

ABSTRACT

Title of Document: COMMUNICANT ACTIVENESS,
COGNITIVE ENTREPRENEURSHIP, AND A
SITUATIONAL THEORY OF PROBLEM SOLVING

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This dissertation presents a situational theory of problem solving that highlights distinctive communicative and cognitive features in human problem solving. Its purpose is to provide a simple and useful, but not atheoretical, account of communication behavior and the cognitive approaches that we adopt during problematic situations.

In the conceptualization, I introduce a new concept, communicant activeness in problem solving (CAPS), which has three domains in communicant activeness to explain not only when people voluntarily learn and share information but also how they choose certain information as more relevant than other information. The three domains are information selection (information forefending and information permitting), information transmission (information forwarding and information sharing), and information acquisition (information seeking and information processing). I then use the focal construct, communicant activeness in problem solving, as a dependent variable in the new situational theory of problem solving.

I also propose another new concept, cognitive entrepreneurship in problem solving (CEPS). It describes cognitive strategies that we take to reason about a solution in some problematic situations. Depending on the situation, we adopt a more or less entrepreneurial mindset. This construct contains four distinct but correlated dimensions:

cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. For conceptual convenience, I named the more entrepreneurial approach the cognitive alpha strategy and the less entrepreneurial approach the cognitive omega strategy. The construct of cognitive entrepreneurship becomes another dependent variable to be accounted for by the independent variables in the situational theory.

To explain the cognitive and communicative dependent variables in problem solving, I use four situational antecedent conditions from the situational theory of publics: problem recognition, constraint recognition, level of involvement, and referent criterion (J. Grunig, 1968, 1997). I refine these antecedent concepts to accommodate several conceptual issues found from the past research of the situational theory of publics (e.g., the multicollinearity issue among independent variables). I also introduce the concept of situational motivation in problem solving that explains motivational effects on subsequent cognitive approaches and communicative behaviors. These revised situational antecedent variables jointly explain 1) how and why people communicate and 2) how people use unique cognitive strategies when they approach problem resolution. I called this emerging theory the situational theory of problem solving (STOPS).

This dissertation elaborates 1) a conceptual model of communicant activeness in problem solving; 2) another conceptual model of cognitive entrepreneurship in problem solving; 3) a situational and motivational account for when, why, and how people communicate and are cognitively unique in a problematic situation. It then empirically tests a set of hypotheses and propositions that pertain to new concepts and the situational theory of problem solving.

This dissertation advances conceptual understanding about how communication behavior and cognitive approaches affect our problem-solving efforts (descriptive theory building). It also contributes to finding a way to improve our adaptability in dealing with life problems (normative theory building). The new concepts and theory, CAPS, CEPS, and STOPS, offer some solutions for theoretical and practical problems in communication and several communication subfields.

COMMUNICANT ACTIVENESS,
COGNITIVE ENTREPRENEURSHIP,
AND A SITUATIONAL THEORY OF PROBLEM SOLVING

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CHAPTER I: INTRODUCTION

The purpose of this dissertation is to develop a situational theory of problem solving. The situational theory of problem solving inherits, refines, and extends theoretical virtues of the situational theory of publics (STP) (J. Grunig, 1968, 1989, 1997, 2005) to become a more general theory of human communication and cognition during problematic situations. The situational theory of publics has contributed not only to the communication field in general but also to the public relations field in particular, and it has a potential to become a general communication theory. Specifically, I propose to broaden the situational theory of publics from simply information taking to a more general conception of communicative behavior, namely, *communicant activeness in problem solving*, which identifies such qualities as information taking, information giving, and information selecting.

I differentiate six subdimensions in communicative activeness, which include *information forefending* and *information permitting* (information selection), *information forwarding* and *information sharing* (information transmission), and *information seeking* and *information processing* (information acquisition). I make this dichotomous subdivision of six variables in terms of *proactiveness* and *reactiveness* in communication action.

In addition, I propose another new concept, *cognitive entrepreneurship in problem solving*, explaining cognitive strategies in problem solving. It captures a varying entrepreneurial mindset in approaching problem resolution. This new concept consists of four subconstructs: cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension.

People respond to problems with different cognitive approaches corresponding to their situational perceptions. When people recognize a problem to which they feel closely connected and have sufficient cognitive resources, they are likely to use a *forward reasoning strategy*. In a forward reasoning strategy, people tend to look for evidence before making a choice, and thus the evidence directs a certain, optimal, conclusion. In contrast, when people recognize a problem as important but are severely constrained by lack of cognitive resources or a strong desire for a specific outcome, they tend to use a backward reasoning strategy. The backward reasoning strategy is a decision-making strategy that flows from a conclusion to certain evidence that best optimizes the hastily drawn *a priori* conclusion. Thus, the backward reasoning strategy refers to an *optimization process* for an *a priori* conclusion. I hypothesize that as one's cognitive entrepreneurship increases, the person is less likely to adopt a backward reasoning strategy. I refer to the backward reasoning as *cognitive retrogression*.

In addition, people tend to consider more ideas and options as they become more entrepreneurial in problem solving. As a result, they display more cognitive breadth, requiring more tolerance for even those competing ideas and rather incompatible perspectives. I refer to such breadth and tolerance as *cognitive multilateralism*.

Next, as one becomes a more entrepreneurial problem solver, one tends to be more enthusiastic and patronizing toward the proposed solutions. I call this *cognitive commitment*. Entrepreneurial problem solvers are typically excited by new ideas. They have a voracious appetite for information that will help them solve a problem. At the same time, entrepreneurs are energetic and enthusiastic about a wide range of ideas, even wild ones, as long as they increase the potential to solve a problem. Thus, their

excitement with the possible ideas and options will grow as their cognitive entrepreneurship in problem solving increases.

Finally, I hypothesize that as one's cognitive entrepreneurship increases, one becomes more heedful and takes all steps *before finalizing* a solution. I name this *cognitive suspension*. En route to a final solution, a problem solver with heightened cognitive entrepreneurship will invest more discriminatory efforts in evaluating options and *reevaluating a selected option before finalizing* it.

This dissertation attempts to move the situational theory of publics to a more general level by incorporating two new dependent variables in its theoretical formulation. After inclusion of a generalized dependent variable of communication behavior, the situational theory should be able to explain not only when and why people communicate but also how they communicate. If publics are active in problem solving, they are more likely to seek, give, and select information. Likewise, after inclusion of differential cognitive strategies that publics might adopt, the situational theory should explain better how people mentally practice their problem-solving task in a given problematic situation. At some times, publics may be more entrepreneurial in problem solving, and thus they use a forward reasoning strategy (i.e., an optimal conclusion search process). At other times, they may be less entrepreneurial and thus adopt a backward reasoning strategy (i.e., an optimization process of *a priori* conclusion).

Scientific progress is possible not only when theorists introduce new theory and concepts but also when theorists increase the abstraction—"generalization"—of available concepts and theory. As Popper (1963) said, a theory is "preferable...which tells us more...which contains the greater amount of empirical information or content" (p. 217).

Theory should tell more by abstracting and “replacing the particular by the general” (Kruglanski, *in press*, p. 3), and we need to “relentlessly” seek a general theory. Similarly, J. Grunig, the father of the situational theory of publics, said that no good theory ever stagnates (J. Grunig & Childers, 1988). In this vein, this dissertation aims at a good and general theory about human problem solving. The new situational theory of problem solving replaces “the particular” (information seeking and processing) “by the general” (communicant activeness in problem solving). As a result, it brings a “greater amount of empirical information and content” (theoretical predictions and accounts). What follows is a brief history of the situational theory of publics.

Situational Theory of Publics

The situational theory of publics was built to explain why and how people communicate (J. Grunig, 1968, 1989, 1997, 2005). The situational theory is a purposeful, teleological theory that predicts the communicative behaviors of publics that most matter to public relations practitioners. This theory has helped define the field of public relations by spelling out who are *publics* in public relations. It refines, improves, and formalizes two classic theories of public opinion, that of John Dewey (1927) and Herbert Blumer (1966), so as to identify publics and measure their opinions.

According to Dewey (1927) and Blumer (1966), publics are critical components of the democratic process who find problems affecting them and organize and act similarly for problem resolution. J. Grunig’s (1968, 1989, 1997, 2005) situational theory of publics provides a means to categorize varying compositions of publics in terms of responsiveness to problems; amount of and nature of communicative behavior; the effects of communication on cognition, attitudes, and behavior; and the potential to participate in

collective behavior in problem resolution (J. Grunig, 1989, 1997, 2005). Because the situational theory has the power to explain and predict who is most likely to communicate actively about social or individual problems, it has been a most heavily used applied communication theory, not only by public relations theorists but also by public relations practitioners. For public relations theorists, the STP provides a critical means to build a body of strategic management of public relations (e.g., the IABC Excellence Study, L. Grunig, J. Grunig, & Dozier, 2002). For practitioners, the STP guides the preparation of communication programs and makes them more strategic (e.g., by identifying publics, choosing realistic short and long-term communication objectives, and evaluating the outcomes of program effectiveness).

Above all, the most important lesson from the situational theory is that audience information consumption is, in general, *random*. Information consumption becomes *non-random* or *systematic* only when people find that information matches their subjective life problems. The problems in people's minds contain a limited subset of many possible problems. Only problems that have relevance to their lives will enter into publics' minds. Therefore, in their communication behavior, people are selectively systematic to meet their internal priorities that are influenced by situational perceptions. Notably, problems are situational—they come and go—in publics' minds. Publics actively communicate only when they experience problematic situations, and thus problems come and go. As their perceptions of problematic situations change, their communication behaviors change situationally. Just as communication behaviors are situational, therefore, publics arise and disappear situationally.

Message senders would like to define the list of problem priorities for publics. Organizations want their publics to behave in a way that the organization wishes (e.g., accept new business policy as it is). However, this is not an easy pursuit. Disappointingly to message senders, publics identify problems themselves. Likewise, publics define the priorities of their problems themselves. In the strategic management of public relations (L. Grunig, J. Grunig, Dozier, 2002), the situational theory of publics shows why blind pursuit of a maximum number of people in a *general public*—opposite to *specific publics* defined by the STP—fails. Because people selectively invest their cognitive and communicative resources only when they perceive it as necessary and relevant, massive audience campaigns, no matter how well intended, often frustrate organizational communicators (i.e., message senders) with poor success.

Thus, public relations scholars use the implications of the situational theory to advise public relations practitioners first to identify who is likely to communicate with their organization and next to suggest that only those active publics, the subset of population who are interdependent and interpenetrating with the organization, will have strategic potential for the organization (J. Grunig & L. Grunig, 1997). Only these critical segments of the environment possess the potential to maximize opportunities and to minimize threats for the organization (L. Grunig, 1992). Thus, the situational theory of publics logically leads public relations practitioners to selectively identify and invest resources in communicating with active segments of their environment and in building

long-term, quality relationships with the strategic publics without cost-ineffective *random* communication (e.g., *mass*¹-oriented campaigns).

Situational variables. The prime interest of the theory is to account for the dependent variables, *information processing* and *information seeking*. The two dependent variables address the question of who is more or less likely to communicate about some problems of interest. Three independent variables are *problem recognition*, *constraint recognition*, and *level of involvement*. In brief, one becomes active in learning some new information (information seeking) when she or he identifies something as missing in life situations and stops to think about it (problem recognition). When the problem is perceived to be closely connected to oneself (level of involvement), she or he would do something to resolve the problem. However, she or he would feel more or less capable in taking remedial action across different problems (constraint recognition). In case she or he perceives there is an unmanageable obstacle to do something or feels less connected to the problem, even if the given situation were perceived to be serious, she or he would remain passive in communication (information processing) or not communicate at all.

Problems of Communication Theories

While communication theories have advanced our understanding of communication behavior, a majority of communication theorists have focused on communication as information learning or consumption by the audience. This trend has limited the scope of communication research in a number of ways.

¹ Blumer (1966) defined *mass* as heterogeneous and *public* as homogenous. In brief, members of a mass become a heterogeneous collectivity because they turn to the same mass medium or because they share the same demographic characteristics (e.g., living in the same region).

Sender-bias in communication research and its consequences. Paul F. Lazarsfeld coined the term *administrative research* in communication to refer to a series of research programs whose main purpose is to enhance the effectiveness of message senders (e.g., persuading an audience). It addresses questions meeting the sender's communication needs, such as: By which channel, can we most effectively reach our audience? To what extent will a mass-media campaign be counteracted by personal networks among audiences? How can we isolate the effects of a campaign from the influences of audiences' interpersonal communication? (Chaffee, 1982).

McQuail (1997) classified the most common research goals in communication as “measuring actual and potential reach for purposes of advertising,” “manipulating and channeling audience choice behavior,” “looking for audience market opportunities,” and “product testing and improving communication effectiveness” (p. 15). He found the most fundamental division of research purposes exists between *audience control* and *audience autonomy*.

McQuail wrote:

By far the greatest quantity of audience research belongs at the control end of the spectrum, since this is what the industry wants and pays for (Beniger, 1986). Few of the results of industry research appear in the public domain and are consequently neglected in academic accounts of the audience. (McQuail, 1997, p. 16)

In the same vein, most communication literature considers communication something that a source does to a receiver, as something that always originates from the source (J. Grunig & Hunt, 1984). Researchers conceptualize communication behavior mainly as *information consumption*, so that message senders can predict when people are more likely to *buy* or *learn* new information (e.g., information seeking or processing).

Few theorists, especially those who are empirically oriented, delve into communication behavior beyond *information taking*. According to Reeves, Chaffee, and Tims (1982), "Only recently have mass communication researchers begun to question the sender orientation embodied in the set of questions [Lasswell's (1948) who, says what, in which channel, to whom, with what effect?] and to propose new ones." (pp. 287-288). Applied communication fields such as public relations have also shown little interest in the need for studying communicators' voluntary information transmission and selectivity. Recently, there exists a burgeoning interest to better understand information dispersion through personal networks in advertising and marketing communication (i.e., word-of-mouth campaigns, Rosen, 2000; Richins, 1983). Yet, its purpose is originated from a sender's perspective to enhance information taking of new product and service among potential consumers. Most studies about information giving are often fragmented or subsidiary to studies advancing knowledge of effective information learning among communicators.

Why, then, is such a conceptual limitation persistent in the field? This is largely due to the legacy from social learning theory that considers human beings to be targets whose passiveness and ignorance require education and reformation. It looks for a best way to enlighten and educate ignorant masses in a way that the sender defines desirable. From such an asymmetric and limited perspective, we see trees but not the forest in communication research.

This dissertation is meant to restore our conceptual orientation from a fragmented part (information acquisition) to an integrated whole (information acquisition as well as information transmission). The prior fragmentary view of communication behavior

deemphasizes communicants' voluntary acts of information selecting, producing, sharing, and transmitting. It is a consequence of sender bias and adoption of a media perspective. In contrast, the integral view of communication behavior accounts for information taking and giving to explain how communication *roles* (sender vs. receiver) and communication *action* (information giving vs. information learning) have been confounded.

