s response to both of these processes is founded upon the organizational member’s ability to accurately conceptualize the environment and the opportunities available therein, a process that is influenced by the organization’s processes and culture (Smith, Collins & Clark, 2005). The next section of this paper considers environmental change and the various aspects of perception, information interpretation, organizational adaptation, and timing.

Environmental change. Environmental change for organizations has been conceptualized on multiple levels. On a large scale change can be conceptualized as a shift (or evolution) within the environmental ecosystem, punctuating the interdependence that organizations share with the environment and each other (Lei & Slocum, 2005). Changes in the market can also be defined as shifts in the organization’s environment that alter the means and methods of competition and the ongoing competitive space of organizations in a particular industry. Change can come to a particular industry through the development of alternative technologies, new competitors and alternate delivery mechanisms (Porter, 1980). An organization’s generic strategy is influenced by the amount of environmental change present in their industry (Miles & Snow, 1978; Lei & Slocum, 2005).

When an organization’s environment begins to change, often the significance of the environmental change is not noticed or identified as a change, and thus an appropriate reaction strategy is not formulated or implemented in a timely manner (Porac, 1994). This is because information continues to be interpreted through the prevalent industry schema. This prevalent schema compels individuals to continue to view the environment and changes within the environment with the same prevalent strategies and models that
have worked in the past, and not recognize that new strategies or conceptions of the environment may be needed to deal with changing situations and markets. If an organization’s environment changes and the organization does not sense this change and conceive of appropriate adaptive strategies it can be severely damaged or cease to exist altogether.

This research project is focused on this problem. Individuals perceive their environment through these mental models, and this research begins to identify how these mental models are related to membership in professional organizations, as well as how this membership might influence the individual’s interpretation of environmental information. Organizations perceive their environment through the representation of its members, and as argued next, their accurate understanding of the environment is important to the survival and well-being of the organization.

*Environmental analysis.* Effective organizations, first and foremost, must understand their environments and develop the capability to sense environmental change that requires an adaptive organizational response. Due to shared technological and material problems, entire industries develop and share common perceptions of their environment, which can facilitate common reactions to predictable, programmed changes in the environment, and which can mask significant changes to the environment (Hodgkinson, 1997). This social exchange process leads to shared understandings about the nature of the marketplace and the means of competition within it, homogenizing the competitive exchange and providing an isomorphic competitive environment (DiMaggio & Powell, 1983). This homogenization can be embedded in the structure of the organizations, their collective culture and standards of organizational outputs within the
industry. Over time these processes become reified and lead to a reliance on proven programs and prevailing mental models, often to the extent that the organization or the entire industry can become out of step with the changing conditions of the environment (Senge, 1990). This can happen when environmental contingencies change and new technologies emerge which threaten the organization’s protected position. This homogenization of perspectives about the environment within and among organizations within an industry therefore limits and retards the organization’s reaction to environmental change, and often limits the response of the entire industry.

_Sensing change is vital._ During periods of evolutionary or radical environmental change individuals are often unable to conceptualize the changes to environmental or market conditions due to _cognitive inertia_ (Porac & Thomas, 1990). The concept of cognitive inertia poses that many of the environmental changes that lead to business downturn stem from the inability of the organization’s management and strategists to properly conceive of the environmental changes taking place and organizing an adaptation strategy for dealing with the changing competitive space (for archetypal examples see Sheaffer, Richardson & Rosenblatt’s 1998 deconstruction of the Baring Brothers & Co. Ltd. failure or Hodgkinson (1997) treatment of the British real estate market). This can be logically extended to identifying new emergent technologies and opportunities within the environment and the strategists’ ability to conceptualize these changes and develop adaptive strategies (Ireland, Hitt, Camp & Sexton, 2001). One strategy that has been suggested to help compensate for this cognitive inertia is to have organizational members periodically engage in individual and collective reflection, which
would allow them to reconsider their basic assumptions and beliefs about the organization’s competitive environment (Huff, 1990; Mitroff, 1988).

Effective organizations, therefore, need to accurately sense environmental change at various levels within the organization, assimilate and accurately interpret this information collectively, and develop effective adaptive change strategies for these environmental changes and opportunities. In the following sections two important perspectives were developed: 1) that organizations sense environmental change through its members and 2) that many inherent organizational processes may mask the accurate and effective interpretation and communication of environmental information.

Organizations Sense Environmental Change and Opportunity through its Members

Individuals gather information from the environment and interpret these cues to draw conclusions about their environment (Edmonson, 2003). This information and its interpretation are communicated within the organization and allow the organization to collectively understand its environment and to conceptualize appropriate response strategies. Therefore the accurate conceptualization of environmental change information is a precursor to the development of an appropriate organizational response. In the following sections, the concepts of organizational learning and inertia will be introduced to allow a foundation for the discussion of information interpretation within the organization.

Defining the organization’s environment. Daft, Sormunen, and Parks (1988) defined the organization’s environment as the “relevant physical and social factors outside the boundary of an organization that are taken into consideration during organizational decision-making” (p.124). Organizations, and the individuals within them,
depend upon the environment for scarce and limited resources (Hannan & Freeman, 1988). An information processing perspective of the environment considers that information about the environment is collected and interpreted by organizational members (Daft, et al., 1988), and that the quality of information and the accurate perception of these signals can be a source of competitive advantage for the organization (Dutton & Freedman, 1984). Thus, it is important for an organization to understand its environment and accurately perceive changes to that environment.

Stable environments allow for stable and incremental adaptation by organizations to changes in the environment, while rapidly changing environments provide uncertainty in organizations and trigger increased environmental scanning and interpretation. As the level of environmental complexity and rate of change increases, the amount of uncertainty perceived by an organization’s management increases (Duncan, 1972). In times of uncertainty, organizations increase their environmental scanning, information gathering and processing (Daft, et al., 1988). Because organizations and the individuals within them have limited scanning capacity, the resources devoted to environmental scanning, information sources, and information quality are important to accurately perceiving the environment and to anticipating developing trends. The goal for the effective use of an organization’s resources is to efficiently gather and process accurate information about the environment and opportunities for change within it.

The market. If an organization can be conceptualized as a process of voluntarily pooling resources by individuals for common use and increased utility, the market can be conceptualized as the processes that control the exchange between organizations. The advantage of a particular set of societal rules that specify social order and the enactment
of the marketplace have been debated for years, (i.e. Marx & Engels, 1848; Weber, 1958). These rules recognize both formal and informal social institutions and work the best when the society as a whole shares a similar cultural perspective toward the market. The market, as perceived on a micro level, is complex and subject to a myriad of social norms and rules. On a macro level, however, the market ultimately operates in an economic model seeking equilibrium in the allocation of resources. Two main concepts that seem to underlie the market are that they have 1) a fundamental set of rules in which they operate at any given time, and 2) a dynamic nature, sometimes defined as an continuing evolutionary process (Mantzavinos, 2001).

These market rules are created and adapted to changing environmental conditions through evolutionary processes. Individuals within a group create default rule hierarchies which lead to shared mental models (Denzau & North, 1994), in this case about rules, forms and processes associated with market participation. In a static sense, these rules provide “similarity in mental models within such communities” (Daniels, Johnson & Chematony, 2002, p.35) and a basis for social interactions and market participation.

These shared mental models evolve over time, are internalized by new entrants, and contribute to the isomorphism with the profession (DiMaggio & Powell, 1983). These perspectives provide the continuation of the norms and values of the profession (Daniels, Johnson & Chematony, 2002). The next section will show that the goal of the organization is to accurately understand the environment and sense environmental change, which may be inhibited by these isomorphic perspectives.

*Organizational learning.* Organizational learning describes the ways in which organizations are able to acquire and leverage information from the environment and
translate it into value for the organization (Crossan, Lane & White, 1999). Organizational learning has been defined as the acquisition and processing of information at multiple levels within the organization (Crossan, Lane & White, 1999), and requires a balance between expert intuition and creativity in interpretation of the information to seek new possibilities for innovation. Organizational learning involves both information gathering and information processing. Information becomes the fuel for organizational growth, development, and renewal (Thomas et al, 2001) through the offering of new and unique products and services tailored to the changing or evolving environment, technologies, markets and needs.

Organizations need to develop tools to ensure accurate environmental analysis because individuals can fail to perceive or properly acknowledge environmental cues signaling change or opportunity for innovation. Due to the effects of cognitive inertia on members within a market, many new innovations come from individuals and groups that are outside the competitive “community” (Lant, 1999). These individuals on the periphery of the community are not bound by many of the mental conceptions of the competitive (enacted) environment, including the technologies, methodologies, worldviews, and industry cultures. They are therefore free to conceptualize new and innovative ways to compete and deliver their services (Porac, 1994).

Environmental information or cues can be interpreted in different ways. Therefore to understand the organization’s interpretation of environmental information, individual learning processes must first be considered. Individuals hold developed mental models and schema from a variety of sources that influence and direct the interpretation of environmental information. As the following learning theories are introduced a case is
built toward the understanding of the importance of organizational culture as a mediating structure, which both organizes and constrains the member’s interpretation of information.

Individual Learning Theories and Organizations

Many learning theories begin with the concept that individuals learn by developing rules for organizing information. The rules theory of learning uses rules as the elementary units of knowledge, and the clustering of these rules provides a system of classification that develops them into an organized system of hierarchies (Holland, Holyoak, Nisbett, & Thagard, 1986). These rules and rule clusters are organized into the individual’s mental models, or transitory rules that apply to environmental conditions at the time (implying the provisional and temporal character of these models). These mental models are “flexible knowledge structures, created anew every time from the ready-made material of rules” (Mantzavinos, 2001, p. 27) and establishes the expectation of the individual about his/her actions prior to receiving feedback from the environment. Environmental feedback provides the means for the individual to modify or adapt their rules (learning through experience) and implies the dynamic nature of learning and adaptation of held mental models to environmental context. Rule-based learning involves the application of rule-based routines and processes to problems encountered in the environment. At the highest level, tacit knowledge rules involve the expert knowledge associated with previous experience, which is often difficult or impossible to articulate (Polyani, 1983).

“Meta-rules,” or heuristics, are learned from previous experience and are automatically applied by individuals to solve new theoretical problems, although it is
important to emphasize that the use of heuristics does not guarantee a correct resolution to these problems (Mantzavinos, 2001). Alternatively, heuristics can be conceptualized as the ways in which individuals direct their attention (Roberts, 2004). Within the environment there is much information that is potentially important to the individual, so procedural rules are developed by the individual to constrain the information sought and/or considered. This process directs people to pay attention to what is focal in their environments and important to their goals (Stanovich, Sá, & West, 2004).

Using language as a tool for information exchange, individuals, when faced with a novel problem, seek to modify existing rules or develop new rules for the solution to the problem (Mantzavinos, 2001). Many problems have solution rules that have been developed by others. Indeed, individuals in most developed societies are rigorously educated for 12-20 years in order to learn the standard rules used within a society and culture, often by selecting among a choice of alternatives available within a given set of rules. In the following section the basic assumptions of these learning theories are utilized in the development of the concept of an individual’s schema and framing of situations and information.

**Schema and framing.** Originally conceptualized by Bartlett (1932), schema can be conceived as “a memory representation containing general information about an object or event” (Willingham, 2001). Schemas represent what is generally true about a particular type of event and contains information about related facts. An individual’s schemas are constructed from the individual’s past experiences, assist in the interpretation of the environment and its social context, and help to formulate the response of the individual to these environmental cues (Rivard, Rudolph & Nielsen, 2002). Schemas are very
powerful tools for individuals, and individuals constantly seek to interpret information in terms of the schemas with which they are familiar. Thus information about situations and environmental conditions are interpreted in the context of familiar schemas in order to make sense of the information and provide guidance for future action (Willingham, 2001). This schema association also guides the selection of information to which the individual pays attention (Anderson & Pichert, 1978). These current schemas, however, 1) may or may not be accurate, or 2) may not provide for the correct interpretation of future environmental information.

As schemas are representations about general relationships, they are associated with practical (or pragmatic) application of representations to information about an object or event. Frames go beyond schemas and are defined as sets of assumptions and beliefs about a particular object or situation (Schön, 1983). These frames are created through the social processes between individuals that share these assumptions or beliefs through communication; the social construction of reality (Berger & Luckman, 1966) and comprise a shared lens within the organization for viewing information from the environment (Argyris, Putnam & Smith, 1985). Individuals are largely unaware that they hold these perspectives. These beliefs, which are the basis of the individual’s organizing frames, are conceptually similar to, and considered to be originally derived from, shared beliefs and values (Smith, Collins & Clark, 2005). These shared beliefs and values are the organization’s culture (Schein, 1985) or climate (Schneider, 2000) as the taken-for-granted assumptions that are shared by organizational members about the nature of reality.
An important difference between frames and schema, as defined herein, includes the deeper sense of beliefs associated with the individual’s frames. Both concepts provide a set of assumptions for interpreting environmental information, however frames, as defined by Schön (1983), include the individual’s beliefs, which allows for the conceptual links and comparison between the individual’s frames and the organization’s culture or value system. According to this theory, individuals acquire, organize and apply these schemas through learning processes, and develop their frames through learning and socialization processes.

*Management studies and framing.* Management studies have borrowed the concept of mental models to understand the processes used to interpret information about the organizations’ competitive environment. A manager’s cognitive structures, developed through previous socialized learning and their interpretation of environmental experiences over time, comprise the framing of information, situations, and drive the strategic decisions that the manager makes (Daft & Weick, 1984). Management scholars describe the organization’s environment as its “competitive space” (Hodgkinson, 1997, p. 921). This representation defines the boundaries and “rules of engagement” within the organization’s competitive arena. Using this model, explanations for an organization’s strategic response to environmental change must begin with an examination of the mental models of the organization’s strategist(s) (Porac & Thomas, 1990).

The way in which the strategists frame the problem situation determines and adds weighting to the options considered. Prospect theory (Kahneman & Tversky, 1979), for example, builds upon this framing and poses that if the problem situation is framed as a loss scenario, strategists will often choose the riskiest option. Additionally, sunk costs,
inaction and emotional attachment to a strategy can all contribute to improper framing and attachment to a particular scenario or strategy (Highhouse, 2001). Thus the way that the problem situation is framed can affect the alternatives selected and option weighting by the strategist.

It has been shown that the individual’s schema and mental models about the organization and its competitive environment effect the individual’s interpretation of information about the environment. The organization, however, relies on the individual’s collection and communication of important environmental information to signal changing conditions and processes. Therefore an understanding of the processes associated with the nature and development of the individual’s mental models should be important for the organization. If the organization can understand the biases that could be introduced into the interpretation process due to the individual’s mental models, it can understand and attempt to compensate for potential interpretation errors and deficiencies, as well as introduce diversity strategies to balance these deficiencies. The following section builds on the social and political aspects of organizations and the ways that they influence the construction of the individual’s mental models.

The Individual’s Mental Models

Building on the perspectives of Max Weber (1958) and the imagery of the iron cage, highly structured organizational fields are posed to lead their members to develop “homogeneity in structure, culture and output” (DiMaggio & Powell 1983, p.147). Two schools of thought will be presented which attempt to describe the presence of aligned mental models within an organizational environment. These schools of thought differ in their approach to the origins of these mental models by describing processes where the;
1) individuals seek and join organizations that share the same goals and values, or 2) the organization socializes its members toward the organization’s values and culture. In the next sections these two schools of thought will be explored and contrasted.

Attraction-selection-attrition. The first school, represented by Schneider (1987, p. 437), presents individuals as seeking like-minded organizations through an attraction-selection-attrition cycle (ASA) which emphasizes that 1) organizations are “functions of the kinds of people that they contain”, and 2) that the individuals within an organization are “functions of an attraction-selection-attrition cycle.” This model, drawing from vocational and industrial and organizational psychology, posits that it is the attributes of people that form the organization’s culture and drive the attendant organizational forms and technology; so that ultimately “environments are [the] function of persons behaving in them” (Schneider, 1987, 438).

This perspective conceptualizes organizations as having goals and values that emerge initially from the person or persons that founded the organization (Schein, 1985). As these organizations evolve, additional individuals have input into defining the organization’s direction, form, processes, and structure (Kimberly & Miles, 1980). Building on the work of Vroom (1966) and Tom (1971), this perspective offers an alternative to the situationist perspective by arguing that experimental research in the situationist area has masked individual differences, and that people choose both the organizations and the settings in which they participate. Schneider argues that through attraction, selection and attrition processes, particular types of persons populate an organization, and these people determine the organization’s behavior.
The main arguments of the ASA perspective that apply to this research project are that 1) organizational change is not brought about by changing people’s schemas or beliefs but by the actual people that join and stay with the organization, 2) organizations do not tend to be flexible or adaptive during changing environments because of the stability of the selection and retention systems, 3) the conceptions of organizational forms, climate, leadership and environmental determinism must be re-cast to include the individual’s attributes and their inclusion in to the organization, and 4) the personality and interest of the individuals within the organization is useful in understanding the organization. This perspective argues for the introduction of creativity and different perspectives through the strategic promotion of diversity within the organization, a concept that has been greatly encouraged within the management literature of late (Barr, Stimpert & Huff, 1992; Thomas et al., 2001).

The ASA perspective argues that the structures, processes, culture and ultimately, similar mental models of the individuals within an organization are caused by the attraction and selection of like members by the organization and attrition of those who do not share the organization’s values. The socialization perspective, presented below, argues that the attitudes, experiences, meanings, and behaviors exhibited and encouraged within the organization impact and help to influence and shape the individuals that are organizational members.

Organizational socialization. The organizational socialization perspective is a school of thought that seeks to explain the development of an organization member’s mental models by examining the social processes ongoing within the organization. Socialization theories pose that the individual’s schema is influenced by the social and
organizational cultures to which the individual is exposed (Shore, 1991). When individuals join organizations they learn the values and beliefs of the organization, legitimizing their membership in the organization (Jablin, 1997). These values and beliefs aid the individual by allowing him/her to make sense of organizational reality. The focus on the organization’s values and beliefs also helps the organization by focusing the efforts of the individuals toward the organizations’ goals. Through individual interaction necessary for organizational socialization, new members learn about the organization’s culture and make individual decisions about identification with the organization (Eicholz, 2000).

Models of socialization associated with new member entry often include the various stages of anticipation, the encounter, and identification (Pacanowsky & O’Donnell-Trujillo, 1983). Through this process of organizational socialization, individuals learn about and accept (at varying levels) the culture and norms of the organization, internalizing them into their own individual mental models.

Both the ASA and organizational socialization perspectives attempt to explain the same phenomenon; that organizational members share common frames that affect the member’s interpretation of environmental information. These two perspectives suggest different processes are associated with the presence of these shared mental models; however neither is likely to completely describe the degree of similarity of mental models within organizations nor the differences in mental models between organizational members and non-members. Much of the management literature, however, has focused on the links between an organization’s culture, leadership and organizational performance. The socialization perspective attempts to describe the processes associated
with the development of the mental frame of an organization’s member, so it will be utilized in the development of the argument, although the ASA perspective will be referenced as it appears to be pertinent or contributory to the argument at the time.

From the socialization perspective the member’s values and shared assumptions provide the framing for the interpretation of environmental information, and the organization’s culture is a significant source of these values and shared assumptions. In the following section this link between organizational culture and the individual’s schema is developed.

Organizational Culture and Individual Schema

Individual schemas (also known as prototypes or mental models) are not simply individual constructions, but are at least partially constructed from collective influences, and major components of these are jointly held (Markus, Kitayama, & Heiman, 1996). Individual schema is related to the individual’s experiences and their interpretation of the meanings and practices of their culture. Schemas are intersubjectively shared (Quinn & Holland, 1987) and “provide individuals in a community with a stock of common orientational models for constructing experiences” (Shore, 1991, p.16). Through such shared models “communities come to share a common general cognitive orientation, which we recognize as intersubjectivity” (Shore, 1991, p.16). One of the goals of organizational psychology is to understand the ways in which culture (the collective representations of the group) takes root in the individual’s consciousness through individual cognitive processes (such as judgment, evaluation and reason; Markus, Kitayama & Heiman, 1996).
The individual’s mental models provide prior knowledge and beliefs about information interpretation, problem content, and context (Evans & Feeney, 2004). The influence that is exerted by these beliefs can be considered **bias**, providing an organizational member with a preference or inclination toward a particular perspective and inhibiting their impartial judgment. If this influence is pervasive it can significantly influence the interpretation of information and the member’s reasoning processes.

It is this bias that is of interest to this research, and I pose that the extent to which the individual shares the organization’s cultural values and beliefs in their own individual schema is a function of, among other things, the extent to which the individual identifies with the organization. As the next section describes, individuals identify themselves with organizations at various levels. The degree of identification that an individual has with the organization may be related to the extent to which the individual’s schema is related to the culture and perspectives of the organization. If the organizational members internalize the organization’s values and the degree to which these values are internalized is related to organizational identification, management will have additional tools to 1) understand the ways in which the organization’s members interpret environmental information, and 2) predict the perspectives and schema of the individual as the organization attempts to provide diverse perspectives to its learning capabilities, management groups and strategy teams.

*Organizational Identification*

Individuals are attracted to and remain in organizations with which they want to be identified. Organizational identification is the extent to which the individual identifies or categorizes themselves as part of the organization (Ashforth & Mael, 1989; Dutton,
An important aspect of this identification is the importance of organizational membership to the individual (Weisenfeld, Raghuram & Garud, 2001). This identification can be motivated by the desire for self-enhancement or self-consistency (Dutton et al., 1994).

Predictors of organizational identification include the level of contact between the individual and the organization and the visibility and attractiveness of organizational membership. Organizational membership can enhance personal self-esteem, self-consistency, and self-distinctiveness (Weisenfeld, et. al., 2001). These individual needs or responses are triggered by a variety of organizational structures and process that are internalized at various levels by the organization’s members. These often include the organizational artifacts and symbols, such as company logos and rituals, such as forms of recognition and ceremonies (Pratt, 1998).

An individual’s level of organizational identification is often related to the intensity of contact and exposure to organizational processes and structures. Individual participation in an organization is an important prerequisite for developing a strong organizational identification (Weisenfeld, et. al., 2001), although for some individuals, organizational contact may not be necessary (Mael & Ashforth, 1992; Pratt, 1998). Therefore testing for identification with the organization must go beyond organizational membership and participation.

Propensity for organizational identification has also been associated with individual personality differences such as the need for affiliation (Weisenfeld, et. al., 2001; Dutton, et al., 1994), promotion or prevention orientation (Liberman, Idson, Camacho, & Higgins, 1999), and the individual’s desire for social contact or
belongingness (Veroff & Veroff, 1980; Markus & Kitayama, 1991). In this way individuals express “the personality characteristics that they think they have and which they value” (Dutton et al., 1994, 245). Within this research this construct was used for measuring the individual’s commitment to the professional organization and their commitment to the profession. In a similar way organizational commitment measures the employee’s commitment to their employment organization.

Organizational commitment. This form of commitment is “characterized as a strong belief in and acceptance of the organization’s goals and values, a willingness to exert considerable effort on behalf of the organization, and a strong desire to maintain membership in [the] organization” (Fields, 2002, p.43). This commitment construct reflects three themes; an affective orientation toward the organization, a sense of moral obligation to remain with the organization and a recognition of the costs associated with leaving. This measure, in part focused on the costs associated with employment changes, is used in this research for measuring the commitment of the individual to their employment organization.

The previous section concludes an introduction to the individual and social processes that relate to the individual’s developed framing of the environment and provides the context for the interpretation of environmental information. The following section identifies the organizational processes associated with the organization’s perception and interpretation of environmental information.