From audience behavior to communicant behavior. Historically, communication researchers preferred the term *audience* in referring to people engaged in *communicative* action. However, equating audience behavior exclusively with communication behavior is an overgeneralization. McQuail (1997) reviewed the historical evolution of the concept of *audience* and concluded, “we keep the familiar word [audience], but the thing itself is disappearing” (McQuail, 1997, p. 2). He pointed out:

Beyond commonsense usage [of the term, audience], there is much room for differences of meaning, misunderstandings, and theoretical conflicts. *The problems* surrounding the concept stem mainly from the fact that a single and simple word is being applied to an increasingly diverse and complex reality, open to alternative and competing theoretical formulation...“what is occurring is the breakdown of the referent for the word audience in communication research from both the humanities and the social sciences” (Biocca, 1988, p. 103) [italics added]. (McQuail, 1997, pp. 1-2)

This is a problem of trying to do too much with one term. The theories adopting the audience concept produce merely phenotypic knowledge to distinguish communicators by “place” (e.g., local media), “people” (e.g., age or gender group), “particular type of medium or channel” (e.g., Internet or cable), “content of its messages” (e.g., subject matter), and “time” (e.g., prime-time vs. daytime audience) (McQuail, 1997, p. 2). Thus, *audience* and *audience behaviors*, the central concepts in studies of mass communication, become misnomers that indicate the “breakdown of the referent” (McQuail, 1997).

Because of the limitation of this conceptual misnomer, communication research remains in a “flatlander thinking” (Abbot, 1952)--failure to think in all dimensions of communication behavior. Without a proper concept, we fail to think outside one narrow area of experience or interest. We cannot perceive the other aspects of communicators beyond the information taker implicit in the concept of “audience.”

In addition, with the limited concept of audience, we miss valuable research questions other than a communicator’s *receptiveness*. We end with knowledge, at best, about how and why audiences behave, not how and why communicators behave. Hence, I propose a term, *communicant*, as a general name for encompassing both *audience* and *sender* of messages. In this newer perspective, *communicant behavior* subsumes audience as well as *sender behaviors* and *recipient behaviors*.

In next section, I will discuss needs and reasons for bringing new concepts of communicant activeness and cognitive entrepreneurship in problem solving. These concepts try to overcome the limited assumption in the studies of communicant behaviors and problem solving.

Communicant Activeness and Cognitive Entrepreneurship in Communication Research

Why do we need to study communicant activeness in problem solving? I selectively concentrate on *communicant activeness*, not passiveness, in studying communicant behavior. Such a delimitation for the concept of communicant behavior is necessary because the human default in communication behavior is *apathy* or *passiveness*, not ardor or activeness. Irrespective of our awareness, human beings are constantly encountering and being affected by life problems. For example, an abrupt hike in tuition fees exhausts my money in the savings account for spring break. Global warming has

gradually increased electricity usage, which affects my utility bills. Election of a certain political figure may increase my taxes. Or, a tsunami may threaten my new house at the beach. The lists of our life problems painstakingly grow and continue. Thus, enlisting and tracking the whole list of problems that affect us is simply impossible. We know that we are less likely to recognize the consequences of some problems until they emerge. It is one thing to be connected with something and another to recognize its presence. When we realize that an almost infinite number of things defines our current state of being, it becomes clear that the human default communicative characteristic is *passiveness*, not activeness. We become active in communication only when we face a life problem that has significant consequence for us.

Communication is a purposeful act, a “tool for solving problems” (J. Grunig, 1997, p. 11). Just as we cannot recognize every problem that exerts influence on our current state of being, we cannot communicate about everything to which we are connected. Hence, the notion that we are lethargic for most of problems is not shameful, but a *modus vivendi* or sustenance mechanism. We have learned this from our evolutionary process. Thus, it is not clever to study about “not doing,” which is uninteresting and hard to observe. Instead, the promise lies in studying about “doing.” Logically, a better way to inquire about communicant behavior is to delimit the scope to how, why, and when we communicate, instead of how, why, and when we *do not* communicate. Therefore, the central concept in this dissertation is the narrow concept of *communication activeness in problem solving*. Communicant activeness is the behavioral alpha and omega of information traffic among social actors. It triggers a social process of problem solving by generating movements of words or symbols among communicants’

minds. I choose to study such *movements* rather than immovable silence so that we can learn better about social process of problem solving.

Next, why is it necessary to study a cognitive approach in problem solving? And why does a cognitive entrepreneurial mindset matter? To answer, I should note that people take different mental approaches corresponding to the kind of problems they have. When they have a problem with which they are not connected or well-trained from past experiences, they enjoy a *mental idleness* in tackling the problem. In other words, we have little need to make extraordinary efforts to solve trivial or solution-ready problems. In contrast, people take a more considered and risk-taking approach when a problem is very important or lacks an easy solution. They find a strong need to be entrepreneurial—extraordinarily hardworking to build a new solution—to return to a default mental idleness. In such instance, we are cognitively effortful in problem solving.

Depending on problem types and our readiness for solution, our cognitive strategy moves from more entrepreneurial to less entrepreneurial. Therefore, a problem solver's cognitive strategy is a variable, not a constant across varying problems. Although we would invest the same amount of cognitive and communicative resources to deal with a problem, our choice of mental approach (e.g., backward or forward reasoning strategy) will result in different problem-solving potentials. In other words, a problem solver's selection of a cognitive strategy becomes a strong predictor for how satisfactory our problem solving will be.

In the earlier version of situational theory, J. Grunig (1968) introduced the term “entrepreneur” to characterize people with extraordinary problem-solving efforts who are

most successful in problem solving. He defined the “entrepreneur” as someone who is actively seeking a solution:

Entrepreneur is defined as “strategic decision maker” who “skillfully manages the resources at his command, which means he is more than a routine manager; he is always looking for the most efficient way of doing things. *The entrepreneur is “rational” not in the sense that he is always a profit maximizer or seeks always to maximize a pre-set goal, but rather in the sense that he recognizes alternative solutions to his problematic situation, evaluates these alternatives, and chooses one of them* [italics added]. (J. Grunig, 1968, p. 4)

Entrepreneurs are the innovators who devise new ways of working out their problems or who adopt new and strange methods in tackling a problem. In general, they are more successful in dealing with their life problems. Hence, theorizing about what an entrepreneurial mindset is and under what conditions people would have more (less) entrepreneurial mindset will enrich our understanding of the human problem-solving phenomenon.

I note that communicant activeness or passiveness is an *extrinsic* behavioral blossom of the *intrinsic* cognitive strategy that one takes within a life situation. That is, communicant activeness is a phenotypical phenomenon reflecting underlying genotypic internal cognitive strategies one adopts in a given situation. For this reason, to study when a communicant takes a more entrepreneurial mindset can also deepen our understanding of communicant behavior. At the same time, the way we deal with information over the course of problem solving should also affect our cognitive approaches in thinking about the problem. Therefore, such bidirectional causal influences should be studied to better understand *how we approach* as well as *how we should approach* problem solving.

To conclude, I delimit the scope of this dissertational study to our cognition and communication. Studying our cognitive entrepreneurship and communicant activeness in problem solving promises a better understanding of *how* and *why* questions in problem solving. Improved understanding of cognition and communication, in turn, will advance the situational theory of publics to a more general theory of problem solving.

Methodology

Theoretically, this study aims to develop new theoretical constructs about our cognitive and communicative features in problem solving and to propose a refined situational theory. The two emerging concepts are set as dependent variables explained by independent variables mostly from the situational theory of publics (J. Grunig, 1997).

Methodologically, this study has two main goals: first to develop reliable and valid measurement systems and second to test the new theory. I thus used a survey to collect data, and this required a relatively large number of respondents who were willing to answer many questions. To meet the need for a large sample size, I adopted a snowball sampling technique, a non-probability sampling strategy, recruiting student participants and their acquaintances in the University of Maryland with exchange of extra-credit.

Generally speaking, non-probability sampling is less desirable because it has severe limitations in generalizing the findings. However, I aimed at theoretical generalizability rather than statistical generalizability. Considering the goal of this study (developing a theory), such choice of data collection can be allowed.

Because this study requires using human subjects, I submitted appropriate documentation to the Institutional Review Board of the University of Maryland. Upon approval, I proceeded to data collection. Throughout the data collection, all the

participants received a full explanation about the title and purpose of the study, their volunteer participation, time commitment, their freedom of withdrawal and right to skip questions, and potential harm and benefits from participation in the study. Participants were neither forced to participate nor to disclose information. Confidentiality was carefully secured. If those contacted student participants refused to participate, they were offered an alternative opportunity for extra-credit.

Significance

This dissertation presents a situational theory of problem solving that highlights distinctive communicative and cognitive features in human problem solving. Its purpose is to provide a simple and useful, but not atheoretical, account of communication behavior and the cognitive approaches that we adopt during problematic situations. This is a significant effort in that it expands and generalizes the situational theory of publics (J. Grunig, 1997, 2003).

First, it is hoped that the emerging theory in this study will contribute to the communication field in general. I theorize communicative action as a *purposive* and *instrumental act* in dealing with life problems. The scope of the resulting theory is to explain human communicative characteristics in *any* life problems. The theory conceptually links communication action with problem-solving efforts we make. Thus, the resulting theory captures not only cognitive and communicative aspects, but also *individual* and *social processes* of problem solving. Those in the communication field have made few attempts to introduce a general theory of communication behavior. This situational theory of problem solving will address that deficiency.

In addition, as discussed earlier, theories and research in communication have often confined themselves to information taking or “processing” in the name of *audience* research (M. A. Hamilton & Nowak, 2005; McQuail, 1997; Chaffee, 1982). I have attempted to overcome such a limited conception in theorizing the new situational theory. Over the course of problem solving, a communicant actively seeks, forwards, and shares, and selects information to be a more effective problem solver. Thereby, unlike audience behavior research, communication behavior in the situational theory is more general—a purposive action by communicant in information transmission, selection, and acquisition dimensions in dealing with problems.

Second, in addition to communicant activeness in problem solving, I theorize cognitive entrepreneurship in problem solving to describe our distinct cognitive approaches toward problem resolution. The theory contains four distinct but correlated dimensions: cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. At times, we adopt a more entrepreneurial mindset. Cognitive entrepreneurship should have implications in applied communication. For example, in risk and health communication, the concept can explain how some interest groups would behave in a particular way and how they cognitively approach their problems. Thus, it is possible to improve public health intervention practice by modifying cognitive characteristics rather than difficult behavioral changes. In political communication, the new concept of cognitive entrepreneurship explains how voters make decisions with electoral information. In public relations, the concept will improve our understanding about how managerial cognitive characteristics in problem solving would affect communication and managerial excellence (L. Grunig, J. Grunig, & Dozier, 2002).

Third, this study addresses several criticisms of the situational theory of publics. For example, Vasquez and Taylor (2001) attacked the STP because it explains little of the “nature, role, and influence of communication” and “marginalized the role of communication process and dynamics” in the emergence of publics and social issues (pp. 149-150). Hallahan (2001) called for more research attention to “issue processes” and “issue dynamics” and communication processes in public relations research. Similarly, Cozier and Witmer (2001) requested a “framework that shifts the locus of analysis to the public’s communicative practices in interactional settings” (p. 618). The new situational theory addresses such calls for new theorizing efforts regarding communication process and dynamics among problem solvers.

Fourth, the new concepts and the situational theory offer several conceptual tools, such as a new typology of publics, predicting problem-solving potential in social conflicts, predicting ethical decision-making styles with a cognitive approach in problem solving, and a more comprehensive segmentation of publics. These are not only practical advancements in public relations practice but also theoretical advancements in that these new conceptual tools are derived from a continuation of theorizing with the situational theory of publics.

Lastly, the situational theory of publics, the parent theory of the situational theory of problem solving, has posed and answered questions such as: What are publics and how do they arise?, With which publics is it possible to communicate and how can one communicate most effectively with each kind of public?, When and why do members of active publics join activist groups?, What communication effects are possible with each kind of publics?, How do activist publics differ from publics that have an intellectual

interest in an issue but do not get actively involved with the issue? (J. Grunig, 1997). The theory emerging from this study complements and refines the answers to these questions. Further, it continues to provide an answer for the “new challenges” that have emerged from the theory-building process (J. Grunig, 1997).

In the next chapter, I will explain the new concepts of communicant activeness in problem solving and cognitive entrepreneurship in problem solving. After the explication, I will introduce the refined situational antecedent variables that will be integrated with the two new dependent variables about cognitive and communicative consequences.

CHAPTER II: CONCEPTUALIZATION

In this chapter, I first introduce two variables, *communicant activeness in problem solving* (CAPS) and *cognitive entrepreneurship in problem solving* (CEPS). The communication field has treated communicants mainly as information takers, and has not studied their information providing and selecting behaviors. The first new variable, communicant activeness in problem solving, addresses this paucity of research by adopting an integrated framework—that is, conceptualizing communicants not only as information takers but also as information givers and selectors—of how people address their life situations. This new variable deepens our understanding about when, how, and why people communicate as addressed by the situational theory of publics (J. Grunig, 1968, 1997, 2005)—i.e., how communication is used as a coping mechanism in problematic situations.

Another variable, cognitive entrepreneurship in problem solving, also inherits the conceptual premise—i.e., *entrepreneurial decision-making*—from the earliest version of the situational theory of publics (J. Grunig, 1968). People in problematic situations take different cognitive approaches toward problem resolution corresponding to their subjective perceptions of a problematic situation. People are more entrepreneurial when they make a decision under some conditions and less entrepreneurial in other situations (J. Grunig, 1968). Because the chosen mental approach results in different outcomes, we need to theorize how people differ in their mindset in dealing with life problems. Although a good descriptive conceptual framework will promise a good prescriptive knowledge to guide better problem solving, there is also a paucity of research to describe different cognitive features in problematic situations. Thus, the new variable, cognitive

entrepreneurship in problem solving, is a worthy theoretical venture to extend our body of knowledge in problem solving.

I next review *under what conditions* people take a certain communicative and cognitive mode of problem solving. For that purpose, the situational theory of publics (J. Grunig, 1997) provides a conceptual and measurement framework. The situational theory of publics proposed four independent variables (problem recognition, constraint recognition, level of involvement, and referent criterion). In conjunction with these four independent variables with the two new communicative and cognitive variables that features different problem-solving approaches, I propose a *situational theory of problem solving* (STOPS). The new theory generates a set of conceptual hypotheses that highlights the theory's utility to the field of communication and public relations.

A MODEL OF COMMUNICANT ACTIVENESS IN PROBLEM SOLVING

Words are also actions, and actions are a kind of words.

Essays: Second Series, "The Poet" Emerson, Ralph Waldo² (1844)

Generally speaking, two generations of researchers have studied communication behavior. The first generation focused on the sender. In market terms, the first generation focused on *information supply* and the *information supplier's interest* about how information should flow (e.g., how consumers behave in responding to different supplying conditions.). Consequently, these researchers conceptualized communicants mainly as a target with varying degrees of receptiveness (information consuming potential) for the message that senders promote. Generation 1 asked "Who says what to whom with which channel with what effect?" (Lasswell, 1948).

² I thank Miia Jaatinen for finding this quote. Jaatinen (1999) cited Emerson's essay in her book, *Lobbying Political Issues: A Contingency Model of Effective Lobbying Strategies*.

In contrast, the next generation emphasized the receiver's point-of-view. Again using the market analogy, this generation attempted to explain communication in terms of *information demand* and *demanders' interest*. It described communicants as active information shoppers who consume information to meet their needs. These researchers asked "Who hears what from whom via what channels for what purpose?" (Chaffee, 1982).

However, neither generation identified communicants as active in *information giving*. They shared a common view of communicants as information takers. The two only differ in how active people are in *information taking*. Both approaches take information giving for granted and thus exclude it in theoretical explanations. Few researchers question why we have to limit our query only to the "audience's learning potentials." Communication theorists by default took the sender's side. They looked curiously at message recipients to increase their receptiveness. However, we can legitimately ask other questions: What would be a general theory of communication behavior that allows communicators as both, not either, sender and receiver under a single theoretical framework? Is it possible to integrate the sender's as well as the receiver's communicative behavior within a single theory? What features are common to sender and receiver that could fit into a single theory?

A key conceptual link to incorporating these two approaches under a single conceptual roof is *purpose of communication*. In both approaches, the communicants, both givers and takers, use communication as a *coping mechanism*. A communicant seeks or disperses certain information for the purpose of problem solving. The contents that drive communicative action can vary, but the use of communication as a coping

mechanism is a constant. The role of communication and the purpose of communicant behaviors are identical in information taking and information giving.

We can conceptually link both sender and receiver by their common purpose. They use communication instrumentally to deal with life problems. People generate and deliver messages (information) to others to solve their problems (e.g., promotional advertising). Likewise, people search for information to solve their problems when they find an absence of relevant information (e.g., reading medical journals). Senders communicate to solve their problems such as persuading people to adopt new ideas, practices, life styles and commercial products, whereas receivers communicate to solve problems such as remedial treatment or about a device to build a solution for their problematic life situations. Both message senders and message receivers share a common identity as *communicants* who consider communication as an instrumental and facilitative mechanism to cope with their life problems. In a nutshell, communication behavior, either giving or taking, becomes *functionally identical*. Hence, it should be possible and useful for us to build a theoretical framework that describes communicants as information givers as well as information takers *simultaneously*. This should lead us to a third generation of communication theories.

A Need for General Look for Communication Behavior

I follow Carter (1973) to define communication behavior as a movement of words or symbols by a person within a life situation. Communication differs from other behaviors in that a person may use it to plan other behaviors but not necessarily connect to other behaviors. Communication is a behavior in itself (J. Grunig, 1976). I began this chapter by criticizing the paucity of communication theories wherein simultaneity of

communicant roles can be housed. A prior approach (J. Grunig, 1989, 2005) segmented publics using the publics' differential responses, such as their differential nature and amount of communication behavior. Previously, the nature of communication behavior has been solely about the nature of one's information taking. I question now why we should limit ourselves to information seeking and processing in defining communication behavior. Whereas communication behavior could vary in terms of *learning* of new facts, ideas, opinions, and attitudes from others, it also could vary in *giving* facts, ideas, opinions, and attitudes from one's own knowledge storage. We can describe communicative behavior via as many dimensions as we want. Then, an important question is what kind of dimensions can help us for the problems we face.

In the following section, I will propose a more general model about communication activeness. The significance claim of that model will be based on the “empirical content of a theory” (Popper, 1999, p. 19). *Empirical content* refers to the class of empirical propositions that can be ruled out by a theory. The empirical propositions should be empirically falsifiable and subject to empirical testing. Thus, a theory contains more empirical propositions—i.e., a theory *asserts more*—takes more potential falsifiability and thus takes more risks. In other words, it is more subject to falsification. Hence, if a theory has passed tests of falsification, it contains a greater amount of empirical content because it has ruled out more empirical observations. A general theory says more, thus, it “can clear up more problems”—“Its explanatory potential or its potential explanatory power is greater” (Popper, 1999, p. 20). It is desirable in this sense to advance a theory with a greater empirical content—a high-content theory (Popper, 1999). By proposing more propositions about communicant

activeness such as information giving and selecting, the new model of communicant activeness should have more empirical content than its predecessor, the situational theory of publics and other communication models of information consumption. Specifically, the propositions in the model of communicant activeness describe not only *when* people learn or consume information, but also *when* people produce and give and *how* they selectively take and give information.

Situational Communicant Activeness

Data, Information, and Knowledge

According to Shannon and Weaver (1949), information is anything that reduces entropy and uncertainty. J. Grunig (1968) conceived of their definition as useful but not valid in that a definition of one construct should not be *what it does* but *what it is*. Instead, he advocated McDonough's (1963) definition as having more merit. According to McDonough (1963), the common term *information* is composed of three components: *data* (unevaluated messages), *information* (data evaluated to apply in a specific problem situation), and *knowledge* (data evaluated for future use in general). Following these definitions, J. Grunig (1968) said that only information and knowledge can reduce uncertainty in a judgmental situation. Information refers to certain data that are judged to be specific and relevant to a given problem situation. All data are candidates for information (or knowledge), but not all data become information unless they prove their applicability and relevance to specific problem solving. In this dissertation, I adopt McDonough's (1963) and J. Grunig's (1968) conceptual explication of information.

A person who recognizes a problem explores the sea of data –i.e., the sea of unevaluated messages—inwardly and outwardly to palliate the perceived discrepancy.

The more one is capable of narrowing the perceived discrepancy by *any* means, the shorter the situation (i.e., the psychological time period of a problematic state) will be. Typically, one initiates an internal search for knowledge that has relevance to a current problem. Knowledge carries over from prior situations to apply to a similar kind of problems. This is “knowledge activation” (Higgins, 1996). When attempted knowledge activation cannot yield an adequate solution, one turns to an external source of knowledge—i.e., information seeking. This is a *knowledge action*.

Knowledge should first be available to the problem solver. Next, the available knowledge is evaluated for its relevance and applicability to a given problem. After it demonstrates sufficient relevance and applicability, it becomes *information* to be applied to a current problem. Likewise, *data* should be available and then evaluated whether relevant and applicable to a given problem. I distinguish data, information, and knowledge so that information is the central concept in a problematic situation. Neither knowledge nor data can be used in itself without an evaluative process for the current specific problem state. Problem solvers judge it by their own subjective criteria, although their judgmental competencies vary.

Communicant Activeness

Communicant activeness in problem solving (CAPS) is a conflated construct to measure communicator’s heightened communicative behaviors by a trichotomic model. I conceptualize the nature of communicant activeness in terms of three domains—the communicative behavioral aspects of information connoisseurship, information outflow, and information inflow. I call them *information selection*, *information transmission*, and *information acquisition*, respectively. I subdivide the tripartite domains of communicant

activeness further into six subdimensions by an activeness dichotomy, *reactive* and *proactive*. This results in the variables of *information permitting*, *information forefending*, *information sharing*, *information forwarding*, *information processing*, and *information seeking*. I hypothesize that the increased level of communicant activeness will result in increased communicative proactiveness in each dimension.

CAPS is a key component of the situational theory of problem solving (STOPS), which provides a set of endogenous variables to be accounted for. Each dimension captures some unique characteristics of communicative activeness that a person possesses when one encounters a problematic situation. The theoretical assumption of CAPS is that we use communication behaviors to cope with problematic situations. To adapt into our never stable environments, communication behavior becomes a way we live as well as operate.

Conceptualizing Communicant Activeness:

Information Selection, Information Transmission, and Information Acquisition

Main Postulate

I delimit the communicant's behavioral aspects to one's information *inflow* and *outflow* and one's *selectiveness*. Such a delimitation does not mean there is no other communicative behavioral aspect, nor does it suggest that other communicatory aspects are uninteresting. Rather, I purposefully select these three dimensions to fill the void in communication research that I feel is most problematic. I refrain from theoretical monism, that there is one best theory to represent the phenomenon of interest. Thus, I advocate ongoing theorizing efforts to construe communicant activeness better.

I first propose a guiding premise about communicant activeness. People use communication instrumentally and purposefully to solve their life *problems*.³ Thus, their instrumental use of communicative acts increases when confronting important problematic situations. The general postulate is: The more one wants problem resolution, the more one's communicative actions will increase. Further:

The more one commits to problem resolution, the more one *becomes selective* in dealing with information, the more one *becomes transmissive*, and the more one *becomes acquisitive* about information pertaining to the problem.

In the following I will elaborate on each dimension of communicant activeness. This will lead to empirical operationalization to build a set of testable measures.

Information Acquisition: Information Processing and Information Seeking

When one faces a problem, he or she starts a process to find a solution. If the problem is recurring, the person would have a transferable solution from prior experience and endeavors to solve it. Hence, once available, one starts an internal retrieval of a prior solution. If the transferred solution fits well into the new problem, the problematic situation will end soon with application of the readymade solution to the problem. In contrast, one may confront a totally new problem with no applicable prior solution. Such a void of applicable knowledge can produce a *meta-problem*, a problem about a problem. If one cannot find an applicable solution, a problem solver will take a longer time and have a harder time closing a problematic state. Then, the problem holder must make extraordinary efforts to build a *de novo* solution. This requires "building blocks"

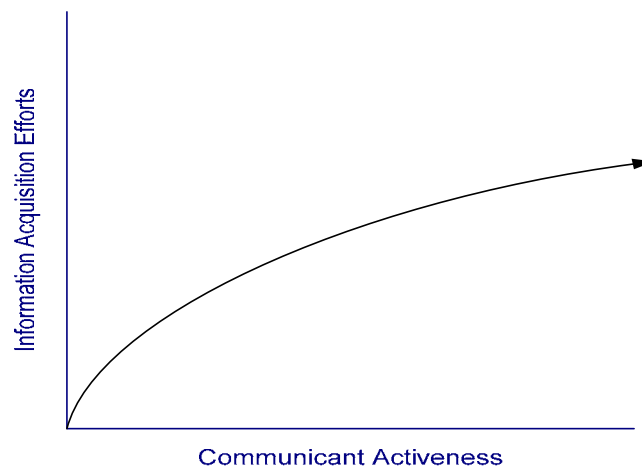
³ I temporarily define problem as a *perceived discrepancy between expected and observed states regarding a domain of experience*. This is a provisional definition. I will fully elaborate the constructs, *problem*, *situation*, and *problem recognition*, in the following section of situational antecedent variables of this chapter.

(Kruglanski, 1989), that is, information relevant to constructing a new solution.

Consequently, one turns to external sources to forage for potentially applicable data and knowledge.

Information acquisition refers to the varying extent of information-collecting efforts for problem solving. In general, the more a communicant becomes active in problem solving, the more one exerts efforts for information acquisition (Figure 1).

Figure 1: Conceptual relationship between information acquisition and communicant activeness.



Specifically, when one feels an urge to deal with a problematic situation, one is more likely to initiate information collecting proactively—*information seeking*. Otherwise, a communicant tends to remain passive and reactive in taking information—*information processing*. The closure of information acquisition efforts corresponds to the increased competence regarding subjective relevance of information acquired in constructing a solution. Once a communicant has built a solution and successfully tested its workability to a given problem, one's competence increases and subsequently decreases his or her need for information.

Information Processing and Information Seeking

J. Grunig (1997) developed a situational theory of publics to “predict the differential responses” such as “responsiveness to issues,” “amount of and nature of communication behavior,” “effects of communication on cognitions, attitudes, and behavior,” and “the likelihood of participating in collective behavior” (pp. 8-9). The amount and nature of communication behavior has special importance in theory and practice in that it solves a critical problem among public communication professionals, that is, who is likely to learn and pick up, not to ignore, the information provided to them. In the situational theory of publics, thus, information processing and information seeking are two dependent variables. The former represents a passive communication behavior, which is “unplanned discovery of a message followed by continued processing of it” (Clarke & Kline, 1974). The latter represents an active communication behavior, that is, “the planned scanning of the environment for messages about a specified topic” (J. Grunig, 1997, p. 9), or “premeditated information seeking” (Clarke & Kline, 1974).

The use of information in problem solving is functionally crucial in problem solving because availability and applicability of the information one possesses determines the likelihood of successful problem solving. As a problem solver has a more serious perception about a given problem, one’s need for more quantity and better quality of information increases situationally. Therefore, the less one perceives a situation as being problematic, the less the person is acquisitive for information about the problem. Information processing characterizes the less active communicants; information seeking characterizes the more active communicants. However, information processing cannot distinguish between active and less active communicants because active communicants are equally likely to discover some message by continued processing of it. In contrast,

information seeking is a communicative characteristic exclusively representing active communicants' behavior. For that reason, active communicants are both high in information processing and seeking, but less active communicants are only high in information processing.

Information Transmission: Information Sharing and Information Forwarding

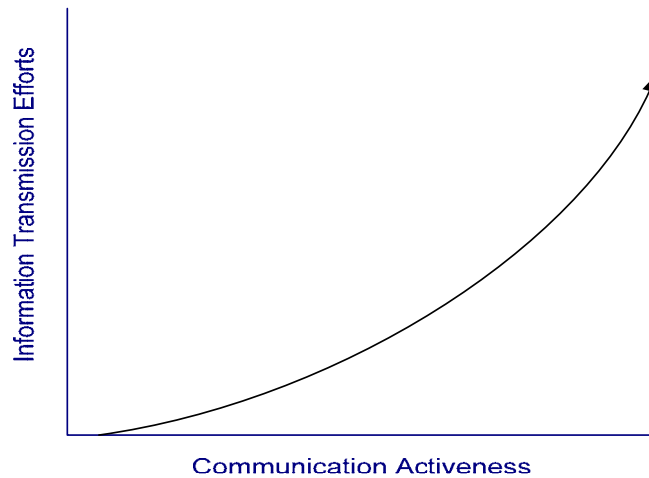
Two dependent variables in the STP--information seeking and processing--have solved many practical problems of public relations practitioners. By the two distinct communication behaviors, the STP helps public relations practitioners identify a group of individuals who are willing to be readers or partners in communicative interactions. However, the STP delimits its scope only to the *learning* aspect of communication behavior. It discusses public activeness more as an *information consumer*. However, there is no reason to refrain from using the STP to think about activeness beyond information taking. Indeed, with the limited scope of thinking about communicant activeness solely as information taking, we delay advancing a better theory about who publics are and what their characteristics are. One promising communicative dimension to extend our theoretical purview in studying publics is information transmission by communicants.

To cope with their problematic situations, people make instant judgments (Bargh, 1996). Making a good judgment requires reliable and applicable judgmental clues and rules for problem solving. Such clues and rules are first sought by the internal inventory check of whether relevant (*applicable*) information or rule(s) are *available* in memory. When requests for guiding knowledge or referent rule(s) are unmet—absence of *knowledge*—people begin to look for external sources, that is, information seeking in the

STP. In reality, however, during this process, problem holders are not only “learning” of *what should be done* but also *educating* others *what would happen* if something is not done and *how much its consequences are as close* enough to have direct effects on them. Such an effort is often captured in some social movement theories as how people get organized or form a group around a common problem. Yet, few communication theories directly conceptualize how it occurs.

Communicative behavior has a central place in the process that connects people to each other not only by collecting and learning related information or solutions for problem but also by providing, provoking, or seeking sympathy for problems. People intuitively and unconsciously realize that a problem becomes easier to solve when it became *a problem for others*. The communication act of *educating* others about a problem is a coping strategy. It forms a collective around the problem. By talking about a problem with others, individuals free their secluded problem. For that purpose, information giving (talking about one’s problem) costs little, but the payoffs are huge. It is a thrifty way to solve a problem by activating information traffic that makes a larger body of people perceive a problem as similarly problematic. It also increases the potential for collective behaviors, such as participating in pressure campaigns, donating money, and engaging in voluntary work for activist events. At the heart of such coorientation toward a problem is *information exchange* among problem holders, especially *information transmission*. In summary, the more the communicant becomes active in problem solving, the more the communicant is likely to transmit information pertaining to the problem (Figure 2).

Figure 2: Conceptual relationship between information transmission and communicant activeness.



Reasons for Information Transmitting

People use communication not only to *learn* relevant information on their way to finding a solution but to *share* the burden of a problem collectively. They also *educate* others about potential harms of and treatments for some problems. Why, then, do communicants give information to others? People use communication to build a solution for a problem as well as to diffuse negative burdens (costs) of the problem ($1/n$, divide the burden into a smaller pieces) and translate the attempted solution into action in the most active case.