Organizational Processes

Organizations sense and respond to environmental change through its members. It is the individuals within the organization that receive information from the environment
and communicate this information throughout the organization in order to understand the phenomenon and to trigger adaptive strategies (Griffith, 1999). Sensemaking describes the micro-level processes associated with the individual’s conceptualization and “making sense of” the environmental phenomena that they perceive (Weick, 1995). Organizational learning (and its variants) consider change an ongoing characteristic of the environment, and describe a macro-level process wherein organizations “learn” from the environment, share information, and create knowledge and competencies that allow them to have a strategic advantage over other competing organizations (Crossan, Lane & White, 1999). In the following sections we will investigate each of these concepts and their interrelationships.

**Sensemaking.** At the individual level, sensemaking is the cognitive process that is engaged when information is received that does not fit with existing schema, especially in conjunction with the individual’s environment (Weick, 1995). This sensemaking process begins as an individual process, although it is set and studied in the organizational context (Weick, 1993). When information is received that is outside of the range of analysis using the individual’s mental models the individual begins scanning their schema to find or adapt schema that would explain or disprove the new information. This sensemaking process begins a communication-based interpretation process among the organization’s members, attempting to fit logical explanations or schema to the information received. Through discursive processes the members within an organization work together in an iterative, negotiating process to be able to understand or explain the phenomenon.
According to Maitlis (2005, p. 21), “Organizational sensemaking is fundamentally a social process: organization members interpret their environment in and through interactions, constructing accounts that allow them to comprehend the world and act collectively”. When organizational members confront information that is confusing or does not fit with extant schema, the organization and its members participate in a sensemaking process to make sense of the information and create order. Through a process of the production of “accounts” (discursive constructions of reality that are used to interpret or explain a phenomena (Antaki, 1994)) or through the activation of existing accounts (Gioia & Thomas, 1996), organizational members socially construct their interpretations of particular events or sets of environmental cues.

In accordance with the socialization perspective, an organization’s culture provides the values and beliefs utilized in the formation of the member’s frames. The organization’s culture therefore comprises the attributes and perspectives that the members utilize to interpret environmental information.

*Culture as context.* An organization’s culture embodies the shared norms, values and assumptions about how the organization and its environment functions (Schein, 1985). Thus culture creates the “…basic tacit assumptions about how the world is and ought to be that a group of people share and that determines their perceptions, thoughts, feelings, and to some degree, their overt behavior” (Schein, 1996, p.11). The importance of culture in the formation and perpetuation of individual and group schema has been argued for some time (Schein, 1996, 1996a, Lant, 1999). Lant (1999) considers the artifacts and practices of a culture to be comprised of previous thoughts and knowledge, and this knowledge is therefore embedded into these cultural systems. Because human
thought, cognitive evaluation of information and, fundamentally, our knowledge is situated within cultural systems, these systems control and direct attention, information interpretation, and the limits for possible alternative interpretations (Lant, 1999).

Thus an organization’s culture provides not only the seeds of patterned, predictable behavior within collectives including organizations and within industries, but also a framework for interpreting information and evaluating strategy. Culture guides the attention that individuals focus on environmental cues and information, and provides the framework for the individual’s frames in the interpretation of this information.

Having identified previous research indicating organizational culture contributes to the mental models of the individuals through social processes, in the next section we will introduce professional organizations as similarly providing a framework for the interaction of its members in a social environment. Professional institutions provide the rules for the enactment of relationships and exchange within a social group, and these rules and values are socially reinforced within and enforced outside the profession. As sensemaking research has traditionally focused on the individual’s participation in the employment organization, this research provides a unique contribution to this body of knowledge by exploring the role of professional organizations in the sensemaking process.

**Professions as Institutions**

Mantzavinos (2001, p. 83) stated that “institutions are the normative social rules, that is, the rules of the game in a society, enforced either through law or through other mechanisms of social control that shape human interaction.” These informal institutions are enforced on multiple levels: conventions, rules and social norms. According to North
(1990, p.3) “institutions are…humanly devised constraints that shape human interaction … in consequence they structure incentives in human exchange, whether political, social or economic.” On a formal level, the term is often used to represent organizations as groups of individuals joining together to achieve a desired collective goal. These formal institutions derive their power from the state in the form of regulation and law, which provides the rules for participation and exchange. These institutions have their own individual epistemologies and conceptualizations about their collective market, environment and influence (Ferlie, Fitzgerald, Wood and Hawkins, 2005).

In the context of this research, institutions are conceptualized as self-regulating groups operating, and often creating, adapting and perpetuating normative patterns of behavior within a society, to provide a stable platform for the development of expectations and conflict resolution. This recognizes both the formal and informal levels of control and representation. An important aspect of an institution, as conceptualized in this manner, is that its rules apply only to the parties that have agreed to be constrained by these rules for a common purpose.

Institutional rules provide for the stabilization of expectations among members of the institutional group and those that interact with it. As posed by Gehlen (1961), however, this simplification via rules can be a double-edged sword. Although it simplifies individual relationships by defining patterns of behavior among individuals, this Entlastung (unburdening) also serves to define new problems as old problems and specify their solution using extant routines. This is especially obvious in the instance where these rules become perpetuated and used long after the reason for their existence is no longer valid.
This highlights the need for institutions themselves to sense and adapt to environmental change to maximize the utility of the institutional participants (North, 1990) and to maintain their position of social control over the programs and processes of exchange within the industry. The adaptive institution needs for its members to be continuously analyzing the environment, conceptualizing these changing environmental forces (both economic and ideological) and petitioning the institution to change the appropriate rules or encourage environmental changes if a significant disadvantage is perceived for the organization’s stakeholders.

As the focus of this research, professional organizations serve as an institution as they provide the normative patterns of behavior that establish cooperative social relationships within an industry. In addition to providing the rules, this institutional conception also defines the strategies that individuals use in social interactions, exchange and conflict resolution. Along with structured rules, professions develop and promulgate shared mental models about the rules of exchange and conceptualization of their market or environment, and have the power to control or block change (McNulty & Ferlie, 2002). Institutions not only provide their members with the guidance for the regulation of their profession, but they also provide the common traditions and procedures through a form of collective leadership (Denis, Langley, & Cazale, 1996). To this end, individuals that participate in the profession are subject to the rules and regulations that are collectively negotiated and purveyed within the industry and also the ethics and norms of the profession that have been created, refined, promulgated and perpetuated over time.

Professional organizations. Professional organizations are organizations that exist to provide a vehicle for the control and regulation of the profession (or provide guidance
and direction for the regulation of the profession) for the benefit of its members. Individuals who participate in professional organizations often learn about the history and traditions associated with the industry (cultural artifacts) and are involved in the ongoing development of the profession’s macro environment (i.e., laws which regulate the profession, its norms, and programmed responses to threats to traditional niches). Thus by design, professional organizations control (or attempt to control) and perpetuate their collective perception of the institutional environment and market.

When significant environmental changes are perceived by the individuals within the institution, they are compelled to take adaptive action based upon the institution’s programmed responses that have been successful in the past and that are conceptually embodied in their policies and structure. Like any organization, a professional organization will be expected to respond to minor changes in its environment in an adaptive way based upon its previous successful responses (Scott, 1992). Yet, a significant or disruptive change would be outside of the normal response range of the organization’s programmed functions, and the organization’s response would not be as clearly defined. In accordance with the concept of organizational momentum (see Bedeian & Zammuto, 1991), the professional organization would be theorized to continue with programs that have been successful in the past while it seeks to understand the ramifications and causes of the disturbance in the environment (Bedeian, 1983).

Advantages and disadvantages of participation in professional organizations. Due to the resources that a professional organization has available to acquire, sort, and interpret environmental information, individuals that participate in a professional organization could have access to a higher quantity and quality of information than non-
members. This information could give the individual (and his/her organization) a competitive advantage over the individual that is required to gather and infer their information directly from the environment in its raw form or from other sources. Thus it would seem that those individuals that are members of a professional organization would be in a better position to conceptualize and react to environmental change.

Alternatively, along with the information that is provided by these professional organizations, the socialization perspective indicates that individual also receives the professional organization’s perspectives on the interpretation of that information. This interpreted information would be expected to represent (or be set in the context of) the collective schema and framing of the professional organization. During times of environmental change, information from the professional organization could be set in the context of the organization’s framing of the market as it was, so individuals that receive and internalize the information from the professional organization could be at a competitive disadvantage. This is because the collected and assimilated information that is communicated from the professional organization could be imbedded in the (possibly antiquated) extant framing of the institution’s schema.

Alternatively, those individuals who are conceptualizing environmental change directly from environmental data (instead of through the professional organization) could be more adaptive and capable of reactive change, especially those individuals that are seeking creative opportunities for new techniques and technologies (i.e., entrepreneurs). Innovators, such as entrepreneurs, typically operate on the fringe of the markets, incorporating techniques and technologies from other areas.
As indicated above, individuals within organizations are subjected to information from various communication streams. The concepts that are internalized by the individual are subject to the information received, the channels through which the information is received (thus providing the concept of the reliability of the information) and the frames that the individual holds about the environment and information received. In the following section the cosmopolitan-local perspective has long held that individuals can hold allegiance to the employment company, providing a local perspective or an allegiance to the profession, which provides a more cosmopolitan perspective.

Cosmopolitan-local perspective. Other theories in the past have been concerned with the individual’s frames and orientation associated with their organizational and professional relationships. One such theory is the cosmopolitan-local perspective, which has attempted to identify whether the individual’s values and orientations are based upon professional or organizational frameworks. Based upon work by Gouldner (1957) the cosmopolitan perspective indicates that professionals will view the world through reference groups that are outside any particular organization. The individual’s cosmopolitan orientation represents that “socialization into and system of rewards affecting professionals—given their extended career span—are strongly tied to a set of career aspirations and expectations which include job changing as a legitimate and expected path toward career achievement” (Kirschenbaum & Goldberg, 1976, p.359). Alternatively, individuals with a lower commitment to the profession and propensity to move would have a local orientation, focusing their career trajectory and commitment to their employment organization.
If this perspective is valid we would expect to find differences in the individual orientations toward the profession or toward their employment organization. Individuals with a cosmopolitan orientation would be expected to have a high level of identification with the profession and exhibit a threat response to environmental change, reflecting a desire for the control of the professional environment. Individuals with a local focus would be expected to exhibit a focus on and exhibiting a high level of commitment to their employment organization.

The above sections have identified organizational influences and processes associated with the noticing and interpreting of environmental data. In addition to their participation in employment and professional organizations, individuals bring perspectives and influences from outside the professional and organizational frameworks. Cognitive frameworks are influenced by genetic and other social influences outside the professional and employment environments. This research will include some of these individual personality differences, which will be described in the following sections.

**Individual Personality Differences**

Sensemaking, as indicated earlier, can be conceptualized as an individual process. As such it is possible that individual personality differences could have a role in 1) the interpretation of environmental information, and 2) the pre-disposition of an individual to belong to a professional organization. Thus it is important to determine whether individual differences would influence the individual’s interpretation of environmental conditions.

The individual difference variable selected for study in this research is the individual’s regulatory focus. This personality measure identifies individuals that are
focused on accomplishment, advancement and positive outcomes as having a stronger promotion orientation while those focused on obtaining security, safety and fulfillment of responsibility have a prevention orientation. This variable was thought to be of particular value to our study in that professional organizations protect the status of the professions, and so professional organization participation may be related to an individual’s prevention orientation.

Regulatory focus theory. One perspective that has been used to study the individual tension between stability and change is regulatory focus theory (Higgins, 1997). In accordance with this theory, the individual’s attitude toward stability and change would be at least partially explained by their focus as they interpret the context. If the individual has a promotion focus they will conceptualize the situation in terms of seeking to approach desired end-states whereas individuals with a prevention focus will seek to avoid negative outcomes (Crowe & Higgins, 1997).