We can break down information transmission as *problem forwarding* and *solution sharing*. Active and activist communicants make efforts to spread their perceived problems widely as being worthy of attention from other people. At times, an organization that has negative consequences on its publics has to compete for publics' attention against activist publics (J. Grunig & L. Grunig, 1997; L. Grunig, 1992). Maltreatment of these negative consequences creates angry publics. Those active publics

disperse their problem perception and a self-serving solution to other publics (e.g., media, government officials, courts, other activist groups). Against the activist publics' communicative efforts, the organization finds it difficult to represent its perspective on the problem. Then the organization becomes active in problem solving. It not only seeks information to better explain its perspective, but also gives information it believes best represents its perspective to other publics. We commonly find such information transmission efforts both from publics and organizations.

We initiate and forward the presence of a problem, our own diagnosis of the source of a problem, and a resolution method to stakeholders. Frequently, information giving such as problem forwarding or solution forwarding becomes the act of problem resolution. For example, you may be annoyed by noise every night (problem recognition). Your investigation reveals that the source of the noise is your neighbors upstairs who fight almost every night. A solution would be to ask the neighbors to stop fighting or to call the police to stop the rude behavior. As such, the very act of information transmission becomes a problem-solving behavior. For another example, you may find that smoking smells bad and that your children are coughing as a result. You begin to look for the source of problem and find your neighbor is violating the no smoking rule in your apartment building. You would like to share your trouble with other neighbors who face the same problem by asking whether they are also affected by the smoking. Then, you may put up a "no smoking" sign in the corridor to politely correct the neighbor's misbehavior. You give information of the problem as well as a solution by informing the affected others as well as those who are causing the problem. Information transmission is

a common resort among problem holders. As they learn and build a solution by information seeking, they educate and apply a solution when they face a problem.

Information Sharing and Information Forwarding

CAPS distinguishes two levels of activeness in information giving. A passive information giver *shares* when someone else requests their expertise in problem solving. The information sharer possesses relevant knowledge and decision rules applicable to a problem at hand. The information sharer has acquired knowledge and decisional rules from past problematic situations. In other words, an information sharer is a formerly active problem solver. However, information sharers are less likely to initiate their information giving themselves. Rather, they proffer information only when being solicited by some information seekers. Information sharing is, thus, a reactive communicant behavior.

In contrast, a more active information giver forwards information about a problem even if no one solicited it. An information forwarder is *proactive* in propagating his or her problem perception and preferred way of problem solving. Information forwarders are thus active communicants who exploit communication instrumentally for problem solving by reproducing a similar problem perception and a solution. Thus, information outflow from an information forwarder is voluntary and self-propelled by heightened problem perception. Notably, information transmission evolves from *problem giving* to *solution giving* as a problematic situation continues. At early stages, a problem solver communicates to obtain necessary information to build a solution. Thus, at the earlier phase of a situation, a communicant's information transmission is primarily about

problem sharing and forwarding. At the later phase, however, a problem solver communicates both the problem as well as a solution.

Individual Problem Solver versus Collective Problem Solver

Publics are disconnected systems of individuals experiencing common problems, and they can evolve into organized and powerful activist groups (J. Grunig, 1997; L. Grunig, 1992; J. Grunig & Hunt, 1984). Problem solvers can maximize their problem solving potential and minimize its costs when they are better connected and coordinated in action. In essence, information giving increases connectedness among isolated individual problem solvers. Cross awareness about an extant problem and subsequent behavioral coordination is only feasible through information exchanges regarding problems communicants commonly face. Therefore, we can meaningfully distinguish problem solvers by the extent of activeness in information transmission (active vs. passive giving).

Chwe (2001) explained that whether members of a collectivity have “common knowledge” is the prime mark differentiating between disconnected and connected social groups. *Cross meta-perceptions* about whether members know about their common problem leads a transition from individual problem holder to collective problem solvers. The cross meta-perception of a problem demarcates between “disconnected systems” and connected systems: e.g., I know I have a problem. *I know* she has the same problem. *She knows* I have the same problem. *I know* that she knows I have the same problem. *She knows* that I know that she knows I have the same problem. In other words, coorienting among disconnected individual problem solvers toward a problem will transform

individuals toward connected collective problem solvers if they are aware of common perceptions about the problem they face.

In terms of the coorientation model (J. Grunig & Hunt, 1984; McLeod & Chaffee, 1973; Newcomb, 1953), the levels of individual problem solvers' heightened *congruency* (i.e., the extent to which each person thinks the other persons' idea or evaluation is similar to one's own) and *accuracy* (i.e., the extent to which one person's perception of the other persons' idea or evaluation approximates the other person's actual idea or evaluation) is a necessary condition to form a social collectivity in problem solving.

Importantly, communication behaviors among problem solvers are the only way to increase common knowledge (*congruency* and *accuracy*) among publics. Specifically, voluntary information transmission about a *problematic state* and the following *cross-awareness* of knowing each other's meta-perceptions regarding the common problem is the primary mechanism that allows separated individual problem solvers to transform into interconnected and coordinated collective problem solvers. To summarize, if a communicant becomes active in the task of problem resolution, he or she is likely to make more effort in information transmission. Specifically, when one commits to solving a problem, he or she is more likely to initiate information transmission proactively—*information forwarding*. In contrast, if less motivated to problem resolution, a communicant tends to remain passive and reactive in giving information—*information sharing*. The heightened likelihood of each problem holder to share and forward information about a given problem increases the collective problem-solving potential among disconnected individual problem solvers.

Information Selection: Information Permitting and Information Forefending

Communicants tend to develop certain preferences in their “usual diet of information” (Case, 2002, p. 93). Festinger (1957) and Hyman and Sheatsley (1947) were forefathers of research on communicator selectivity. Since then, social psychologists and communication researchers have done ample studies about selective exposure. Although communication selectivity has attracted many researchers, findings are often controversial (Frey, 1986; Sears & Freedman, 1967). Putting aside all the hubbub around selective exposure, I conceptualize *information selection* as a situationally evolving human *communicative feature*, not only to cope with *the problem* of “cognitive discrepancy” reduction (Carter, Pyszka, & Guerrero, 1969) but also to cope with *the problem of* “information reduction” (Evans, 1989, p. 112) that is a *meta-problem* to a communicant. Past researchers have explained that selective attention or exposure occurs when people attempt to solve a problem of cognitive dissonance (Festinger, 1957, 1964) by taking information in a *selective* manner (i.e., *avoid* dissonant but *approach* consonant information).

I am dissatisfied with the default dissonance reduction mechanism that consists solely of avoiding dissonant information or seeking consonant information (Festinger, 1957, 1964). Avoiding dissonant information and seeking consonant information are two ways, but not the only ways, to reduce an internal state of dissonance. In general, through information behavior, communicants can reduce dissonance in two ways. One is a *revising expectation* strategy. Problem recognizers—who find a discrepancy between expectation and current observation—may *modify* their *expectation state* (e.g., “conjectural knowledge” Popper, 1963) to reduce the *perceptual distance* (e.g., the extent

of departure from an anticipated state) by approaching to relevant information and by avoiding irrelevant information.

The other is *reinforcing expectation* strategy. Problem recognizers may *modify a current observation state* by avoiding dissonant and/or seeking consonant information. Here, in *any* strategy, a communicant's information selection will occur given that the communicant is highly active in problem solving. To resolve dissonance, one has to discriminate between irrelevant and relevant information. This requires communicants to weigh available information. Specifically, one could reduce a dissonant state either by *weighing reinforcing* information to modify a problematic expectation state (i.e., dissonance reduction by deflecting observation that is a *pseudo* problem-solving strategy) or by *weighing reforming* information to modify a problematic observational state (i.e., *genuine* problem-solving strategy).

Past studies in selective communication did not use such a general conception of dissonance reduction strategies. In the former reinforcing expectation strategy, communicants tend to seek and forward any information that is *subjectively relevant* to reinforce prior expectation. In the latter, revising expectation strategy, communicants tend to seek and forward any information that is *relevant* to revision or refinement of content of prior expectation.

Also, I put emphasis on *selective interpretation* and *selective production* of information in addition to selective access, processing, or exposure. I conceptualize information selection to include not only selective information taking and giving (i.e., specific *information* pursuit) but also selective *interpretation* of information (i.e., specific *interpretation* pursuit). At times, communicants have low control in processing certain

unpalatable information (e.g., a TV news program). At other times, communicants have sufficient knowledge or confidence enough to face and tolerate distasteful information. Further, communicants may systematically seek dissonance-arousing information (e.g., a communicant who anticipates a discussion with opponents).

Finally, selective communication often occurs among communicants who need to *reduce information* during a problematic situation. As a result of heightened communicant activeness in problem solving, communicants tend to accumulate a vast amount of potentially *relevant* information, more than they were able to manage. At some point, communicants face a problem about problem solving—i.e., managing an adequate information pool while considering the tradeoff between quality and quantity. Whereas communicants will take any information related to the problem at an early stage of problem-solving efforts, they begin to collect information discriminately at later stages. In sum, communicants situationally evolve from *relation seeker* (e.g., taking and giving any information related with the problem) to *relevance seeker* (e.g., taking and giving only information relevant to the problem solving) in their communication behavior. Trafficking information—i.e., information inflow and outflow—is more and more under the guidance of certain discriminatory judging criteria as communicant activeness increases. The more one becomes an active communicant, the more one becomes a relevance seeker.

In summary, information selection occurs either to solve *the problem of cognitive discrepancy reduction* (i.e., *problem*) or to solve *the problem of information reduction* (i.e., a *meta-problem* in dealing with a problem). In *both* cases, communicants use *information selectively for problem solving* (i.e., *to reduce cognitive discrepancy or to*

reduce information). In any instance, a communicant becomes increasingly more of a *relevance pursuer* whose perceived relevance is *subjectively defined* corresponding to changes in one's situational perceptions. At one time, communicants may avoid some information-causing discrepancy as *irrelevant* (i.e., because one feels that information conflicting with a prior belief is wrong and unworthy) and approach agreeing information as *relevant* (e.g., because information bolsters one's confidence that a prior belief is appropriate and valuable) to the discrepant state.

At another time, the same communicants may approach discrepant information as *relevant* (e.g., because one feels that information conflicting with a prior or present belief is useful to revising old beliefs) and ignore or avoid information confirming prior belief as *irrelevant* (e.g., because one feels that information supporting prior belief has little use in rescripting an old belief). In all cases, the communicant becomes a *relevance pursuer*, corresponding to the communicant activeness and to the amount of information available.

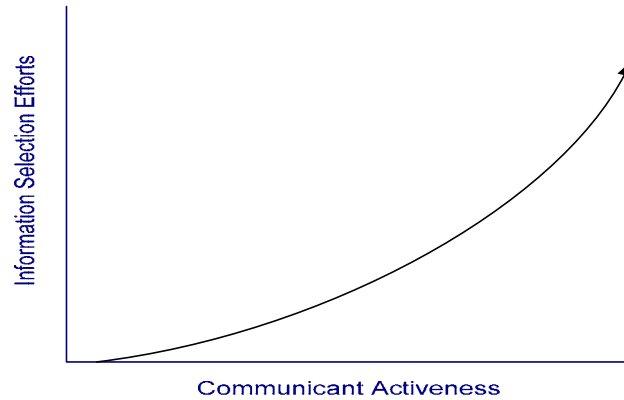
In taking, interpreting, and giving information, communicants tend to develop some *discriminatory rules* about what kind of information is relevant in the current task of problem solving. Thus, communicants solve a meta-problem (i.e., a need for information reduction) by situationally evolving from a *relatedness pursuit* to *relevance pursuit*. In either case, information selection results from a *self-defined notion of relevance* in solving a problem (i.e., a need for cognitive discrepancy reduction) or a meta-problem (i.e., a need for information reduction). Before I conceptually explicate what I mean by information selection, a brief review of those issues in studying selective communication is required.

Problems in Studying Selective Communication

In the literature, almost without an exception, researchers have discussed communicant selectivity only in terms of selectivity in information collection and recollection—i.e., selective retrieval of internal memory or selective search for an external pool of information. There are few, if any, attempts to extend the scope of human information selection beyond information acquisition. The common terms referring to studies in selective communication are *selective exposure*, *selective perception*, or *selective communication*. These studies narrowly focus on passive information consumption. Selective communication studies have their roots in dissonance theory and Heider's (1958) balance theory. Its main assumption is that people tend to avoid dissonance-arousing information while looking for information reinforcing current beliefs, opinions, and decisions.

Putting aside whether selective information processing or seeking is empirically tenable, I question why we limit selective communication to selective exposure. I alternatively suggest that we should study selective communication in terms of selective information giving as well. Such selectivity in information giving can introduce important knowledge to explain individual and collective problem-solving processes (e.g., via what mechanism an extreme view reproduces itself among active publics). Thus, the conception I propose here supplements, rather than supplants, previous studies regarding communicative and cognitive selectivity with a general theoretical frame. I here propose that the greater communicant activeness, the more the communicant becomes selective in information acquisition as well as in information transmission (Figure 3). In the next section, I will discuss the issues in selectivity research.

Figure 3: Conceptual relationship between information selection and communicant activeness.



Selective processing, selective production, and selective propagation. As briefly mentioned, there is a paucity of literature on the phenomenon of selective communication as both acquisition selectivity and transmission selectivity. Thus, I raise the question of why we do not see selectiveness in terms of information production and propagation. Past research has invariably focused on the learning aspects of human information selectivity, namely, selective exposure.⁴ In his classic review of selective exposure to information, Frey (1986) surveyed the scope and history of selective exposure research up to that date. However, even his exhaustive review of informational selectivity remained exclusively within a notion of “selective exposure to information”—i.e., information inflow—with no consideration of information outflow (Frey, 1986). Such a narrow focus in communication research programs has its origin from the sender-oriented research paradigm (e.g., to increase audience susceptibility to educate or persuade target recipients

⁴ Chaffee, Stamm, Guerrero, and Tipton (1969) noted that selective exposure has some problems: “at any rate, it is impossible to distinguish between these two kinds of behavior in that study, so the more inclusive term selective exposure is used, to indicate that selective behavior of either type is under observation” (p. 17).

as a message sender intends). Thus, conceptual balance in a subsequent review of selectivity is necessary to get generalized lessons from past studies of selectivity.

In addition, the inconsistent findings in selective exposure studies have suggested that researchers should consider selectivity in terms of “information evaluation” (Sears & Freedman, 1967; Feather, 1963) or selective interpretation. Often, information media allow little control for communicants in processing messages. Chaffee et al. (2001) noted that selective attention is not empirically observable from the less controllable media such as newspapers and television (news program and television political ads). As they summarized well, these media sources “offer balanced coverage” and “certainly some exposure to both sides is unavoidable when watching or reading news” (p. 263). Thus, audiences have “little opportunity to avoid counter-attitudinal information” (Chaffee et al., 2001, p. 264).

Instead of viewing selectivity solely as selective processing, it would be theoretically more promising to take selective communication as not only selective processing under some conditions (e.g., more constrained or presence of strong decision rules) but also selective interpretation. Indeed, people processing identical information reach starkly different conclusions. For example, voters who watched the same TV presidential debate often conclude that their preferred candidate has won the debate. This suggests that communicants resist, modify, and translate information they are processing in a way consistent with their internal rules and beliefs. Hence, information selectiveness not only comes in the way of selective processing (*de facto selectivity*) (Sears & Freedman, 1967) but also takes the form of selective interpretation or selective production. In addition, selective interpretation of some information results in selective

propagation through communicants' networks (e.g., if an active communicant processes and interprets information in a selective manner, she or he would also discharge it to others in that way). In the present study, I develop such a general conception of information selectiveness to include selective processing, selective interpretation, and selective transmission of information.