Promotion and prevention choices have been examined in the context of choice situations by Liberman et al. (1999). In their research, a positive correlation was found between openness-to-change and a promotion focus, whereas a preference for stability was found to be associated with a prevention focus. This research studied not only the manipulated focus of the research population but also examined the chronic promotion/prevention focus of the individuals.

The understanding of the individual’s schemas would help management researchers recognize the effect on the organizational members’ schemas on the interpretation of environmental information and attitudes toward environmental change. In addition to the institution’s influence on the individual interpretation of information,
individual personality variables could account for the predisposition of groups of organizational members to particular mental frames.

In synopsis, this research will investigate whether individuals that participate in institutional organizations and have the opportunity to acquire information from the institution also share the perspectives of the institution. This research was implemented through an investigation of the differences in perspectives of individuals that do and do not participate in and identify with professional organizations and monitor their response to environmental change. In the following sections the specific research questions will be developed to test this thesis.

Research Questions on Environmental Perspectives and Response to Change

The first purpose of this research is to investigate whether the individual’s perspectives about the industry are related to their membership in or identification with professional organizations. A relationship between organizational participation and the individual’s perspectives about the industry would suggest the salience of social influence processes through organizational participation on the individual’s perspectives. This leads to the following hypotheses about professional engineers:

H1 Individuals who are members of the professional organization will be more likely to hold a perspective about the industry that is related to the policies of the professional organization than individuals who are not members.

H2 Individuals who identify with the professional organization will be more likely to hold a perspective about the industry that is related
to the policies of the professional organization than individuals who do not identify with the professional organization.

These perspectives are thought to influence the frames of the professional organization members. Thus the second purpose is to investigate whether individuals’ perspectives about the industry influence their response to environmental change as a threat or opportunity. A strong relationship between individual perspectives about the industry and interpretation of environmental cues as a threat or opportunity would indicate that the perspectives that individuals develop through social exchange or hold about the industry influence their responses to industry change, leading to the following hypothesis:

H3 Individuals who hold a perspective that is related to the policies of the professional organization will be more likely to respond to environmental change as a threat, as opposed to an opportunity, than individuals who hold a perspective divergent from the professional organization.

Beyond the perspectives of the industry, several professional variables have been identified that may influence the individual’s response to environmental change. This leads to the third purpose, which is to seek to identify relationships between professional organization membership and identification and the individual’s response to environmental change.

This leads to the following hypotheses:

H4 Individuals who are members of the professional organization will be more likely to respond to environmental change as a threat, as opposed to an opportunity, than individuals who are not members.
Figure 1: Conceptual relationships with individual’s perspectives about the environment

H5 Individuals who identify with the professional organization will be more likely to respond to environmental change as a threat, as opposed to an opportunity, than individuals who do not identify with the professional organization.

Other research variables. This research investigates the relationships between individual, group and professional variables, the individual’s perspectives on the environment and their attitude toward environmental change. As shown in Figure 1, relationships between the individual’s perspectives about the environment and individual difference variables included age, gender and promotion and prevention orientation. The employment organization variable included was organizational commitment, and the
professional variables included professional organization membership, identification with the professional organization and identification with the profession. These perspectives were thought to be related to the individual’s response to environmental change.

The relationships between the individual, organizational and professional organization variables and the individual’s response to environmental change are shown in Figure 2. The individual difference variables tested again included age, gender and promotion and prevention orientation and the employment organization variable included was organizational commitment. The professional variables included professional organization membership, identification with the professional organization and identification with the profession, and an additional environmental variable is introduced.
as the individual’s perspectives on the environment. This environmental variable was posed to be related to the individual’s response to environmental change.

Having introduced the research variables and hypotheses, the following section will introduce the professional engineer group that will be the focus of this research and describe the research approach. For this research the individual’s perspectives and responses were investigated through the use of vignettes which describe changes to the professional environment, and requesting the individual’s response to these environmental scenario.

The Engineering Profession and Professional Engineers

To provide engineering services in the public sector, engineers are required to be licensed as Professional Engineers and are regulated by the individual states in which they practice. Each state has an autonomous licensing board that is generally comprised of licensed engineers, and which is responsible for promulgation and enforcement of the rules governing the practice of engineering in the state, the profession being ultimately controlled through these rules as enacted by the state legislative body. State registration is a cumbersome process, requiring an 8 hour fundamentals and an 8 hour licensing exam, plus the demonstration of 4 years of progressive engineering experience. There are often additional requirements for continuing professional education and development.

Nationally there are an estimated 500,000 Professional Engineers that are registered in at least one state, from a pool of an estimated 5,000,000 graduate engineers in the United States (data provided by the National Society of Professional Engineers (NSPE) at their National Convention, 2004). The National Society of Professional Engineers is the professional organization (or institutional organization) that deals with
the professional interests of the professional engineer, and has a membership of approximately 50,000. This organization has traditionally provided the national coordination and acts as a spokesperson for the industry. In the past it has generally promulgated rules as “model laws” that most states have adopted as their model. The officers of the NSPE are elected members from the various states in the United States. Many of these officers have been engaged in the practice of engineering for 25 to 30 years, and many have been NSPE members for years and as such have been influenced by the traditions of the engineering profession.

Engineers that provide engineering services in the public sector are required to be Professional Engineers and participate in the institutionally controlled practice of engineering. Forces that affect this institutional practice are emergent trends and environmental change, and groups that influence the regulation of the practice have in some cases formulated and articulated a reactive or adaptive response strategy to deal with these developments. If individuals or organizations do not respond to these changes, it may be because these trends may not have been properly conceptualized as environmental change by the individual or group, or that the group, through a protectionist strategy or organizational inertia, has not conceptualized or embraced these changes. Institutional organizations, like other organizations, through the ascribed process of cognitive inertia, may have a tendency to continue to conceptualize the environment in a traditional manner in the face of environmental change, and miss the opportunity to take advantage of or control emerging opportunities within the industry.

Professional engineers. Due to rapid advancements in scientific developments and changing demographic trends in engineering education, the practice of engineering is
experiencing significant changes. Among these changes are; 1) the development of new fields of scientific discipline for which there are no current standards, 2) whether the disciplines of computer hardware and software design should require professional standing or supervision, 3) the desire of the profession to regulate product and manufacturing design outside of the built environment, 4) the association of engineers with their technical discipline above the overall profession of engineering, possibly contributing to the increasing trend of technical certification displacing professional registration and control, 5) the globalization trend as it applies to the development of engineering design and the mobility of engineers, and 6) other disciplines claiming territory traditionally occupied by engineers (such as architects, landscape architects and, in some cases, attorneys). These emergent trends effect the practice of engineering, but may or may not be noticed or reacted to by the individual professional engineer. The underlying question that compels this research is the extent to which the individual’s participation in professional organizations is related to their ability to accurately conceptualize the environment or environmental change.

In the past, theorists have attempted to articulate the perspectives that individuals hold about their organization’s environment and the ways that these perspectives influence their interpretation of environmental cues. Two of the perspectives that have been included in this research are Schneider’s attraction-selection-attrition model and Gouldner’s cosmopolitan-local perspective. As the final research focus, these theories, which have been introduced in previous sections, will be compared and contrasted as they apply to professional engineers.
In the previous sections research was identified which relates to the role of organizational participation in the development of the individuals’ schema and shared mental frames. The role of institutions and the conception of the market have been identified to describe the context of institutions and their desire for control of those pertinent aspects of the market. Finally, environmental change has been introduced as a triggering mechanism for adaptive change within an organization or institution. This allows for the investigation of the relationship between institutional organization participation and the individual’s conception of the competitive environment, and to this end research hypotheses have been developed.

The goal of this research is to extend extant knowledge about the role of social influence within organizations to include the influence of institutional (professional) organizations. It has been argued that the perspectives and frames of individuals are influenced by the organizations to which they belong; however the influence exerted by participation in professional organizations is not as well known. The extent to which the individual’s sensemaking process is influenced through participation in professional organizations has not been previously researched, and the following sections describe the empirical methodology and research group utilized to investigate these relationships in this research.

Method

Sample and Procedure

The goal of this study was to capture the perspectives of groups of individuals as they confront an institutional environment that is subject to emergent change and to
identify differences in the perspectives of the participants within these groups. A survey was utilized to obtain a sample of individuals within these groups, and a copy of the survey form is included as Appendix A. A list of professional engineers was obtained from the website of the Texas State Registration Board. From this list a sample of 415 professional engineers was randomly selected. This sample was not controlled for the employment organization, and these individuals were not screened for gender, race or ethnic background.

Attached to the questionnaires was a cover letter explaining the objective of the survey, assuring respondents of the confidentiality of their responses, and indicating an appreciation for their voluntary participation in the survey. Respondents were informed that the survey’s objective was to obtain their perspectives about the professional environment, and completed surveys were returned to Ohio University Department of Psychology.

*Questionnaire responses.* Of the 415 questionnaires mailed the number of respondents for the surveyed professional engineers was 121, of which 2 indicated that the respondent was either deceased or retired and did not feel competent to complete the questionnaire. The final response was \( n = 119 \), or a useful response rate of 29%. Of these respondents, 92% were male and 8% female. The average age of the respondents was 54.2 years with a \( SD \) of 13.6 years.

Fifty percent of the respondents were employed in the consulting industry, 27% were in industry or manufacturing, and most of the remaining were employed in the public sector. Additionally, 52% were employed in organizations with 25 or fewer professional engineering employees, while 48% were employed in organizations with
greater than 25 professional engineers. 90% of the respondents held active licenses in the State of Texas while 10% of the respondents held an inactive license status.

Statistical power. With a usable response rate of 119, a power of .8 and a probability of \( p = .05 \) on a two-tailed distribution, a medium effect size was achieved (\( d = .37 \), Cohen, 1988, Table 2.4.1). Statistical evaluations were performed using SPSS statistical software.

Measures

The survey asked respondents to provide discrete and scaled information measuring different aspects of the individual’s attitude toward the industry, the competitive environment, and their individual pre-dispositions. These measures are described below.

Individual perspectives about the environment. This variable is the average of six responses to questions about the profession. These questions were developed from the NSPE’s perspectives on the industry as articulated in its mission statement, strategic goals and position papers. These questions focus on the individual’s attitudes toward the industry, the type of work that should be controlled by the profession, how aggressively the industry should protect their traditional areas of practice, and how the industry should generally act toward environmental change. The responses range from “strongly disagree” (1) to “strongly agree” (7). Individuals with high score on this variable would be expected to hold a perspective similar to that promulgated by NSPE on the importance of the profession and hold high the value of professional registration and the importance of its regulation and control.
The NSPE Fellow members are members that have been honored for their service at all levels of the professional organization, and their perspectives about the industry are expected to align with the professional organization’s positions. Access to a database of the NSPE’s Fellow members was sought in order to test the validity of the perspectives about the industry scale. Because access to this database was not provided, the response of the Fellow members was limited to the respondents within our research sample. NSPE Fellow Members were found to hold a perspective about the industry that was closer to the professional organization’s position \((M = .66, SD = .16)\) than either NSPE members \((M = .48, SD = .39)\) or non-NSPE members \((M = .40, SD = .32)\), however the difference in the means of the responses of these groups was not significant \(F(2,115) = 1.31, p = .27\).

**Organizational and professional identification.** The member’s level of identification with the professional organization and identification with the profession were measured with a scale developed by Mael (1988), refined in Mael and Ashforth (1992) and empirically validated by Mael and Tetrick (1992). The original ten item measure reported an internal reliability of .76 (Mael, 1988) and the six item scale used in this research reported an internal consistency alpha of .81 (Mael & Tetrick, 1992). This instrument has responses that range from “strongly disagree” (1) to “strongly agree” (7), and comprises of questions which develop the level of the individual’s identification with the organization, such as “When someone praises the NSPE, it feels like a personal compliment.” Individual responses were obtained using the full instrument for identification with the professional organization, however due to space constraints in the
questionnaire only two questions for the individual’s level of identification with the profession could be included.