Postdecisional selectivity versus predecisional selectivity. In his cognitive dissonance theory, Festinger (1957, 1964) identified different effects from dissonance. The most dissonance is aroused *after a decision is made* because counterfactual decision alternative(s) are missed; and thus dissonance is easier to observe. To reduce *postdecisional internal negativity* (i.e., dissonance), one type of selectivity deals with information—i.e., uses a “confirmatory strategy” by favoring information supporting one’s already made decision and/or by *avoiding* information challenging that decision. Frey (1986) summarized:

The general hypothesis was that the search should differ according to whether it occurs before or after the commitment is made. Prior to a decision, people should be relatively unbiased in their seeking and evaluation of information. Once the decision has been made, however, selectivity sets in: People search for decision-supporting (consonant) information and avoid decision-contrary (dissonant) information. This same bias is evident as well in the manner in which people evaluate the information found: Items of information that support the decision are often considered to be more credible and reliable than contrary information. (p. 44)

Festinger (1957, 1964) and Frey (1986) said that selectivity could be observed in “postdecisional” processing, assuming that it cannot be observed in *predecisional* processing. However, Brownstein (2003) examined many studies conducted since Festinger’s (1964) dissonance theory was developed and suggested that there *may* be a “biased predecision processing.” According to Brownstein (2003), biased predecision processing may happen “when decision makers restructure their mental representation of

the decision environment to favor one alternative before making a choice” (p. 545). Specifically, this bias related to a selective information search that “favors one alternative, or reevaluation of alternatives, in which one alternative is bolstered and/or the others denigrated until the choice becomes obvious” (Brownstein, 2003, p. 545). Review of relevant research on theories of cognitive dissonance and selectivity (e.g., studies about choice certainty or motivated reasoning) led him to favor, despite some disfavoring findings, the empirical presence of predecisional selectivity.

I take a position that we can observe selective information behavior *either* in predecisional or postdecisional processing. We frequently encounter a problematic situation wherein we hold a strong *preference* for or *avoidance* of a certain outcome state (e.g., curing my beloved one’s disease). It often leads us to *selectively pursue* information that can enhance our subjective confidence and sustain hope for the desired end. At times we selectively forage for information to increase self-fulfilling confidence while suspending a final judgment (predecisional selectivity). At other times, we selectively collect information to reinforce a previous conclusion (postdecisional selectivity). Communicant selectiveness regarding information behavior, therefore could occur, either in a predecisional or in a postdecisional way.

Reinforcement account versus relevance account. Freedman and Sears’ (1965, 1967) reviews of selective exposure studies resulted in a serious pessimism about cognitive dissonance theory because it had failed to generate empirical support to meet its theoretical claims. Sears and Freedman (1967) pointed out: “It is enough to say that the results [from testing hypotheses derived from cognitive dissonance theory] are again equivocal” (p. 208) and “there is no consistent result in this research” (p. 207). Feather

(1962, 1963) found that smokers were more interested in both consonant and dissonant information than were nonsmokers. Brock (1965) failed to find clear support for selective exposure in his partial replication of what Feather (1962, 1963) had found. Freedman (1965) even found a strong preference for non-supporting information among those who experienced dissonance.

Sears and Freedman (1967) reviewed this literature and concluded that:

... a considerable amount of experimental research has uncovered no general psychological preference for supportive information. Under some circumstances, people seem to prefer information that supports their opinions; under other circumstances, people seem to prefer information that contradicts their opinions. In no way can the available evidence be said to support the contention that people generally seek out supportive information and avoid nonsupportive information. (p. 212)

However, Sears and Freedman (1967) also noted the existence of some “de facto selectivity.” “Most audiences for mass communications apparently tend to over-represent persons already sympathetic to the views being propounded, and most persons seem to be exposed disproportionately to communications that support their opinions” (p. 212). They took it as “paradoxical” and questioned: “How can it be that people are in fact selective, yet display no trace of a general preference for supportive information?” (Sears & Freedman, 1967, p. 212). More recently, Chaffee et al. (2001) found that selectivity increases both in “counter-attitudinal” and “attitude-consistent” directions if a communicant becomes active for a problematic situation. The prediction of the direction in which one’s selectivity moves is inconsistent in their views. In brief, Chaffee et al. (2001) tested and found some support for the conclusion that the more people are involved, the more information they seek in both directions.

Earlier, Carter, Pyszka, and Guerrero (1969) presented strong experimental evidence that selectivity can be in an opposite direction. They found from three experiments that whereas there was equal selectivity under a control group, two-thirds of the participants in a “dissonance” condition chose to read an essay countering their favored position as the personal relevance increased. Carter et al. (1969) interpreted that result as suggesting that dissonance should be reformulated “simply as perceived cognitive discrepancy” so that avoidance would just be one possible communicative reaction *en route* to discrepancy reduction. This finding tells us the concomitant presence of “reversal” selectivity with confirmatory selectivity, unlike what dissonance theory had suggested. Dissonance theory adheres to the notion that “preservation of current belief” is the only communicative goal in a dissonant situation (i.e., a pseudo problem solving). In contrast, what Carter et al. (1969) suggested was more general. At times, preservation of current beliefs *can become irrelevant* if one’s perceived involvement with a problematic state is high. Under such a circumstance, one would perceive the revision of current beliefs as more *relevant*. At other times, preservation of current belief would be more relevant for situational reasons (e.g., high constraints against embarking on problem-solving efforts) and thus looking for information increases confidence in one’s current beliefs.

Unlike the prior reinforcement account, Carter et al.’s (1969) relevance account better explained why some selective communication happens. Its major premise is: Communicants select some information over other information because of its subjectively defined relevance. *Subjectively defined relevance* in using information suggests that one’s judgment about information relevance depends on whether the communicant finds some

utility after due consideration of problem-solving conditions (e.g., constraints).

Subjectively defined suggests that the perceived relevance by the communicant could be fairly different among communicants even if they have the same problem.

One would attribute such results to personal bias, perceptual distortion, or overestimation of situational constraints. However, a given communicant's judgment is the most important, no matter how biased it is, because one translates one's perception to action. What matters is the value defined by the eyes of beholder. Thus, at one time, a communicant would avoid dissonant information, not because it is unbearably dissonant, but because the person felt it is less relevant to the task of problem solving. In other cases, one would approach some dissonance-causing information because he or she felt it is more relevant to his or her effort to solve a problem. I adopt the relevance account as a more general explanation for selective exposure. In contrast to the reinforcement account (e.g., dissonance theory), relevance explains not only the old findings but also explains other selection types such as *reversal* selective strategy.

The relevance account thus becomes a *general* explanation. Whereas cognitive dissonance theory adopted a reinforcement explanation, the present study will use a relevance explanation wherein reinforcing and revising strategies can be explained by a single account. It allows that a communicant can reduce discrepancy *via any* method—i.e., by *pseudo* problem solving (e.g., selective exposure to reinforcing information) or by *genuine* problem solving (e.g., selective exposure to reforming information).

Whereas selective attention is a more ethereal approach to reducing a dissonant state (e.g., by deflecting one's perception of environmental conditions), the problem solving approach is a more material approach to reduce perceived discrepancy

permanently (e.g., by bending one's course of action to fit into environmental conditions). However, both approaches are functionally equivalent in reducing cognitive discrepancy. That is, the information one selects plays the role of augmenting subjective confidence either by strengthening a current belief (attempted solution) or by constructing a new belief (attempted solution).

However, the reinforcing approach is a *self-fulfilling strategy* resulting from situational constraints and/or from a self-serving referent criterion (i.e., wishful or willful thinking on the outcome state). On the other hand, the revising approach is a more *self-reforming strategy* through which communicants are free from situational constraints and have less of a self-serving referent criterion. The choice of a problem-dealing strategy is closely associated with the extent of constraint recognition and strength and type of referent criterion.

In both cases, communicants travel the path from general to *specific*, from random to *systematic*, and from related to *relevant* in dealing with information corresponding to the level of communicant activeness. A communicant's heightened situational motivation toward problem solving orients one to be more selective—i.e., to pursue a *specific subset of information* to fit into the specific characteristic of the given *problem content*. The *content of a referent criterion*, *its magnitude of influence*, and the *extent of situational constraints* explain the type of information specificity. For example, if one's problem is to anticipate a political discussion with opponents, he or she would use a revising selectivity to better attack an opponent's view and defend his or her own view. If one has unmanageably high situational constraints in a given problematic situation (e.g., presence of another urgent problem), he or she would use a reinforcing selectivity. Or, if one has a

strong decisional reference readily applicable to the current problem (e.g., knowledge carried from past problem solving of a similar kind), he or she would again use a reinforcing selectivity.

To summarize, some situational parameters such as referent criterion and constraint recognition jointly lead communicants to be more or less selective as well as to turn to specific directional information in a given problematic situation. Thus, one who is devoted to a position would situationally pursue more countering information regardless of the current stance one favors. The same person could be a partisan pursuer of information who only keeps cognitive poise under serious commitment to a priority. However, at any rate, the strict and exclusive association of selective directionality with only avoidance of dissonance and only preference for consonance, as dissonance theory predicts, is theoretically and empirically less tenable.

Emerging Communicant Selectiveness during Problem Solving

It is easy to be open and generous in taking information when we feel little connection (e.g., a small stake) to an issue the information is about. However, we tend to develop some needs and find a certain method to discriminate information when it begins to interrupt one's routine commitments to other life problems. People without much of a stake either become generous and open-minded or less caring and indiscriminant about information that comes in and out of their minds. They feel little difficulty in permitting any position, opinion, or information to enter unless they perceive something being problematic.

In contrast, people with high stakes (e.g., highly motivated people) need to develop a more sophisticated understanding and thus scrutinize the influence of

information more carefully (positive or negative, supporting or refuting). Thus, they often become selective as a result of increased seriousness of a problem. Notably, when people become more active in problem solving, most communicants find it difficult to allow *any* information to enter their minds. Although we know that being open to take, interpret, and give information is more desirable in problem solving, various reasons (e.g., too much seemingly important information) prohibit us from remaining open and generous in dealing with information. Thus, selecting a manageable subset of useful information out of *would-be* useful information is a necessary but challenging task to communicants.

Perrow (1989) observed what an active researcher—who is a problem solver—often does in taking information during research:

I require libraries to *hide* most of the literature so that I will not become delirious from the want of time and wit to pursue it all. There is just too much material. The problem is not access, it is the reverse, containment... Were I now to browse the stacks... I would drown, or panic, and certainly lose my way. (pp. 29-30; as cited in Case, 2002, p. 94)

Perrow (1989) confessed that when he needs books and articles, he “send an assistant to get it so that he will not be distracted by adjacent materials” (as cited in Case, 2002, p. 94). He wants the assistant to keep him away from the literature in the areas he is researching, despite some potential relevance, which he thinks might be redundant and low in quality. Such “nonuse” (Wilson, 1996) or “filtering” (Case, 2002) commonly expedites, rather than distracts, from a given problem solving process.

Similarly, Wilson (1995) observed and advocated efficiency and rationality in filtering out information—a “nonuse policy”—that is necessary when one is given more information than one could absorb (Wilson, 1995, pp. 45-46). To avoid being engulfed by

a large supply of relevant information we make and apply rules in managing the information we face. Perrow (1989) added a similar observation:

Large literatures may be cut down drastically: one may ignore the past, ignore “foreign” contributions, ignore contributions from identifiable schools and traditions of thought...ignore work done with certain techniques or in particular styles or with particular approaches (p. 199; as cited in Case, 2002, p. 95)

Throughout problem solving, communicants tend to create some discriminatory rules to guide judgments that will be included and excluded. Case (2002) sharply distinguished such information “filtering” from “avoidance.” Information is often “not avoided but rather simply not *used*” (Case, 2002, p. 95). Although using discriminatory rules could lower the quality of information, it can, at least, solve the problem of information overload—a meta-problem of problem solving. In summary, as a communicant becomes active, information selection or specification is heightened. In the following, I will discuss more closely sources, types, and strategies of communicant selectiveness.

Defining information selection. Communicants with some heightened situational need for information soon would face another problem. Because active foraging of data often results in a huge pile of information that would surpass one’s cognitive capacity and cognitive capability (Kruglanski & Thompson, 1999), managing information effectively to build a solution to the problem is a meta-problem one must deal with. As Evans noted (Evans, 1989; Evans & Over, 1996), one often must reduce an overwhelming amount of candidate data in the problem solving task. Indeed, just as the absence of available knowledge is a serious problem, the abundance of available knowledge is an equally challenging problem—i.e., the embarrassment of riches. Hence, I conceptualize the problem of information reduction as another source of communicative selectiveness that

communicants use in taking, interpreting, and giving information. In summary, during a problematic situation, there is a tradeoff between quantity and quality of *would-be* information. As the available pool of data increases, a need for *related* and *more* information turns into a need for *relevant but less* information—a *contradictory* need for a narrowing down mechanism.

Naturally, we carry out information taking, evaluating, and giving “in a highly selective manner using some form of heuristic process” (Evans, 1989, p. 112). We adaptively opt for a strategy of selective search to increase the range of viable alternative solutions. In the present model, therefore, I define *information selection* as the degree of *pursuing specificity* evolving from *random* to *systematic*, from *general* to *specific*, and from *related* to *relevant* in dealing with data corresponding to a communicant’s activeness. The two general sources of communicant selectiveness arise from the problem of reducing cognitive discrepancy and/or the problem of reducing a surplus of information in problem solving.

Selection types. I use the terms, *information selection* and *information specification*, interchangeably in this study. By *information specification*, regardless of its valence (i.e., counter to or consistent with current belief), I mean that a communicant becomes selective if one *develops some preference for a certain subset of information* in pursuit of problem resolution. Communicants develop more confidence in some subsets of information. The direction of information a communicant will pursue (e.g., avoiding or seeking dissonant information) is associated with type and magnitude of referent criterion as well as the level of constraint recognition. However, in the current model of communicant activeness, predicting direction of information specificity (i.e., selectivity

expressed either counter to or consistent with current belief) matters less than predicting the magnitude of information selectivity. Regardless of the direction of information selectivity, we can impose a single conceptual dimension of the extent of selectiveness to the direction of information selectivity.

In other words, I conceptualize *reinforcing selectivity* (i.e., what dissonance theory predicts) and *revising selectivity* as being *functionally equivalent* in reducing cognitive discrepancy and the amount of information. Communicants at times prefer supporting information while avoiding nonsupporting information; at other times they prefer nonsupporting while avoiding supporting information corresponding to their choice of problem solving approach. What then is common around such contradictory tendencies is the *pursuit of specificity* of certain information over other information, which depends on the communicant's own meaning and definition of *relevance* for the given task—problem solving.

The direction of content material can be attitude-consistent or attitude-inconsistent, but the *magnitude of specificity* in preference or avoidance is conceptually identical. Just as pro-life and pro-choice activists can fall into a single variable of activeness or partisanship, the degree of pursuing specificity in taking and giving information can merge the duality of contents (e.g., seeking supporting vs. seeking nonsupporting information) into a singular concept—i.e., information selectivity. Hence, we can reinterpret the contradictory tendencies as a common way such that the more active the communicant is the more one becomes selective or specific in consuming and sharing information with others. In other words, there is no reason to view selectivity as patently associated with “a general preference for supportive information” only (Sears &

Freedman, 1967, p. 212). Rather, communicants develop a need for pursuing specificity in whatever way they perceive to be *subjectively relevant*, either to reduce cognitive discrepancy or the amount of information.