*Individual response as threat/opportunity.* This variable was developed as an indicator of the individual’s response to environmental change as a threat or opportunity. The concept of an environmental threat or opportunity is considered in this research to be the opposite poles of a common dimension. To test for the individual’s response to environmental change vignettes were presented which described environmental change scenario. Based upon these vignettes, respondents are asked to present their responses based upon their perspective of the situation as an opportunity or a threat. The responses to these questions were evaluated with respect to the individual’s perception of the level of threat or opportunity associated with the environmental change scenario presented. The responses range from “strongly disagree” (1) to “strongly agree” (7) and some responses from each of the presented scenario were reverse scored and averaged to develop a value for this variable for the individual.

*Regulatory focus.* This personality orientation variable was measured by the Regulatory Focus Questionnaire (RFQ: Harlow, Friedman & Higgins, 1997). This psychometric questionnaire records the individual’s predisposition along two independent subscales, the promotion and prevention subscales (Higgins et. al., 2001). The internal reliability of the original scales are .73 for the promotion scale and .80 for the prevention scale (Higgins et. al., 2001).

*Professional organization membership.* Professional organization membership information was collected, including current or past membership and Fellow membership status.
Commitment to the employment organization. The individual’s commitment to their employment organization was tested using several questions from the shortened version of the Organizational Commitment Questionnaire (Mowday, Steers & Porter, 1979). Research reliability for the full model ranges from .74 to .92 (Fields, 2002). Due to space constraints in the questionnaire, only two questions with the highest reliability were included.

Analytical Process.

The first purpose of this research is to seek relationships with the individual’s perspectives of the environment. In order to test the individual’s perspectives about the environment the model was developed as previously shown in Figure 1, which identifies the individual, organizational and professional variables which was compared with the individual’s perspectives about the environment.

The second and third purposes of this research are to seek the relationships with the individual’s response to environmental change. In order to test these relationships the model, shown previously in Figure 2 was developed indicating the individual, organizational and professional relationships which were tested.

Alternative paths to those hypothesized. This model seeks to find relationships between professional organizational memberships, perspectives about the professional environment and the individual’s perception of and response to environmental issues. These perspectives are expected to be affected by the individual’s identification with the professional organization and their regulatory focus. This model makes assumptions about the relationships between these variables and the direction of influence from prior research; for example, that perceptions and attitudes about environmental change are
influenced by the individual’s perspectives about the industry, which are themselves
influenced by the individual’s relationships with professional organization membership
and identification. These expected relationships are based upon previous research and
theories in the areas of management and organizational psychology as cited herein.

These variables are considered to be influenced by the factors indicated, however
it must be acknowledged that the correlations developed in this research could be
influenced by factors which have not been identified, and that the direction of influence
may not have been properly identified, or that there may be other factors affecting all of
the variables which are not understood or identified at this point.

Results

Correlations and Reliability of Survey Measures

Means, standard deviations, correlations, and reliability estimates for all major
measures are given in Table 1. Reported correlations are Pearson product-moment
correlation coefficients. The internal reliability of the measures are reported in the
diagonals.

As shown in Table 1, reliability for the metrics using Cronbach’s alpha generally
proved to be good for the developed metrics of the individual’s perspectives about the
industry (.81, k = 7) and response to environmental information as a threat/opportunity
(.79, k = 16). For the individual’s identification with the profession (.55, k = 2) and
commitment to the employment organization (.85, k = 2) only two questions from the
model could be included due to space constraints on the questionnaire form.
In the final model, the individual’s identification with the professional organization and profession proved to be significant predictors, contributing an additional 25% of the variation in the final model. This affiliation or identification with the psychological group allows the individual to define themselves as one with the group, sharing their successes and failures (Mael & Tetrick, 1992). This psychological measure identifies individuals with shared characteristics, virtues and allows the individuals to

For the regulatory focus scale, the promotion and prevention scales were evaluated independently using the unweighted raw scores. The reliability for the promotion scale was (.59; k = 6), while the reliability for the prevention scale was (.79; k = 5).

Influence of Professional and Organizational Relationships on Perspectives about the Environment

The first purpose of this research was to investigate whether professional and employment organization variables are related to the individual’s perspectives about the environment. To examine these relationships a hierarchical multiple regression was performed using the individual’s perspectives about the environment as the dependent variable as indicated in Figure 1. The individual difference variables of age and gender were entered first, followed by promotion and prevention focus, which were then followed by the employment organization commitment variable. These were followed by the professional variables tested; professional organization membership, identification with the professional organization and identification with the profession. The results of this regression are given in Table 2.

In the final model, the individual’s identification with the professional organization and profession proved to be significant predictors, contributing an additional 25% of the variation in the final model. This affiliation or identification with the psychological group allows the individual to define themselves as one with the group, sharing their successes and failures (Mael & Tetrick, 1992). This psychological measure identifies individuals with shared characteristics, virtues and allows the individuals to
### Table 1:

**Means, standard deviations and coefficients for study variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Age</th>
<th>Sex</th>
<th>Promo</th>
<th>Prev</th>
<th>NSPE</th>
<th>Org Id</th>
<th>Prof Id</th>
<th>Org Size</th>
<th>Org Comm</th>
<th>Pers Ind</th>
<th>Resp Env</th>
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<td>.24*</td>
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<td>.25**</td>
<td>.17</td>
<td>.50**</td>
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<td>-.05</td>
<td>-.07</td>
<td>(0.85)</td>
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<td>-.18</td>
<td>.14</td>
<td>.14</td>
<td>.49**</td>
<td>.49**</td>
<td>-.01</td>
<td>.16</td>
<td>(0.81)</td>
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<td>-.08</td>
<td>.04</td>
<td>-.21*</td>
<td>-.20*</td>
<td>-.23*</td>
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<td>.09</td>
<td>.10</td>
<td>-.15</td>
<td>(.79)</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2 tailed).

** Correlation is significant at the 0.01 level (2 tailed).

Age: Individual's Age
Sex: 1 = Male, 2 = Female
Promo: Promotion Orientation Measure--Regulatory Focus (High = high promotion orientation)
Prev: Prevention Orientation Measure--Regulatory Focus (High = high prevention orientation)
NSPE: NSPE Membership (1 = NSPE member, 0 = non-member)
Org Id: Identification with Professional Organization (-1 = low level, 1 = high level)
Prof Id: Identification with the Profession (-1 = low level, 1 = high level)
Org Size = Employment Organization Size (-1 = <25 professional members, 1 = > 25)
Org Comm = Organizational Commitment (-1 = low level, 1 = high level)
Pers Ind: Perspectives About The Industry (-1 = low alignment with professional perspectives, 1 = high)
Resp Env: Response to Environmental Information (-1 = threat response, 1 = opportunity perspective)
Table 2:

*Results of linear regression on the individual’s perspectives about the industry*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th></th>
<th></th>
<th>Step 2</th>
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<td>.00</td>
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<td>.00</td>
<td>.00</td>
<td>.13</td>
<td>.00</td>
<td>.00</td>
<td>-.08</td>
</tr>
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<td>.03</td>
<td>.07</td>
<td>.09</td>
<td>.07</td>
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<td>-.19</td>
<td>-.02</td>
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<td>-.25*</td>
<td>-.01</td>
<td>.01</td>
<td>-.19*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.01</td>
<td>.14</td>
<td>.01</td>
<td>.01</td>
<td>.16</td>
<td>.00</td>
<td>.00</td>
<td>.02</td>
<td></td>
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<tr>
<td>Organizational Commitment</td>
<td></td>
<td></td>
<td></td>
<td>.22</td>
<td>.09</td>
<td>.23*</td>
<td>.16</td>
<td>.09</td>
<td>.16</td>
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</tr>
<tr>
<td>Prof Org Membership</td>
<td></td>
<td></td>
<td></td>
<td>.06</td>
<td>.08</td>
<td>.07</td>
<td></td>
<td></td>
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<tr>
<td>Identification with the Prof Org</td>
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<td></td>
<td></td>
<td>.30</td>
<td>.10</td>
<td>.33**</td>
<td></td>
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</tr>
<tr>
<td>Identification with the Prof</td>
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<td></td>
<td></td>
<td>.32</td>
<td>.09</td>
<td>.36**</td>
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<tr>
<td>R² Change</td>
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<td></td>
<td>.08</td>
<td></td>
<td></td>
<td>.05*</td>
<td></td>
<td></td>
<td>.25**</td>
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<td></td>
</tr>
<tr>
<td>R² Total</td>
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<td>.33**</td>
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</tr>
</tbody>
</table>

* = p < .05, ** = p < .01.

share in the accomplishments. As shown, the individuals that identify with the profession and have these shared characteristics and virtues tend to strongly share the institutional perspectives of the profession.

Hypothesis 1 predicted that membership in a professional organization would be positively related to the individual’s perspective on the industry. The correlation results (r = .14, p = .15), as well as the regression analysis indicate that the direction of the relationship appears to be as predicted, however the results were non-significant.

Hypothesis 2 posed that the individual’s perspective on the industry would be positively related to the individual’s level of identification with the professional organization. A statistically significant relationship was found between these variables (r = .49, p < .01), supporting the hypothesis. Thus, individuals’ perspectives on the industry had a stronger
relationship with their level of identification with the organization than with membership in the organization.

Individuals that were NSPE members in our research sample were found to hold a high level of identification with the professional organization ($r = .48, p < .01$), but not with the identification with the profession ($r = .17, p = .07$). Interestingly, individuals that were NSPE members in the past but had dropped their membership still held a higher level of identification with the professional organization than individuals that were never members of the professional organization $t(88) = 2.39, p = .02$. These findings indicate that individuals that are members of the professional organization have a stronger sense of identity with the professional organization than non-members, and although this sense of identification wanes after the individual leaves the professional organization it still remains stronger than for individuals who never held membership in the professional organization. Non-members of the professional organization in this sample identified more strongly with the profession than with the professional organization.

*Individual’s Response to Environmental Information*

*Influence of the individual’s perspectives.* The second purpose of this research was to determine whether perspectives about the industry were related to response to environmental change as a threat or opportunity. The measure of the individuals’ response to environmental change was developed to determine whether individuals would identify an environmental scenario more as a threat, which would trigger a defensive response, or an opportunity, which would trigger an opportunistic posture. To identify whether the individual’s perspectives about the industry were related to the individual’s response to environmental change after controlling individual differences, professional
and organizational variables, a hierarchical multiple regression analysis was employed. This analysis again began with the individual difference variables as predictors, then added organizational variables, professional organization variables and finally the individual’s perspectives on the environment. The variables considered in this model are shown in Figure 2, and the results of this regression are given in Table 3.

As indicated from this regression, the individual’s perspectives on the industry did not provide any significant amount of variation in the individual’s response to environmental change after controlling for individual and professional variables; thus, Hypothesis 3 was not supported. The results for the overall model was statistically significant but only explained 15% of the variation in the individual’s response. The total number of individual and organizational variables kept several of the predictors from being statistically significant.

Due to the shared variance among the three professional organization variables, independent hierarchical regressions were run using all three of these as predictors in order to identify the amount of variance explained by each. The results of this regression are given in Tables 4, 5 and 6. In these regressions, variables that were not significant at any step were removed. Prevention orientation was retained in that it described a small but relatively consistent amount of variation which was not described by other variables.