After divorcing direction of selectivity from magnitude of selectivity, we can develop a more general concept of communicant selectiveness in dealing with information. This is a good way to solve the paradox: “How can it be that people are in fact selective, yet display no trace of a general preference for supportive information?” (Sears & Freeman, 1967, p. 212). When we stripped the direction of selectivity from the presence of selectivity, the paradoxical two conclusions (i.e., contradictory empirical findings regarding information selectivity) noted by Sears and Freedman (1967) can be reconciled. If a communicant decides to revise a prior expectation, he or she would ignore information consistent with beliefs or pursue information countering beliefs because it is more relevant to the situation. If a communicant decides to reinforce a prior expectation, he or she would pursue specific information reaffirming current belief because it is relevant to meeting the goal of problem resolution. Because such a need for specificity arises situationally, one crucial question is: Under which conditions does such selectivity in communicant behavior arise.

Selection strategy. Once a communicant finds he or she has an important problem but does not have adequate knowledge internally, he or she starts an external search to find a workable solution to the problem. In general, at earlier phases of problem-solving efforts, communicants adopt an *adding strategy*. By an adding strategy, communicants attempt to *collect any information* that is *perceived to be related* to the problem. By using an inclusive strategy that selects information indiscriminately, communicants can

generate copious amounts of potential information in a relatively short period of time. In terms of goal concepts, this suggests that in earlier phases, the most important goal after recognizing a serious problem is to build a solution. However, when a person finds a shortage of relevant knowledge, it creates another problem of problem solving. This meta-problem thus creates a subordinate goal of gathering information applicable to finding a solution.

To provide enough information grist for the cognitive mill, communicants will forage for as much potentially useful information as possible. Again, in terms of goal concepts, this task is a meta-goal or instrumental goal that facilitates the achievement of the superior goal—problem solving. However, at some point, problem solvers encounter another kind of meta-problem. By using an inclusive strategy, communicants tend to pass through a threshold of adequate would-be information. Problem solvers find it increasingly difficult to manage the information pool they collect. It then taxes the problem solver's cognitive capabilities enough to threaten the investment of cognitive resources to the primary goal—problem solving. Hence, at a later phase, communicants begin to adopt a *removing* strategy that takes information only when it is relevant—i.e., an *only if* strategy.

To solve a new meta-problem of *information inflation*, one starts to reduce cognitive complexity caused by earlier covetousness in acquiring information. To illustrate with goals concepts, two situational goals begin to compete in recruiting necessary *cognitive resources* for meeting goals at a later phase of problem solving. However, the meta-goal or instrumental goal must yield its demands for cognitive resources (which is natural consequence of earlier covetousness) to the primary

situational goal, problem resolution. Hence, as a compromise, a communicant shifts one's informational behavioral strategy from *increasing complexity* of the cognitive pool—by increasing *quantity* of available information— to reduction of cognitive complexity by being miserly and stringent in selecting information to be added. Communicants thus become more aesthetic and selective—connoisseur-like—as they pick up information *only if* it meets certain criteria. In other words, communicants now seek *cognitive competence* in problem solving rather than *cognitive complexity* that is subsidiary to the primary goal of a situation. The rule that emerges in communicants' minds is that discriminating information should change from *vaguely alluding* to *specifically referring*, from *randomly encountered* to *systematically located*, and from *remotely related* to *closely relevant*.

In summary, problem solvers pursue *available* information at the earlier phase, whereas they pursue *applicable* information at the later phase of problem solving. A judging criterion evolves during a problematic situation. It in turn guides subsequent information acquisition and transmission toward resolution of the problem. This explains why information selection occurs in the continuum toward higher communicative activity—i.e., the higher communicant activeness, the greater selectivity in communicative actions (information acquisition and transmission).

Information Permitting and Information Forefending

An active communicant exhibits selectivity not only through selective intake and outtake of information but also by selectively interpreting and producing information. Specifically, information selection will be observable in selective *consumption*, *production (or interpretation)*, and *propagation* of certain information that fits well into a

referent criterion a communicant holds for a problematic situation. I break down information selection conceptually into two distinct states of communicative activeness. The higher state of information selection is *information forefending*, the lower state of information selection is *information permitting*. Forefending information means advance or prior warding off or resisting information. These are parallel to the proactive (more active) and reactive (less active) information acquisition (information seeking and processing) and information transmission (information forwarding and sharing).

In taking and giving information pertaining to a problem, communicants tend to forefend the scope of information as the level of communicant activeness rises. I define information forefending as an active communicative feature of information selection. As a problematic situation continues, some forethought or discriminatory referent criterion emerges whereby communicants solve problematic situations by reducing cognitive discrepancy or information. In other words, the more active a communicant within a problematic situation, the more one develops some forethought in evaluation of *data* to construct a solution (i.e., external *data*→information) and in evaluation of *knowledge* to give out to other communicants (i.e., internal *knowledge*→information). The forethought or discriminatory referent criterion helps communicants organize the search process for related information and to sort out the irrelevant from the relevant. It not only provides some preliminary familiarity with data that will be evaluated but also provides an organizing frame wherein a wide but related range of information can be hosted.⁵

⁵ A need for forethought arises from information abundance—i.e., active communicants tend to have *more information sources* and thus *more cognitive knowledge* available. An active communicant's decision and solution building derives from the "composite of all information" they learn (J. Grunig, 1997, p. 25). To make a decision and to compose a solution, thus, an active communicant develops a strong need for an effective reduction mechanism. Some evaluative lens or referent criteria evolve therefore.

Whether a communicant applies a discriminatory criterion in judging the value and utility of available information depends on his or her preconscious and conscious cognitive processes. The process could be preconscious if one has brought a strong decision rule, or guiding principle, carried from prior situations, or a strong desire for an end state (e.g., parent's willful thinking to cure one's ill child). In such instances, he or she will use the decision rule to evaluate the relevance of given information without consciously evaluating. At other times, communicants would not have such a cross-situational decision rule or guiding principle—encountering a problem requiring a novel solution. As a result, one has to deal with more information and thus find a need to reduce it to expedite the process of problem solving. Hence, as the problematic situation continues, communicants tend to better train themselves in evaluating the utility of information by developing a set of criteria (e.g., reliable sources, topics, or content areas) to distinguish and sort out the influx of candidate information.

In contrast, communicants tend to not discriminate information if they are not active regarding the problem. They do not commit to any specific judging criteria because of problem *irrecognition*. Such communicants behave in an ill-guided and ill-focused manner in taking and giving information. In dealing with information, they are *random, general, and pursuing of mere relation*; they are not *specific, systematic, and pursuing of relevance*. In the absence of information judging criteria, the less active the communicant is, the more one is lenient in evaluating information so as to consider *merely related* information to be *potentially useful*. Thus, less active communicants offer little value to an information provider because they are painfully nonchalant, their minds

are crowded by too much irrelevant information, or they are incompetent in sorting out *applicable* information from that which is simply *available*.

Because I postulate that the heightened perception of a problematic situation (e.g., higher problem recognition and a high perception of involvement to a problem) increases the activeness of situational communication, a weak perception of being problematic would elicit a *lower need* for revising/reforming a current solution or *lower confidence* in a newly emerging solution. For the former case, the person feels less provoked to compose a new solution, meaning that a less active communicant has little internal motivation to think about a problem. This leads the person to be permissive, which is *indifference*: e.g., “I don’t care whatever it says.” For the latter, the person can avoid being explicit because of the absence of any committable solution, thereby not taking a side. This leads him or her to be permissive, which is *diffidence*. Regardless of the source, that is, indifference or diffidence, I here postulate that people under lower magnitudes in situational-perceptual parameters will be more permissive in their communication behavior, whereas those higher in situational-perceptual parameters will be more forefending in their communicative behavior.

In sum, regarding communicant selectivity I postulate:

The greater the communicant activeness, the more the communicative behavior is systematic, specific, and pursuing of relevance. In contrast, the lesser the communicant activeness, the more the communicative behavior is random, general, and pursuing of mere relation.

Integration of Information Selection, Transmission, and Acquisition:

A Catchall Conceptual Model of Communicant Activeness in Problem Solving

Communicant activeness in problem solving is the central concept that bring together three communicative behavioral dimensions: information selection, transmission, and acquisition. The construct, communicant activeness, here becomes the integrative glue that binds together six variables about information behaviors. The major premise is that the more a communicant becomes active for a problem resolution, the greater the communicant becomes selective, emissive, and acquisitive for information related to the problem. Specifically, as communicant activeness increases, a communicant does more information forefending, forwarding, and seeking. As communicant activeness decreases, a communicant does more information permitting, sharing, and processing. Figure 4 and 5 summarize the major premise of communicant activeness and three dimensions of informational behavior.

Figure 4: Three-dimensional representation communicant activeness.

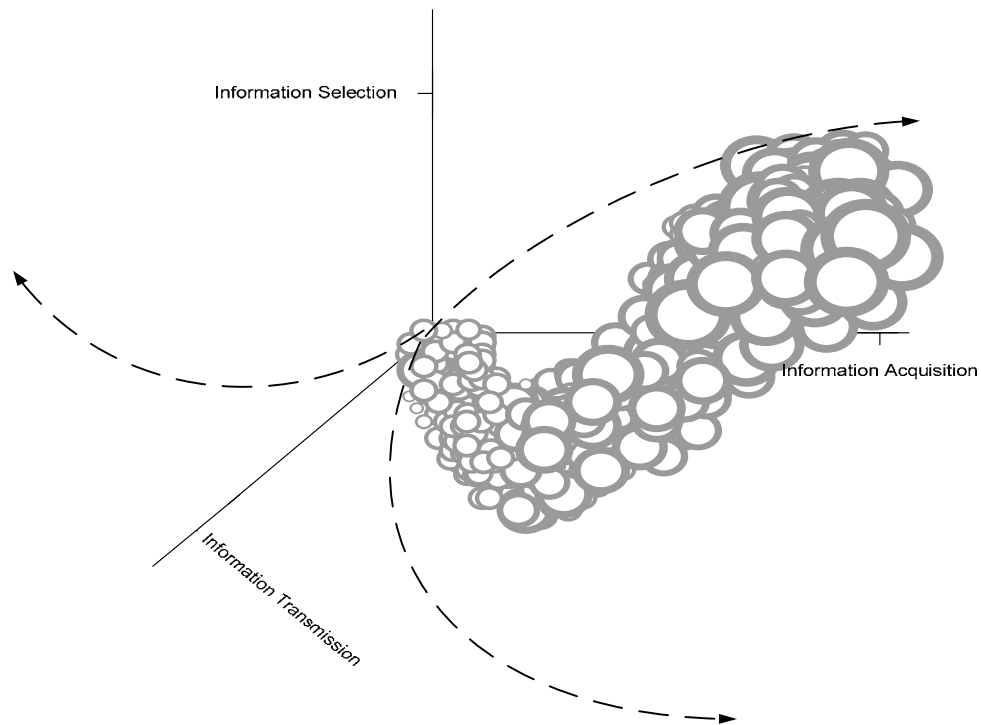
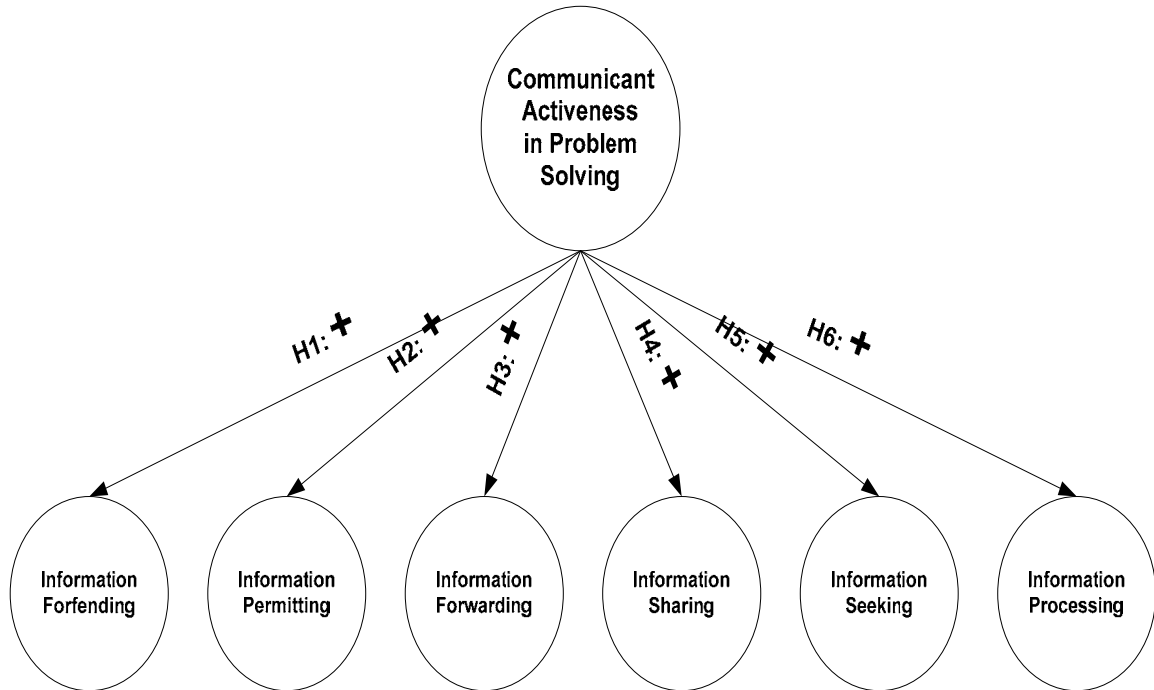


Figure 5: A model of communicant activeness in problem solving.



I define six subdimensions of informational behavior that are correlated with each other.

In factor analytic terms, the six dimensions of communicant activeness are correlated with the construct of communicant activeness. Information permitting, sharing, and processing indicate reactivity in communicant activeness, whereas information seeking, forefending, and forwarding indicate proactivity in communicant activeness. These dimensions conceptually tap different levels of communicative activeness (e.g., liking vs. absence of liking). Therefore, the greater the communicant activeness, the more likely are reactivity and proactivity indicators to both be strongly present. In contrast, the less communicant activeness, the more likely it is that only reactive indicators are present.

H1: The higher the communicant activeness in problem solving, the higher the information forefending.

H2: The higher the communicant activeness in problem solving, the higher the information permitting.

H3: The higher the communicant activeness in problem solving, the higher the information forwarding.

H4: The higher the communicant activeness in problem solving, the higher the information sharing.

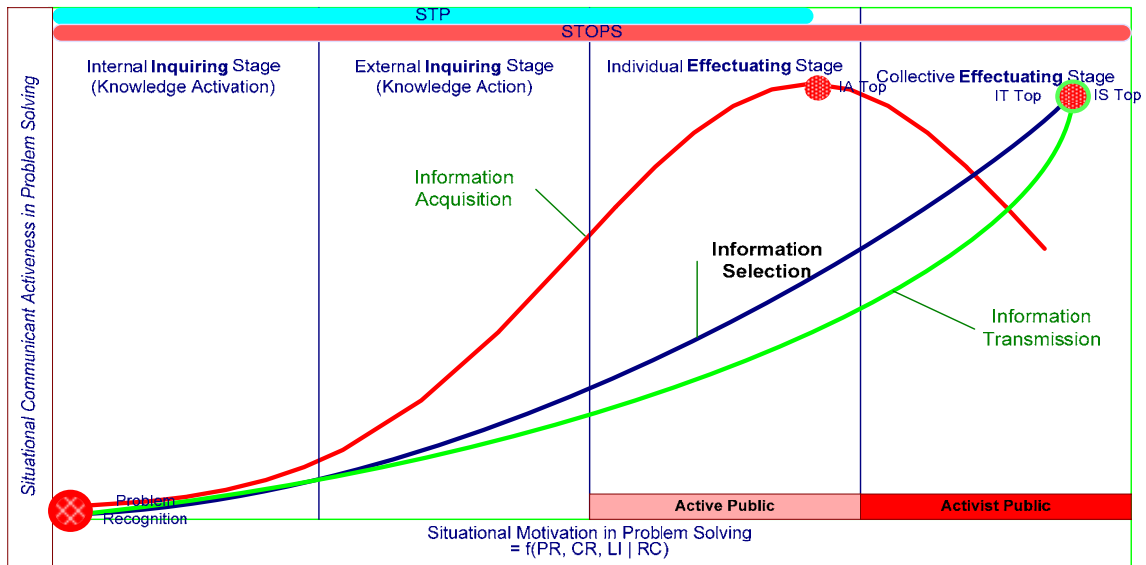
H5: The higher the communicant activeness in problem solving, the higher the information seeking.