As can be seen from Table 6, the final model includes only a single significant predictor; the individual’s identification with the profession explained the greatest amount of variation at 5% after controlling for age and prevention orientation, $\beta = .25$, $F(1,103) = 6.88, p < .01$. In investigating the third purpose of this research, the following
Table 3:

Results of linear regression on the individual’s response to environmental change

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>$SE$</td>
<td>$\beta$</td>
<td>$b$</td>
<td>$SE$</td>
</tr>
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<td>.00</td>
<td>.20*</td>
<td>-.00</td>
<td>.00</td>
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<tr>
<td>Gender</td>
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<td>.04</td>
<td>.02</td>
<td>.06</td>
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<td>Promotion Orientation</td>
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<td>-.01</td>
<td>.00</td>
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<td>.06</td>
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<td>.04</td>
<td>.00</td>
<td>.07</td>
</tr>
</tbody>
</table>

$R^2$ Change

- $R^2$ Change: .04, .03, .01, .07, .00
- $R^2$ Total: .08, .08*, .15*, .15**

* = $p < .05$, ** = $p < .01$. 
Table 4:

Results of linear regression on the individual’s response to environmental change using professional organization membership as the professional organization predictor

<table>
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<th>Variable</th>
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<th>Step 3</th>
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<td>Prof Org Membership</td>
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<td>-.15</td>
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<tr>
<td>R² Change</td>
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<td>.02</td>
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<tr>
<td>R² Total</td>
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<td>.10**</td>
<td></td>
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</table>

* $= p < .05$, ** $= p < .01$.

Table 5:

Results of linear regression on the individual’s response to environmental change using identification with the professional organization as the professional organization predictor

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<th>Step 3</th>
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<td>.02</td>
</tr>
<tr>
<td>R² Total</td>
<td>.07*</td>
<td>.09*</td>
<td></td>
</tr>
</tbody>
</table>

* $= p < .05$, ** $= p < .01$. 
Table 6:

Results of linear regression on the individual’s response to environmental change using identification with the profession as the professional organization predictor

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th></th>
<th></th>
<th>Step 2</th>
<th></th>
<th></th>
<th>Step 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
<td>β</td>
<td></td>
<td>b</td>
<td>SE</td>
<td>β</td>
<td>b</td>
</tr>
<tr>
<td>Age</td>
<td>-.00</td>
<td>.00</td>
<td>-.21*</td>
<td></td>
<td>-.00</td>
<td>.00</td>
<td>-.17</td>
<td>-.00</td>
</tr>
<tr>
<td>Prevention Orientation</td>
<td>-.00</td>
<td>.00</td>
<td>-.17</td>
<td></td>
<td>-.01</td>
<td>.00</td>
<td>-.13</td>
<td></td>
</tr>
<tr>
<td>Identification with the Profession</td>
<td></td>
<td></td>
<td></td>
<td>-.14</td>
<td>.05</td>
<td></td>
<td>-.25**</td>
<td></td>
</tr>
<tr>
<td>R² Change</td>
<td>.04*</td>
<td></td>
<td></td>
<td>.03</td>
<td></td>
<td></td>
<td>.05**</td>
<td></td>
</tr>
<tr>
<td>R² Total</td>
<td>.07*</td>
<td></td>
<td></td>
<td>.13**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* = p < .05, ** = p < .01.

section identifies other variables related to the individual’s response to environmental information.

Organizational membership and identification. Although it did not turn out to be a significant variable in the final model, Hypothesis 4 accurately predicted a negative relationship between the individual’s response to environmental change and professional organization membership (r = -.20, p < .05), indicating that professional organization members would tend to perceive the environmental cues as a threat. Similarly, Hypothesis 5 correctly predicted a negative relationship between the individual’s level of identification with the professional organization and their response to environmental change. A significant relationship was found with the individual’s identification with the professional organization (r = -.23, p < .05) indicating that individuals with a high level of identification with the professional organization would tend to perceive environmental change as a threat. In the same manner, in accordance with Table 5, identification with
the professional organization was not significant after controlling for age and prevention orientation $\beta = -.15, F(1,106) = 1.93, p = .17$.

The individual’s identification with the profession was a statistically significant predictor of the individual’s membership in the professional organization $F(2,107) = 18.92, p < .01$.

Regulatory focus. The individual’s prevention orientation had a significant relationship with the individual’s response to environmental change, although it was not significant in the final model ($r = -.21, p < .05$). Prevention orientation, as an individual pre-disposition toward safety and security, was correctly predicted to have a negative relationship with individual response as coded, indicating that individuals that are high on prevention orientation would be pre-disposed to be resistive to change. Much of the explained variance was shared with the individual’s identification with the profession and professional organization, with which it was correlated.

The means of the responses for the promotion focus measure (71% of full scale) and the prevention focus measure (60%), was not close to the upper bound of the scale, alleviating fears that the measure may be subject to a ceiling effect. The means of previous research is not available, so it is not clear whether the high means of this sample is typical or unique to this sample population.

Organizational commitment. Organizational commitment measures the individual’s “attitude or orientation that links the identity of the person to the organization, a process by which the goals of the organization and those of the individual become congruent” (Fields, 2002.) This individual alignment with the goals and values of the organization includes a willingness to commit considerable effort toward the
achievement of these goals. Organizational commitment did not prove to be significantly related to the individual’s response to environmental change, yet described variance which did not appear to be correlated with any of the other predictors from the final model.

Discussion

Organizations need members to sense environmental change and conceptualize adaptive and appropriate response strategies to this change. If organizations do not maintain multiple perspectives and information channels within their organizations, then “when the environment changes they will (1) not be aware that it has changed, and (2) probably not be capable of changing” themselves (Schneider, 1987, p. 446). This research investigated whether individuals who participate in professional organizations have homogenized perspectives about the professional environment and thus a particular orientation toward environmental change (i.e.; perceiving change more as a threat than an opportunity). Through this investigation, significant relationships were found linking individual personality differences, professional, and organizational variables to the individual’s response to environmental change as a threat or opportunity.

Knowledge of these relationships can be valuable in promoting diverse perspectives within project and strategy teams, perspectives that “serve as a filter or conduit for potentially unique information that can be applied to their team or task” (Dahlin, Weingart & Hinds, 2005, p.1099). In the following sections, the meanings of the found relationships among the individual’s membership in and identification with professional organization will be discussed, as well as their perspectives about the
profession, and their response to environmental change. Additionally the significance of these found relationships are compared and contrasted with other individual and organizational theories, including contrasting the socialization and ASA perspectives and revisiting of the cosmopolitan/local research perspective.

Individual’s Perspectives about the Environment

The first purpose of this research was to investigate whether the individual’s perspectives about the industry were related to their membership in, or identification with, a professional organization, which provides the framing for their gathering and interpretation of information about the environment. An individual’s educational background and expertise provides the “framework for considering what information is important to the task … which in turn influences what information they attend to and incorporate into decisions” (Dahlin, et al., 2005, p. 1008). This framework then influences their information encoding and processing processes (Hinsz, Tindale & Vollrath, 1997). A primary focus of this research was to investigate ways that these perspectives are developed and influenced through participation in or identification with professional organizations.

In accordance with the socialization perspective, I sought to determine if the professional organization influenced the perspectives of the organizational member. Professional organization membership, however, was not found to be related to the individual’s perspectives about the industry.

Professional organization membership. Professional organization membership was not found to be highly correlated with the individual’s perspectives on the industry. This finding indicates that one cannot assume that individuals that are members of
professional organization hold the perspectives of the professional institution any more strongly than non-members. One possible explanation for this lack of a relationship between holding the perspectives of the professional organization and membership in the professional organization may be because their employing organizations may sponsor their membership. In this way some of the professional organization members may participate to enjoy the benefits of the organization, while not holding tightly to the perspectives of the industry purveyed by the professional organization. Alternatively, other individuals could share the perspectives of the professional organization and yet not be sponsored by their employment organization nor consider themselves personally able to afford their professional organization membership dues. For these reasons, identification with, and not simply membership in, a professional organization would make a better measure of the organizations influence on perspectives, which is what was found.

The socialization model anticipates a positive relationship between professional organization membership and perspectives about the industry because organization membership gives the members access to information and perspectives of the professional organization. Because changes within the environment could be interpreted as changes to the norms and possibly the organizational structure of the industry, this perspective holds that individuals that are members of the professional organization would have a tendency to interpret information related to environmental change as a threat. The socialization literature (i.e. Willingham, 2001) and organizational culture literature (Schein, 1996a) both indicate that, within organizations, information about the
environment would be interpreted through schema negotiated and shared by organizational members.

Our research found a primary tendency toward this influence but the relationship did not prove to be significant. Johnson and Hoopes (2003) indicated that research on the influence of these shared beliefs has in the past shown conflicting and inconsistent results. In the same way this research was unable to identify common schema or perspectives of the industry which are shared by the professional organization members. As the following section indicates, however, the individuals’ perspectives about the industry were found to relate to the individuals’ level of identification with the profession.

*Professional organization membership and identification*. For the research sample of professional engineers, the individual’s perspectives about the industry were found to be moderately related to both the individual’s identification with the profession and identification with the professional organization. The significant relationship found between the individual’s membership in the professional organization and their identification with the professional organization would be predicted by the both the organizational socialization literature, which explains that individuals that are members of the organization are socialized to the policies and traditions of the organization (Ashforth & Mael, 1989) and the ASA perspective, which holds that individuals that identify with the organization will seek and maintain membership in the organization (Schneider, 1987). In the following section, other found relationships associated with the individual’s identification with the profession are discussed.
The individual’s level of identification with the professional organization and with the profession was found to be moderately related to each other and to the individual’s perspectives about the environment. Of these, the individual’s identification with the profession and professional organization were both predictors of the individual’s perspectives about the environment. In the following section the individual’s perspectives about the industry will be compared with their response to environmental change.

*Individual’s Response to Environmental Change*

*Perspectives about the industry.* The second purpose of this research was to determine whether individuals’ perspectives about the industry influence their response to environmental change as a threat or opportunity. Although the individual’s perspectives are considered to be a filter or conduit for information (Dougherty, 1992), the operation and function of individual perspective and group diversity are not clearly defined or easily researched (see Kilduff, Angelmar & Merah, 2000). In this study we were also unable to develop a measure of the individual’s perspectives about the industry which would allow for these perspectives to be related to the individual’s response to environmental information as a threat or opportunity.

Although the individual’s perspectives about the industry did not explain a significant amount of variation in the individual’s interpretation of environmental information, the individual’s identification with the profession did have a significant direct effect, and is addressed below.

The individual’s response to environmental information as a threat or opportunity is a measure of the individual’s immediate intuitive and affective reaction to the presented environmental scenario. As shown in Tables 6, the strongest predictor of the
individual’s response to environmental change was found to be the individual’s identification with the profession.

*Identification with the profession.* The individual’s identification with the profession describes the most variation in the individual’s response toward environmental change. The negative direction of these relationships was predicted as well, indicating that the higher the individual’s level of professional identification the more inclined they were toward viewing the environmental cues associated with environmental change as threats and not as opportunities. This indicates that individuals that identify with a profession and are disposed to view industry change as a threat may miss opportunities to capitalize on environmental change opportunities (Dutton, Kukerich & Harquail, 1994). Alternatively, individuals that avoid threats are less likely to advocate risky ventures that may compromise an organization’s viability.

An employing organization’s effective strategy implementation is dependent upon the alignment of its members with the overall strategy of the organization (e.g., Miles and Snow, 1978). An organization that promotes innovation would be more interested in engineers that take chances; whereas engineers in cost conscious organizations might appreciate conservative perspectives. Likewise, within organizations, engineers working in R&D would be expected to take more chances than someone working in quality control. Understanding the level of identification with the professional organization would provide some insight into the disposition of the engineers in these various roles.

Having analyzed the relationships between the individual’s attitude toward change and their identification with the profession, the following section will examine the
relationships between the individual’s regulatory focus and their perspectives on the environment.

Regulatory focus and individual response to environmental change. The individual’s prevention focus had a main effect with response to environmental change; however, it did not prove to explain significant independent variance in the final model. This relationship indicates that individuals with a prevention perspective would tend to hold a perspective about the industry that is protective of the professional positions and interpret information as a threat. This relationship is complimentary with previous research associated with this regulatory focus personality measure (Schneider, 1987).

The individual’s promotion focus measure was found to be correlated with commitment to the employment organization and the individual’s prevention focus measure was found to be moderately related to the individual’s identification with the profession. These findings are in keeping with Higgins et al. (2001) notion that the promotion system is concerned with accomplishment and advancement, which can be found within the employment organizational setting. Alternatively, prevention systems are concerned with “obtaining security and underlies higher-level concerns with safety and fulfillment of responsibilities” (Higgins, et al, p. 4). This prevention orientation would fit with the findings of the professional commitment results found in this research.

The internal reliability of the promotion orientation scale was at the lower bounds of scale acceptability, which may have affected the ability of this scale to provide significant relationships with the individual’s perspectives about the industry. It is possible that through further the development of this scale measure can be improved.
Age and professional effects. Age was initially a moderate predictor; however, it shared variance with several other predictors, and became non-significant in later regression steps. The first-order correlations between age and membership and identification indicate a tendency for older individuals to have membership and share a higher level of identification with the profession and professional organization. In accordance with these findings, individuals that are participating in group level processes would have more of a tendency to respond to environmental information as a threat if they were older and had a high level of identification with the profession. Conversely, they would tend to respond to environmental change information as an opportunity if younger and did not have a strong sense of identification with the profession. To the extent that managers have input into the composition of organizational teams, they can use these individual and professional attributes to assure that particular expertise and perspectives are represented in the information processing within the team (Dahlin, et al., 2005.)

In the selection of an organizational strategist or the development of a top management team responsible for the future direction of an organization, the selection of an individual with strong professional identification could limit the organization’s ability to sense, identify, and rapidly respond to change in the environment. In a competitive environment where change is increasing rapidly, an organization’s competitive advantage may soon be lost if change is not sensed and responded to quickly. Alternatively, if individuals were too prone to sense environmental change as opportunities, they might push for organizational responses prematurely, expending the organization’s resources chasing opportunities that never materialize. Therefore the selection of individuals that
may have a particular perspective or disposition toward change could be strategically added to a group to increase the possibility that a perspective toward responding aggressively toward change would balance the traditional perspectives of stability and resistance to change.

*Research Support for Existing Theories*

**ASA.** The individual’s identification with the professional organization was related to the member’s desire to seek membership in the professional organization. Identification with the profession was found to be related to current organizational membership, and dropped for past members. This findings support the perspectives of the attraction/selection/attrition model in that “people and human settings are inseparable; people are the setting because it is they who make the setting” (Schneider, 1987, p.440). The professional organization is thus comprised of members who share a vision around the organization’s goals, which relates to the individuals’ “shared prototypical characteristics (and) virtues” associated with organizational identification. (Mael & Tetrick, 1992, p.814).

The ASA perspective argues for and describes a deliberate process of attraction and selection to the professional organization. This perspective presumes that individuals that join the professional organization seek the benefits and security of this organization, and possibly the knowledge provided through the organization.

The ASA perspective, however, represents a specific viewpoint for the interpretation of these found relationships. Alternatively, the results could argue for the validity of the socialization perspective, recognizing that individuals that join these professional organizations receive the socialization and identify strongly with the
organization. Upon leaving the organization these individuals may no longer be receiving the socialization provided by the organization, and their sense of identification wanes.

**Cosmopolitan/local orientation.** This research has results which can also be interpreted as in keeping with the cosmopolitan/local orientation perspective, which indicates that professionals would tend to view the world through reference groups that are outside of a particular organization; cosmopolitan orientation” (Kirschenbaum & Goldberg, 1976). To support this perspective the prevention score was somewhat related to the individual’s identification with the profession, indicating that individuals that would be protective of their position have a sense of satisfaction or belongingness to the profession (Mael & Tetrick, 1992), and would hold a cosmopolitan perspective.

Additionally, the promotion scale measure was related to commitment to the employment organization, thus representing a propensity to hold a local orientation.

Identification with the profession was found to be related to response to environmental information. Because individuals that have a cosmopolitan orientation would look to their profession as the basis of power and be committed to their specialized role skill (Grimes & Berger, 1970) environmental change could be perceived to threaten the market relationships and structure of the profession and would be resisted.

Alternatively, individuals that have a local orientation (and thus have a low identification with the profession) may perceive environmental changes as opportunities for the development of new techniques or technologies which are not tied to the structure and relationships of the profession.

This concludes the discussion of the findings of this research with respect to the individual’s perspectives about the environment, response to change, and relationships of
these findings with related research perspectives. In the following sections the limitations of this research will be presented with implications for future research.

Research Limitations

This research studied the perspectives of professional engineers and the relationship between these perspectives and individual, organizational and professional variables. In the following sections the limitations of this research are discussed as well as implications of the findings and recommendations for future research.

Research sample. The database for this research sample was comprised of a group of professional engineers currently registered in the State of Texas. Texas is one of the states that have the highest number of registered professional engineers in the United States, and most of the respondents are residents of the state of Texas. The attitudes of the respondents, many located in this particular geographic region, may not be indicative of the generalized attitude in different areas of the country. Certainly these attitudes would not be expected to generalize to other areas of the world where individualistic cultures are not dominant or where professional norms vary. For example, individuals within collectivist cultures would be expected to have a higher level of commitment to their employment organization as a cultural norm, and could have completely different cosmopolitan/local influences.

Other professions. Other issues may affect the generalizability of the research results as well. Most professions have the need for coordination and disseminate information about the technical environment and changing environmental and regulatory requirements. In this way it is expected that the profession of engineering shares these qualities with other professions, although it could be argued that the rate of change in
other professional environments are different. The generalizability of these results would also depend upon the relative tolerance of various professions and professional organizations for the promotion of progressive ideas toward embracing change.

Additionally in this research the author may have inadvertently identified and utilized resistive policies associated with change and not provided a balanced representation of adaptive policies in the professional organization, the acceptance of which can vary between professions. However, because the perspectives and attitudes are related to the individual’s membership and identification with the professional organization and the profession, many of these findings would be expected to generalize among similar professions, tempered by the rate of change within the industry at the time.

*Questionnaire responses.* Mail questionnaires can raise questions about the differences between respondents and non-respondents. One reason is that individuals that participate in mail questionnaires have an opportunity to read the entire questionnaire and respond if they have an interest in the types of questions posed in the survey or have an opportunity to provide written comments (which this survey provided for). Additionally, some individual personality variables might allow for a predisposition to return or not return responses.

This research attempted to maximize the responses to the survey by providing an appropriately worded cover letter on letterhead utilizing the university logo, by providing an introductory letter which was personalized to the individual, and by utilizing a questionnaire which was designed to have a professional appearance. Additionally the original contact was followed up with a personalized postcard indicating that their
participation in this study is important. All of these strategies were implemented in order to minimize the non-response bias predicted by Dillman (1978).

Additionally, it is speculated that individuals that read the entire questionnaire before responding would be more inclined to respond if their orientation was of a cosmopolitan nature and their interest was with the profession (Gouldner, 1957). Individuals that held a local outlook would be pre-disposed not to respond if it required time away from the performance of productive tasks.

Sampling bias could be introduced through the exclusive utilization of the Texas engineer’s database, which was the only found state database available in a searchable and printable format. Because age and gender information is not available for the professional engineers we are unable to determine if the sample population is adequately represented by the respondents. The percentage of inactive respondents at 10% was consistent with the population of registered professional engineers in Texas, indicating that the active and inactive (many retired) engineers are accurately represented. Because Texas is a border state with a significant percentage of immigrated population, participation bias could affect our respondents if a portion of the respondents may not have a command of English as questionnaires in other languages were not offered.

Age effects. With the mean age of the sample population nearing retirement age, many respondents may have held short term perspectives or attitudes toward their future working conditions. Certain results of this research may be explained through the identification of career cycle changes, which reflects the individuals tending to be more stable in an employment organization later in their career stages due to changing expectations concerning their professional and employment goals (Taylor, 1968.)
Younger professionals may be socialized to expect upwardly mobile career transitions to require mobility with respect to employment organizations, whereas older professionals would have had the opportunity to settle into career positions and organizations that reflect their positions and accommodate their goals. This orientation could help to explain the negative relationship between age and response to environmental change through the recognition that older individuals would be more resistive to change and younger individuals would be more inclined to accept and adapt to environmental change as a part of a career transition or transformation.

**Implications for Future Research**

This research focused on the identification of environmental cues which indicate significant or radical change within the environment of the profession, and the results of this research indicates that professionals that strongly identify with their profession tend to respond to radical change in a threatening manner. Professions, however, have long been adapting to, and even developing and embracing, technological and environmental change. Engineers specifically have long been known for their ability to develop and adapt to new tools, technologies and modeling techniques to increase the efficiency and effectiveness of their procedures. Future research could focus on the level of perceived change that might trigger a differential response between the individual’s adaptive tendency (learn to use the new tool or technique) and a resistive tendency (to resist environmental changes).

*Recognizing environmental change.* This research presented environmental change scenario and did not address the threshold ability of the individual to identify environmental change as change. Change literature (for an example see Bedeian and
Zammuto, 1991) has been focused on the organization and its leadership’s inability to identify environmental change and take the appropriate responsive action. Future research needs to identify the intuitive threshold associated with adaptive responses to incremental change and significant change, which needs to trigger radical adaptive-oriented responses both individually and within the organization.

Additionally, this research used vignettes that are associated with perceived environmental change and asked for responses to these scenarios. As this research is attempting to identify the individual’s response to environmental change as introduced through these vignettes and this response has an affective component, it can be argued that the use of hypothetical scenarios do not yield a completely accurate response because the participant has nothing at stake. Future research would need to address this problem through continuous evaluation during periods of environmental change using longitudinal studies or reflexive studies that ask participants to reflect upon their feelings and attitudes during times of environmental change. Owing that change is identified only after the change has occurred, both of these methodologies have their own disadvantages; however, each can be used to balance the deficiencies of other methodologies.

In Conclusion

It is important for an organization’s members to be able to sense and adapt to environmental change. This research has shown that the engineer’s promotion focus and identification with a professional organization and with the profession are related to their tendency to share the professional organization’s perspectives about the industry. These perspectives reflect the professional organization’s positions associated with environmental change and control of the profession. Holding these professional
perspectives, however, was not found to be strongly related to the individual’s response to environmental change as a threat or opportunity.

Although this research did not find that these professional perspectives related to the individual’s response to environmental change the individual’s prevention orientation and identification with the profession were predictive of their response to environmental change, and future research might be directed toward further refining these variables and explaining their influence on the individual’s response.

Our findings did indeed support the notion that membership in and identification with an engineers' professional associations, and not simply their employing organizations, can provide insight into how they view the engineering environment and the meaning of turbulence in that environment. Further research into the processes and content of these views is necessary to determine the magnitude and relevance of these effects on whether and how engineers influence the ways that organizations perceive and respond to their particular environments.
References


Appendix A: Questionnaire

Professional Engineering Market Survey

Questionnaire # __________.

Note: This questionnaire number will only be used for confirming the return of questionnaires and not for identification with individual respondents.
Professional Engineering Market Survey

Thank you for your participation in this survey. Your attitudes toward the Professional Engineering Market are very important to us, and we sincerely appreciate your help in making this survey a success by completing and returning this survey form promptly.

This first group of questions will let you express your attitudes about the practice of Professional Engineering and its market. These questions should be answered by circling the number that you feel best describes your belief about the accuracy of the statement.

1. It is vital that the institution of Professional Engineering should protect their traditional areas of practice from encroachment by other groups such as architects, landscape architects and technologists.

   1     2         3  4     5          6  7
   STRONGLY DISAGREE       STRONGLY AGREE

2. The development of new fields of scientific discipline in the areas of engineering (such as biometrics and nanotechnologies) should be regulated in the same manner as the traditional fields of Professional Engineering.

   1     2         3  4     5          6  7
   STRONGLY DISAGREE       STRONGLY AGREE

3. The fields of computer hardware and software design should be regulated in the same manner as the traditional fields of Professional Engineering.