H6: The higher the communicant activeness in problem solving, the higher the information processing.

Two Phases of Situational Communicant Activeness: Inquiring and Effectuating Phases

I sequentially break down communicant behavior during a problematic situation into an inquiring phase and effectuating phase. By an *inquiring phase*, I refer to communicant's activeness that is salient in composing—i.e., exploring, investigating, and delving into—a solution. By an *effectuating phase*, I refer to a communicant's activeness in carrying into effect a solution that is to be selected. As a communicant's activeness continues to solve a problem, the communicant shifts his or her focus from information acquisition to information transmission and selection. At the early stage of communicative behavior in a problematic situation, problem solvers invest their communicative resources primarily to extend the pool of usable knowledge and information. Sooner or later, problem solvers reach a level of subjective confidence in the quantity and quality of information and knowledge they have gathered. Once saturated with information, a communicant feels fatigue in increasing his or her information inventory. Hence, one's wealth of relevant information toward a given situational problem bolsters selectivity in managing—processing, producing, and propagating—information during a problematic situation. Thus, a subjective conception of information saturation leads one to the effectuating phase—investing communicative resources in applying and carrying out a solution. This is a turning point from the inquiring phase to the effectuating phase. To illustrate the two phases, I offer the sequence model of communicant activeness shown in Figure 6.

Figure 6: Sequence model of communicant activeness.



Once we detect a problem, we seek a solution internally. Human beings have a general tendency to record and transfer their successful experience of problem solving—i.e., knowledge—to other similar problems. Thus, one’s own memory is the first step when one recognizes a problem. If one’s effort for knowledge activation results in some solution that is available, applicable, and having judged usability (Higgins, 1996), she or he can immediately move into the effectuating stage—carrying into effect the available, applicable, and usable solution. I call such an initial retrieval effort for knowledge and information recollection from past situations the internal inquiring stage. If the initial internal retrieval efforts are not successful, one turns to external sources. External sources could be any one in one’s communicant networks as well as any medium or database that could provide knowledge and information related to a given problem. I name such external collection stage the external inquiring stage.

Should one’s inquiring efforts be successful, the communicant transfers oneself from information consumer to information supplier. That is, the more one is active in

taking information about something, the greater the communicant is likely to give information as a result because he or she is now likely to have certain ‘solutions’ of one’s own (i.e., a new revised referent criterion as the outcome). As noted earlier, information transmission contributes to problem solving in many ways (e.g., resource mobilization). Notably, such a new perspective (consisting of a new revised referent criterion or solution for the problem) is likely to drive information seeking and forwarding in a more selective way (i.e., as consistent with his or her new revised solution/referent criterion). Figure 6 captures this sequential shift of focus by its differential curves. As seen in the figure, information acquisition increases first and information selection and information transmission follow next.

To summarize, in the inquiring phase, we can observe more information permitting in processing and seeking possible solutions. The transition from the inquiring phase to the effectuating phase is demarcated by the perceived information saturation of the communicant who has little confidence that the additional collection of information will increase his or her ability to deal with the problem. However, this threshold point can be hastily reached—i.e., shortened—by external pressure (e.g., if immediate action is necessary).

In the effectuating phase, we can observe more information forefending in processing, seeking, sharing, and forwarding. To do something about a problem (i.e., reduce a negative consequence from the given problem), one now should endorse a specific solution. That is, the problem solver finalizes a certain inferential rule, solution, or treatment that has developed and emerged from the inquiring phase. Such endorsement and finalizing of a proposal for a certain solution (at least temporarily until one

encounters a new problematic situation in which the chosen solution is not effective) is a transitory process of wedging (i.e., decisive and committing to one conclusion) from hedging (i.e., indecisive and dividing risks by considering more than one options) (J. Grunig & Stamm, 1979). Now the selectiveness of information acquisition increases—that is, the communicant selectively seeks and forwards information that better supports, reinforces, and elaborates the endorsed solution. A wedged solution becomes an evaluative lens through which any information is interpreted subsequently. That becomes a new referent criterion (decision rule) for subsequent problems of the same kind. Under Phase I (inquiring), a person's activeness in communication behavior is mainly expressed in terms of information acquisition and more permitting. In contrast, under phase II (effectuating), a person's activeness in communication behavior appears in terms of information transmission and more forefending.

Finally, the sequence model helps to conceptually and empirically distinguish between active and activist publics. The easiest way to differentiate between active and activist publics is to say that activist publics have far stronger beliefs and actions. However, according to CAPS we can meaningfully and usefully distinguish the two, active and activist publics, the most important targets of communication in public relations. The newer dimensions of information transmission and selection in the present model conceptually distinguish between an active public and activist publics. Previously, we could only distinguish activist publics as more active in problem solving than active publics. However, now we can conceptually articulate that activist publics are more active in that they are more selective and more emissive. Activist publics attempt to transfuse their way of problem definition as well as a solution proposal. In contrast,

active publics are selective but relatively less emissive. They tend to approach problems individually rather than collectively. In short, active publics are those communicants who are more effortful in information acquisition. Thus, they are in the inquiring phase in the sequential continuum. In contrast, activist publics are those communicants who are more effortful in information transmission. Hence, they are in the effectuating phase with stronger transmission and selectivity than active publics (Table 2).

Table 1

Phases of Communicant Activeness and Active and Activist Publics

<i>Phases of Acting for Problem Solving</i>	<i>Type of Public (Communicant)</i>		
		Active Public	Activist Public
Inquiring	Yes	No	
Effectuating	No	Yes	

Selectivity in the Inquiring and Effectuating Phases

We tend to believe that obtaining some information obligates a communicant to believe, feel, or behave in the way the information dictates (Thayer, 1987). However, exposure to some information does not always elicit informed behavior consistent with the information provider's belief and wish. Case (2001) explained it well:

Not only are people told that taking drugs and smoking are ultimately bad for their health, they can observe this fact in the world around them; those observations, however, often do not result in less consumption of harmful substances. As Sears and Freedman pointed out, failure to act on information is often due less to selective exposure than to a rejection of information with which we disagree: Perhaps resistance to influence is accomplished most often and most successfully at the level of information evaluation, rather than at the level of seeking and avoiding of information. (pp. 93-94).

I explain such inconsistency in communication effect as a difference between what information content suggests and what the information acquirer would interpret or how he or she would behave by the communicant's selectivity—specifically selective

evaluation or interpretation. When a problem holder concludes that a solution, regardless of its choice from merits or from effects, she or he is more likely to communicate with clarity (i.e., specific information) than with confusion. A communicant with a chosen problem solving method tends to assign cognitive and communicative resources toward effectuating rather than inquiring about a solution. He or she shifts problem solving efforts from constructing a workable solution to enacting it. Hence, we often find that communicative selectivity is more salient in the dimension of information transmission: i.e., communicants who are more forwarding are also more forefending. Communicants attempt to effectuate—forward a problem paired with their preferred solution—by forming a collective around the problem. This happens because communicants can share the cost of problem resolution with other problem holders. In addition, communicants can facilitate the problem solving process by mobilizing more resources from others. To effectuate a solution is in essence to produce and propagate a set of information so as to mobilize other problem solvers' potential resources by information selection and transmission.

Relative to salience of communicative selectivity in information transmission, communicant selectivity is less noticeable in information acquisition. A primary reason is because information acquirers have little control over providers of content materials. During the information acquisition period, information solicitors have little influence on information contents (e.g., a patient cannot hear what he wants to hear from his doctor about his illness.). Instead, information acquirers can control the way of interpreting the given information as consistent with a personal referent criterion (e.g., the patient would interpret his doctor's serious warning as indicative of a professional cliché.). For example,

audiences have little power when they are watching TV programs even if some contents are distasteful. Thus, active liberal voters and active conservative voters are not different in the way and extent of information acquisition—e.g., diligently watching the same TV debate. However, they often express their views differently in their interpretations—e.g., drawing starkly different conclusions about who won a presidential debate.

Summary

Information selection refers to one's selectiveness in dealing with—consuming, producing, and propagating—information. Specifically, I conceptualize that information acquisition will be more selective during seeking than processing, whereas information transmission will be more selective during forwarding than sharing.⁶

The more a communicant becomes active, the more one would become selective in his or her communicative behaviors. In addition, I postulate that selectiveness should be stronger in information giving than information taking. Next, Information transmission refers to the extent of imparting information about a problem one perceives. At some point of information consumption, one is likely to develop a good deal of information inventory about a problem. This in turn motivates a communicant to have a greater sense of informative connoisseurship and opinion strength. A communicant's endeavor increases self-confidence and commitment to the solution one has developed. Communicant activeness in problem solving (CAPS) predicts that heightened motivation will lead a person to transmit information (e.g., about a problem with a loaded solution) willingly and voluntarily to others. Information transmission can be a functional act to

⁶ Information sharing and forwarding are used here in a slightly different way from common usages of the words. In brief, forwarding is proactive communicant behavior (e.g., voluntary and willful transmission and transfusion to an intended segment of people) regarding a certain problem, whereas sharing is reactive communicant behavior (e.g., simply being responsive when solicited).

resolve a problem directly (e.g., mobilization of resources). Or it can be a humanitarian act to reduce negative consequences among neighboring communicants. Finally, information acquisition refers to extent of one's desire to accumulate information related to a problematic state. A communicant is more likely to satisfy his or her information appetite corresponding to the level of his or her epistemic motivation. The situational theory of publics has set this aspect of communicative behavior as default endogenous variables to be accounted for.

CAPS postulates two phases of situational communicative activeness as the inquiring phase and effectuating phase. The inquiring phase is highlighted by information acquisition to carve out a workable solution(s) as its feat of communicative action. Yet, information transmission and information selection are not salient at this period. However, such low salience of information transmission and selection as communicant behavior in the inquiring phase becomes dominant features at the effectuating phase. Early indulgence to relevant information will elate the communicant enough to apply one's alleged solution to the problem. A certain level of self-confidence from the knowledge accumulation ends one's need for more information before doing something about the situation.

The communicant now enters into the effectuating phase, that is, a period in which he or she translates preferred beliefs, opinion, or solution into action. At this phase, one experiments with a chosen solution or belief (e.g., an opinion) to the problem and becomes an exponent, although not permanently, to the epistemic conclusion resulting from a prior inquiring phase. One can still amend a favored solution even when it is put in force. However, consuming information for amendment in the effectuating phase is not

likely to be permissive or indiscriminant as in the inquiring phase. Now, one has a preconceived view. Communicants are now prepossessed by a chosen solution and are likely to forefend—i.e., to be selective—in acquiring information until experimentation provides irresistible evidence of the malfunction of the favored solution—another problem recognition. At the effectuating phase, increasing the communicant’s selectiveness is more rewarding to him or her than a balancing neutral effort, in contrast to in the exploratory, inquiring stage. It would be easier to find a flaw in a composed solution by being partisan to it,⁷ by recruiting helping hands and resources to work out the solution, and magnifying “acting-out” energy in translating a composed solution within one’s situational constraints.

Next, I turn to another new variable, cognitive entrepreneurship in problem solving. With it, we can observe that problem solvers use different mental approaches following different problem perceptions across situations. I offer a model to describe those differential mindsets in problem solving in next section of this chapter.

A MODEL OF COGNITIVE ENTREPRENEURSHIP IN PROBLEM SOLVING

Life is lived forward but understood backward.

Søren Kierkegaard

We believe our will or intention precedes an act. We would be bewildered if someone told us that “we *first did* a certain action and *next understood* what we did.”

Why is such a claim so offensive to us? Perhaps it is due to our deep respect for the role

⁷ In the effectuating stage, we tend to develop more contents for conjecturing (to be tested) carrying from the inquiring stage. As a consequence we are likely to practice selective communication. The human mind must conjecture to know the utility or veracity of an idea. This conjecturing procedure inherently requires our minds to commit or feign commitment to an idea as though useful and veracious at least momentarily, even though not assured and unknown. Such a commitment, although momentary or pretended, is selectivity. Molding a proper and durable solution to a problem requires being painstakingly persistent in repeating such an ostentatious experimentation until reaching an irrefutable state.

of our *will* in an *act*. We dwell on the thought that we are the master of our own life and that we take control our own actions. We live so deeply in a *rational* decision-making tradition that it seems that every important decision we make *must be intended* by us *beforehand*. The decision-making process flows unilaterally from a *deliberative process* concerning what we will do to a subsequent *action (decision)*, not vice versa. Although it could be extremely short or even unconscious, any given conclusion of judgment ought to be preceded by some degree of will or intention.

However, in this section I will theorize our mental process with a counterintuitive assumption that our action or judgmental conclusion made during a problematic situation *can precede* our intention, volition, or rationale of a given act or choice. Unlike the common conception about the unilateral flow of cognitive efforts to decision making, I conceptualize a bilateral sequence between cognitive efforts and decision making (e.g., a decision precedes cognitive efforts about the decision). Even further, I contend not only that intention at times has no place in our cognitive working process, but also that such a counterintuitive sequence from an action to cognitive working (e.g., intention) is our default cognitive approach, which we take routinely. In what follows, I will discuss how the sequence of cognitive efforts and decision making can often be reversed.

Inferential Order in Problem Solving

I conceptualize two directional flows between decision-making and cognitive working in problematic situations as *forward reasoning* and *backward reasoning*. Brehm (1956) once raised the issue of understanding “what happens *after* the choice” (p. 384). Although much research has been done regarding “the phenomena that lead *up to* the choice [*italics added*],” little research effort has been made to study the phenomena of

reversal (Brehm, 1956, p. 384). More recently, Frey (1986) in his classic review of selective exposure to information summarized as “*seeking out of decision relevant information does not cease once a decision is made*. Rather, this search *continues during a postdecisional period* during which the person confronts and weighs the various decision alternatives and their respective advantages and disadvantages [italics added]” (pp. 41-42). As Brehm (1956) and Frey (1986) said, research on the phenomena of how problem solvers are cognitively working *before and after a choice* made is a significant area of inquiry.

Underlying the common research focus *on predecisional cognitive efforts* is the normative belief that people should behave in a rational way. Researchers seem to take seriously the wisdom that “there is no use crying over spilled milk”—i.e., little can be done after making a decision. However, regardless of such normative influences on theorizing about choice situations and cognitive working, we often observe that we are “crying over spilled milk.” People make cognitive efforts after making a choice. Such postdecisional mental elaboration has no effect on the given choice, especially when a problem solver enacts a chosen solution for the problematic situation. Putting aside the issue of how we can make a better normative theory, in the present section of this chapter I will conceptualize both approaches of predecisional and postdecisional cognitive working. In other words, I build a descriptive theory—i.e., sketch a *process*—about the illative orders between a problem solver’s cognitive labor and the drawing of a judgmental conclusion.