   1     2         3  4     5          6  7
   STRONGLY DISAGREE       STRONGLY AGREE

4. Professional Engineers should be responsible for the design of products and equipment outside of the built environment (as in transportation vehicles, manufactured goods, etc.) as they are in the built environment (construction of buildings, roadways, bridges and public infrastructure).

   1     2         3  4     5          6  7
   STRONGLY DISAGREE       STRONGLY AGREE

5. The association of the engineer with his Professional organization is more important than the association of engineers with their technical discipline’s organization (ie civil, structural or mechanical engineering organizations).

   1     2         3  4     5          6  7
   STRONGLY DISAGREE       STRONGLY AGREE

6. The association of the engineer with his Professional organization is more important than the association of engineers with their employment organization.

   1     2         3  4     5          6  7
7. The protection of the local regulation of engineering in the face of the globalization trend in engineering design should be a high priority of the engineering profession.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

8. I really care about the fate of Professional Engineering.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

9. I would accept almost any job assignment in order to keep working within the Professional Engineering field.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

For the next group of questions, information will be provided concerning possible changes and trends the Professional Engineering market. Presuming that the information provided is correct, please provide your best response as directed.

Questions 10-13. Pursuant to a 2004 ASME survey, based upon wage pressure due to foreign labor competition, nearly 10% of large and medium sized engineering companies reported that more than half of the engineering jobs had been outsourced offshore (Curtis, 2004).

10. I feel threatened by these changes.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

11. I believe that these changes will increase opportunities within the engineering profession.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

12. From my perspective, these changes are for the better.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

13. In light of these changes, I would look forward to changing the way that I do my work.

1 2 3 4 5 6 7

STRONGLY DISAGREE STRONGLY AGREE

Questions 14-17. There seems to be an increasing trend toward specialization in the traditional engineering fields and correspondingly an increasing use of technically trained specialists and other non-professional engineers in these areas (ie fire suppression
piping design, fire protection system design, surface water control and detention, inspection services, etc.)

14. I feel threatened by these changes.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

15. I believe that these changes will increase opportunities within the engineering profession.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

16. From my perspective, these changes are for the better.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

17. In light of these changes, I would look forward to changing the way that I do my work.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

Questions 18-21. New areas of engineering are being introduced which are outside of the traditional role of engineering. These areas in the past have included computer hardware and software engineering, and future areas could include biometrics and materials science.

18. I feel threatened by these changes.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

19. I believe that these changes will increase opportunities within the engineering profession.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

20. From my perspective, these changes are for the better.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE

21. In light of these changes, I would look forward to changing the way that I do my work.

1 2 3 4 5 6 7
STRONGLY DISAGREE    STRONGLY AGREE
Questions 22-25. Currently the profession of engineering is regulated in the public arena and in particular within the private sectors, mostly focused on the built environment (the construction of buildings and public infrastructure). Recently, private industry and manufacturing sectors have indicated interest in a certification process for engineers in their industries.

22. I feel threatened by these changes.
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

23. I believe that these changes will increase opportunities within the engineering profession.
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

24. From my perspective, these changes are for the better.
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

25. In light of these changes, I would look forward to changing the way that I do my work.
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

The following group of seven questions allows you to provide information about an organization which represents the engineering profession.

26. Are you familiar with the policies of the National Society of Professional Engineers (NSPE)?
   1 2 3 4 5 6 7
   NOT FAMILIAR AT ALL  EXTREMELY FAMILIAR

27. I agree with the policies of the NSPE?
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

28. When I talk about the NSPE, I usually say 'we' rather than 'they'.
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

29. The NSPE's successes are my successes.
   1 2 3 4 5 6 7
   STRONGLY DISAGREE  STRONGLY AGREE

30. I am very interested in what others think about the NSPE.
31. When someone praises the NSPE it feels like a personal compliment.

1 2 3 4 5 6 7
STRONGLY DISAGREE STRONGLY AGREE

32. If a story in the media criticized the NSPE I would feel embarrassed.

1 2 3 4 5 6 7
STRONGLY DISAGREE STRONGLY AGREE

33. Are you a member of the National Society of Professional Engineers (NSPE)?
   (Y/N) ___. If not, were you in the past and dropped your membership? (Y/N) ___.
   How many years are you or have you been a member? _______. What was your highest office held?
   _______________________. Are you a Fellow of NSPE? (Y/N) _______.

   The following two questions refer to the company or organization that you currently belong to, or your own company if you are self-employed.

34. I am proud to tell others that I belong to my employment organization.

1 2 3 4 5 6 7
STRONGLY DISAGREE STRONGLY AGREE

35. I am willing to put in a great deal of effort beyond what is normally expected in order to help my employment organization be successful.

1 2 3 4 5 6 7
STRONGLY DISAGREE STRONGLY AGREE

   The following group of eleven questions allows us to know more about you as an individual and asks about specific events in your life.

36. Compared to most people, are you typically unable to get what you want out of life?

1 2 3 4 5 6 7
NEVER OR SELDOM SOMETIMES VERY OFTEN

37. Growing up, would you ever “cross the line” by doing things that your parents would not tolerate?

1 2 3 4 5 6 7
NEVER OR SELDOM SOMETIMES VERY OFTEN

38. How often have you accomplished things that got you “psyched” to work even harder?

1 2 3 4 5 6 7
NEVER OR SELDOM SOMETIMES VERY OFTEN
39. Did you get on your parent’s nerves often when you were growing up?
   1  2  3  4  5  6  7
   NEVER OR SELDOM  SOMETIMES  VERY OFTEN

40. How often did you obey rules and regulations that were established by your parents?
   1  2  3  4  5  6  7
   NEVER OR SELDOM  SOMETIMES  VERY OFTEN

41. Growing up, did you ever act in ways that your parents thought were objectionable?
   1  2  3  4  5  6  7
   NEVER OR SELDOM  SOMETIMES  VERY OFTEN

42. Do you often do well at different things that you try?
   1  2  3  4  5  6  7
   NEVER OR SELDOM  SOMETIMES  VERY OFTEN

43. Not being careful enough has gotten me into trouble at times.
   1  2  3  4  5  6  7
   NEVER OR SELDOM  SOMETIMES  VERY OFTEN

44. When it comes to achieving things that are important to me, I find that I don’t perform as well as I ideally would like to do.
   1  2  3  4  5  6  7
   NEVER TRUE  SOMETIMES TRUE  VERY OFTEN TRUE

45. I feel like I have made progress toward being successful in my life.
   1  2  3  4  5  6  7
   CERTAINLY FALSE  CERTAINLY TRUE

46. I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them.
   1  2  3  4  5  6  7
   CERTAINLY FALSE  CERTAINLY TRUE
   This last section allows us to get some basic information about your experience in the engineering industry.

47. What is your age _______ and number of years providing engineering services. _________

48. Please state your gender (M/F). ____________

49. Is your firm generally an Industry or Manufacturer______, Architectural, Engineering or Consulting Firm______, Manufacturer’s Rep. or Distributor ______ or other (please specify) ________________________________.
50. What is your present job position within your employment organization?
__________________

51. Approximately how many Professional Engineers employed in your organization?_______

52. Do you have any additional comments that you would like to share about our survey or specific questions within the survey? (If so and your comments address a specific question, please identify the question #.) Please print clearly.
We sincerely appreciate your participation in this survey. Your input is very important to us and is greatly appreciated. Please return the questionnaire as soon as possible to:

Charles Pickering  
Department of Psychology  
200 Porter Hall  
Ohio University  
Athens, Ohio 45701
Appendix B: NSPE Cover Letter

Ms. Kathryn Gray, President
Dr. Al Gray, Executive Director
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314-2794

Dear Ms. Gray and Dr. Gray:

As you may recall from my previous conversations, I am in the dissertation phase of my Ph. D. in Strategic Leadership from Ohio University. My research will study the effects of professional organization membership on the individual’s attitudes toward environmental change and the interpretation of environmental change as a threat or opportunity.

The research group will be Professional Engineers that are and are not members of the NSPE. The difference in interpretation of environmental events will be compared between these groups, and I believe the results of the research would be helpful to the NSPE in understanding the differences between individuals that do and do not seek NSPE membership. I would be glad to share the results with you after the research is complete, along with any additional relevant information that can be interpreted from the collected data. This information will be collected via a written survey form in the US mail and returned to Ohio University during the fall months of 2005.

At this time I intend for my sample database to be derived from individual state registration rolls, however I wanted to make you aware of my research in case there were questions from NSPE members who would be receiving questionnaires and might wonder if NSPE had sponsored or promoted the research. At this time I am not asking for sponsorship or promotion from the NSPE.

If you would agree I would like to get a list of the names and addresses of the NSPE Fellows and I would like to provide a small sample of them with the questionnaire in order to establish the baseline for NSPE member’s perspectives on the environment. I would be glad to provide a copy of the questionnaire as long as you can assure us that information or prepared responses to the specific questions will not be disclosed as they could provide a bias to the results of this research. I would be glad to talk to you about this research project and address any questions that you might have.
Thank you in advance for your support, and please respond to me with any questions or concerns that you might have about this research project.

Respectfully Submitted:

Charles Pickering
Department of Psychology
200 Porter Hall
Ohio University
Athens, Ohio  45701

Email:  cp230001@ohio.edu
cpickering1@charter.net
Appendix C: Cover Letter

(Date)

<FirstName> <LastName>
<Address 1>
<Address 2>
<City, State, Zip>

Dear <FirstName>: 

The Engineering Profession is experiencing change due to international competition, emerging technologies and changing perceptions about the practice of engineering, and these changes affect the ongoing practice of Professional Engineering.

You have been selected among a small number of engineers to give your perspectives and opinions about these changes in the engineering industry. Your name was drawn from a random sample of Professional Engineers across the country to provide this information. It is important that each questionnaire is completed and returned, and your attitudes and perspectives about the industry are important to our research.

You can be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so that we may check your name off the mailing list when your questionnaire is returned. Your name will never be placed on or associated with the questionnaire.

The results of the survey will be used by the Organizational Psychology Department at Ohio University for their research about Professional Engineering, and shared with the wider educational community upon publication. You may receive a summary of the results by writing “copy of results requested” on the back of the return envelope, and printing your name and address or email address below it. Please do not put this information on the questionnaire itself.

I would be happy to answer any questions that you might have about this survey. Please forward any questions to the address below.

Thank you in advance for your support.

Charles Pickering
Department of Psychology
200 Porter Hall, Ohio University, Athens, Ohio  45701
Appendix D: Variable Computations

Perspectives about the Industry \( \text{indpers} = \frac{(q1+q2+q3+q4+q5+q6+q7)}{7} \)

Identification with the Professional Organization \( \text{proforid} = \frac{(q26+q27+q28+q29+q30+q31+q32)}{7} \)

Identification with the Profession \( \text{profid} = \frac{(q8 + q9)}{2} \)

Promotion Factor Calculation \( \text{promo} = (7-q36)+q38+(7-q44)+q45+(7-q46) \)

Prevention Factor Calculation \( \text{prev} = (7-q37)+(7-q39)+q40+(7-q41)+(7-q43) \)

Response to Environmental Information as a Threat/Opportunity \( \text{envres} = \frac{((7-q10) + q11 + q12 + q13 + (7-q14) +q15 + q16 + q17 + (7-q18) + q19 + q20 + q21 + (7-q22) + q23 + q24 + q25)}{16} \)

Attitude toward Change \( \text{attchgal} = \frac{(q13 + q16 + q17 + q20 + q21 + q25)}{6} \)

Commitment to Employment Organization \( \text{emporgcm} = \frac{(q34+q35)}{2} \)

Large or Small Organization \( \text{lgsmorg} = \text{if } q51 > 1 \text{ then } 1, \text{ else } -1 \)

NSPE Membership is coded 0 for non-members, 1 for members.