Human beings are pragmatic in their reasoning. For this reason, both reasoning strategies play a functionally equivalent role in the mind. A person who suffers from an

infestation of mice at home does not discriminate between the colors of his or her cats as long as they reduce the number of mice. In a similar sense, the directionality of the reasoning process does not matter to problem solvers as long as it generates a workable solution. However, to devise a way to improve problem solving in general, we need to know under what conditions one adopts which reasoning strategy and how well the chosen cognitive strategy supports effective problem solving.

What is the major distinction between backward and forward reasoning sequences? I answer that it is how a problem solver uses his or her cognitive resources and efforts in relation to a conclusion. In the forward strategy, one invests cognitive effort to construct, define, and compare solutions as broadly as possible, and select among possible solutions with regard to their merits. Thus, one's selection of a solution is the last step after using up most of one's available cognitive resources. In contrast, in the backward strategy, one invests cognitive effort to construct, define, and select a best justification for an already chosen conclusion. Thus, one's selection occurs before using up most of one's cognitive resources. In other words, a backward reasoner invests most cognitive resources to reinforce an *a priori* conclusion. To better understand these two reasoning strategies, we need to understand how we make decisions during problematic situations.

A Syllogistic Illustration of Cognitive Working

Before I conceptually elaborate the focal construct of the cognitive entrepreneurial mindset in problem solving, I will take some time here to describe the mental process of cognitively working toward a situational conclusion in problem solving—i.e., how we perform cognitive tasks during a problematic situation. Here, a syllogistic reasoning process is a useful frame within which to explain the human

judgmental process (Kruglanski & Thompson, 1999). In brief, a syllogism is a deductive argument consisting of two premises and one conclusion (Hurley, 1997). It takes the form of major premise → minor premise → conclusion. For example:

No painters are sculptors. [Major Premise | *Evidence*]

Some sculptors are artists. [Minor Premise | *Evidence*]

Therefore, some artists are not painters. [*Conclusion*]

Depending on their positions in the argument, we distinguish three terms within a syllogism. The *major term* is the predicate of the conclusion (i.e., painters); the *minor term* is the subject of the conclusion (i.e., artists); and the *middle term*, which becomes the conceptual bridge between the two premises (i.e., sculptors), is the one that occurs once in each premise and does not occur in the conclusion. The major premise, by definition, is the one that contains the major term: e.g., “No painters are sculptors.” The minor premise is the one that contains the minor term: e.g., “Some sculptors are artists.” The conclusion is the derived argumentative result from the combination of major and minor premises: e.g., “Therefore, some artists are not painters” (Hurley, 1997).

This formal categorical syllogism provides a baseline to discuss any routinely drawn human judgmental conclusion. However, our everyday reasoning processes are more *pragmatic* and *probabilistic* than such a rigid framework of logical steps (Evans, 2002). Lay thinkers often draw judgmental conclusions using a more basic syllogism known as the *if—then—rule*. Lay people who are not trained in formal logic do, in fact, exhibit a *rudimentary deductive competence* when confronted with judgmental tasks (Evans, 2002). For example, we stop our car when we see a red light—e.g., *if I see a red*

light, *then* I should stop my car. This does not require us to set up a strictly formal categorical syllogism argument to reason a proper action.

For another example, we may routinely use incorrect rudimentary syllogistic reasoning when stereotyping others: e.g., if a person is an Asian, then she or he must be good at mathematics. One may see an Asian student in a math class and predict that he or she must do well on exams. We can almost always restate such basic *pragmatic and probabilistic* syllogistic reasoning examples into more *formal and categorical* syllogism arguments.

Regardless of formality or logicity, however, lay thinkers conduct judgmental processes via a more implicit and simpler syllogistic reasoning process (i.e. *if—then*)⁸ (Evans, 2002; Kruglanski & Thompson, 1999; Over & Evans, 1997; Evans & Over, 1996). Therefore, I assume that the human reasoning process can be best illustrated by a pragmatic and probabilistic syllogism in conceptualizing the focal construct of cognitive entrepreneurship in problem solving. From now on, I will use the term syllogistic reasoning to denote the method that lay thinkers routinely use.

Directionality between evidence and conclusion. As mentioned, we make decisions through a simple and pragmatic process of syllogistic reasoning (i.e., *if—then—*). Within the syllogistic reasoning frame, people recollect, collect, or elaborate information to deploy it as supporting *evidence* toward a given judgmental *conclusion*. We not only use the rules that we are carrying from prior situations by a form of the *if—then* rule (e.g., [if] children watch violent movies, [then] they behave aggressively); but

⁸ We do inferential tasks by implicit, not explicit, application of the *if—then—syllogism*. We may not explicitly use the words, “*if—*” and/or “*then—*” in performing an inferential tasks. Simple *association linkages* between “terms” are often sufficient to making inferences: e.g., “red light—stop.” However, we can almost always reconstruct the syllogistic reasoning process by using the *if—then—format*.

we also perform current inferential tasks by a deductive processing of an if—then—syllogism (e.g., [if] I saw a very aggressive kid, [then] he must have watched many violent movies in the past). Here the *extent of association (the strength of connection)* between the *if*—component and the *then*—component is called “relevance” (Kruglanski & Thompson, 1998).

We confer a certain amount of relevance to the inferential association in corresponding with the relevance we can draw from the *decisional referent rule* (e.g., [if] children watch violent movies, [then] they behave aggressively). That is, the confidence that we have in our judgmental conclusion (e.g., confidence about “the aggressive kid who had watched many violent movies”) is commensurate with the strength of the associative link between if—then—rule we use as a decisional referent frame (e.g., the extent of one’s belief that ‘watching violent movies causes aggressive behaviors for children’). For example, consider that you observe a very aggressive act of a child. Subsequently, you might take that act as evidence to draw a judgmental *conclusion* that “the child must have watched many violent movies/games.”

Evidence intuitively precedes a conclusion. However, initiation and completion of the judgmental process between evidence and a conclusion in problematic situations can occur in any direction. One may start from a conclusion and proceed to seeking evidence. Or, one may start from seeking evidence to proceed to a conclusion. Sometimes people benefit, consciously or unconsciously, by following the forward direction (i.e., *evidence dictates a certain conclusion*). For example, one might think that “if someone is a Harvard graduate and working in top management for a large business,

then she must be smart.” At other times, however, people find merit, consciously or unconsciously, in reverse order reasoning (i.e., a *conclusion dictates certain evidence*).

One draws a conclusion first by applying a salient rule—i.e., a *prime decisional referent*—and next collects evidential information that warrants the predetermined conclusion. For example, a person with a terminal illness might draw a quick judgmental conclusion such as “I am OK” and collect evidential information that indicates and reinforces his physical well-being. Or, a group of political leaders might quickly decide to go to war for a salient reason (e.g., the political regime of that country has been uncooperative with us) and next seek out additional supporting decisional referents and information (e.g., the leader of the country is a dictator; he made his people hungry; he have made weapons of mass destruction; he provided support for terrorist groups etc.).

In the example, the conclusion (e.g., we are going to war) precedes substantial evidence (e.g., the whys for war) that warrants and justifies the conclusion. In other words, a conclusion directs the individual to seek certain evidence that justifies the hastily drawn conclusion. It is important to understand that the drawing of a conclusion does not exclude active cognitive working or elaboration in a retroactive way. Even though we make a decision, we might feel it is necessary to elaborate our chosen conclusion. We conventionally assume that a drawn conclusion completes our cognitive working process. However, quite often we go backward in problem solving. Therefore, the direction between drawing a conclusion and connecting evidence to it is bidirectional.⁹

⁹ Although we almost always describe the judgmental process as a forward and unidirectional manner (e.g., I decide so for such reasons), we often go backward but do not explain so because of our *reconstruction* of a judgmental process to report to others.

Forward reasoning vs. backward reasoning. Now I will elaborate two directional flows of syllogistic reasoning. Assuming an equal amount of cognitive resources and motivation in solving a problem, a problem solver can take two contrasting mental approaches in expending cognitive capacity and capability. One is the forward reasoning and the other is the backward reasoning. First, forward reasoning is the commonly conceived way of problem solving. In terms of the syllogistic if—then—reasoning frame, I define *forward reasoning* as a cognitive approach when *evidence directs a solution*. To illustrate the process of a forward reasoning approach, I offer the following:

If information a, b, c, d (i.e., evidence) tells this, then option A (i.e., conclusion) should be selected as a best decision.

I found some antecedent conditions (i.e., evidence) that merit and favor this conclusion among the others.

Therefore, I choose this course of action (or a solution) because preceding evidence warrants this specific conclusion.

In contrast, I define *backward reasoning* as a cognitive approach when *a conclusion directs evidence*. The following is an illustration of a backward reasoning approach:

I selected option A for an important reason.

(If) I selected option A (i.e., conclusion), (then) *the acceptable justifications*¹⁰ (i.e., evidence) for the option A (possible evidences) would be a, b, c, d.

I found some antecedent conditions (i.e., evidence) which fit well with the chosen conclusion.

Therefore, I made a good decision.

Here, the thinker quickly reached a judgmental conclusion by a prime decisional rule and then sought out rationales that make the selected option more conclusive and convincing.

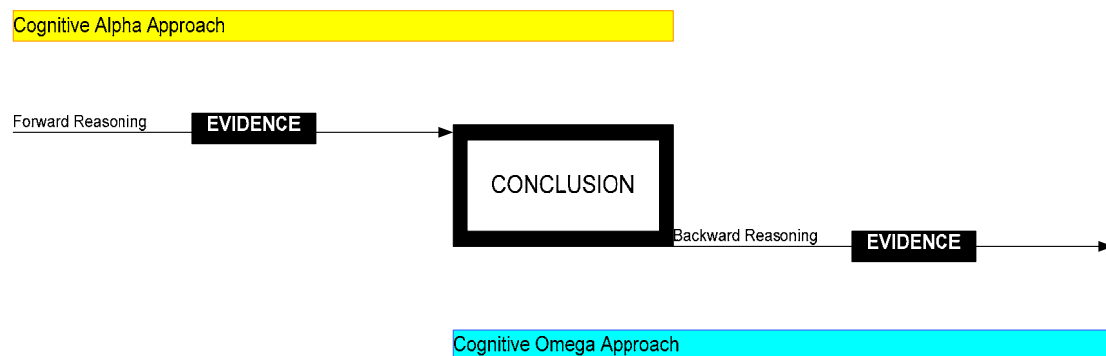
This is an *optimization process* for an *a priori* conclusion.

¹⁰ Justifications can be possible consequences (merits or harms) associated with a chosen option. Such a case is forward reasoning rather than backward reasoning.

Notably, in both cognitive approaches, a chosen solution for a problem should first contain the *observational contents* that best fit the major premise chosen within a syllogism model. Then, the chosen solution will produce a level of *confidence* commensurable to the degree of *relevance* between “if” and “then” contents in the major premise.

Figure 7 summarizes the two distinct cognitive reasoning approaches in problem solving.

Figure 7: Cognitive strategies in problem solving.



Certitude of a given conclusion. By using the syllogistic reasoning frame, we can define attitude as a judgmental conclusion drawn about a certain social object or issue (Kruglanski, 1989). The attitude—an evaluative judgmental conclusion—might be supported by evidential materials. However, the certainty one can draw from evidence toward a conclusion is not determined by the *frequency or amount of information* connected, but by the subjective “*relevance*” of prior belief or decisional referent rule(s) in making the given judgment (usually, as another form of an if—then rule that became a major premise.)

A person under pressure to make a quick judgment would draw a referent criterion (in a form of an if—then—rule that becomes a *major premise*) that is available and applicable to the given problem. Next, she or he seeks out some analogous evidential material from the current situation (via observation). When new evidence collected is similar to the evidence in the activated referent criterion toward the conclusion, he or she then *confers* the given certainty (relevance in the major premise or referent criterion) in the old premise *to* the newly drawn conclusion, which is *tantamount certitude attached to* a fit (relevance) between the old if-then rule (the referent criterion one is now deploying). In other words, when a person is under pressure to make a quick decision, he or she looks for evidence similar to that which supports his known experience or referent criterion. The extent to which the evidence is similar is commensurate with the degree of certitude that will be associated with the new decision.

This can solve a puzzle that many public opinion researchers encounter. Public opinion researchers often have found that people who express a strong attitude about something would lack cognitive knowledge that supports a given evaluative conclusion toward the attitudinal target. J. Grunig and Hon (1988) reported and summarized such affective publics without cognitive counterparts on attitudinal objects:

Several studies of publics arising from environmental issues and corporate policy issues, however, have found some consistency in the cognitive strategies constructed by members of active publics and in the nature of their attitudes. Grunig and Ipes (1983) also found that *active publics have more organized cognitions than do passive publics*. Two studies, Grunig (1982a) and Grunig and Ipes (1983), showed that *passive publics are more likely to hold attitudes than cognitions*. *Active publics are equally likely to hold both attitudes and cognitions*. *Less active publics express attitudes even when they have no cognitions on which to base them*. (italics added, J. Grunig, & Hon, 1988, pp. 5-6).

Combining this judgmental process with the directionality of initiation and completion of a judgmental task, an explanation of why passive publics often have unreasonably strong attitudes (conclusions) in the absence of cognitions (evidence). As most dual models of social influence (e.g., the Elaboration Likelihood Model, Petty & Cacioppo, 1986) suggest, under some conditions people with limited judgmental motivation and capability become cognitive economizers. People draw a quick conclusion using an activated previous judgmental rule (referent criterion or schema) and match easily identifiable evidential materials.

However, when individuals have an internal preference or directional expectation about the outcome that the decision might produce, backward reasoning is more likely to happen because the preferred outcome exerts influence in selecting a referent criterion or prior rule. This is the way *wishful thinking* happens and why many decisions that a lay person makes are unrealistically biased. People adopt a referent criterion that best warrants the preferred end state regardless of its actual likelihood. This happens because a preferred outcome state powerfully influences an individual to activate a certain prior judgmental rule *that more successfully warrants* the preferred outcome state among others.

Parallel syllogistic reasoning processes. At the same time, drawing a conclusion first is not necessarily limited to a single conclusion. It is possible for a person to intentionally (and often thoughtfully) select multiple, conflicting conclusions. Problem solvers may want to be scrupulous or wish to reduce possible errors and risks in the judgmental task. The forward reasoning strategy requires considering a relatively large number of alternative courses of action (i.e., the larger number of solution candidates

reviewed). In contrast, the backward reasoning strategy would consider relatively fewer alternative courses because of the readymade solution or because of strong prior motivation that leads one to a specific course of action. Although backward reasoning problem solvers can be cognitively hard working enough to construct multiple syllogisms, problem solvers with a forward reasoning approach are more likely to construct and go through a more scrupulous multiple syllogistic reasoning process.

Cognitive Strategies and Behavioral Molecules

In terms of the syllogistic reasoning framework, I described a backward reasoning process (i.e., a conclusion comes first and seeking information (evidence) follows). A strong major premise—a *prime decisional referent*—would compel the lay thinker to draw a syllogistic conclusion pertaining to a problem. Once a hasty conclusion is drawn, the person looks for information that increases the fit between the observed minor premise and the preferred major premise. The enrichment provided by observational information that increases the *relevance* of the if—then rule of a major premise increases confidence in the given conclusion.

The forward reasoning process, in contrast, suspends drawing a conclusion until reaching a certain level of subjective confidence—i.e., a feeling of information saturation—to make a better decision (i.e., seeking evidential information comes first and drawing a conclusion follows). Here judgmental rules and proposed solutions compete to demonstrate their merits over the competing sets. To be selected, a solution proposal should demonstrate superiority by its merits. Problem solvers thus undergo the laborious iterative process of *what-if thinking* to examine merits and pitfalls associated with given pieces of information until one solution emerges as the best. These two cognitive

approaches provide a simple way to summarize the multiple differential decision-making approaches described in J. Grunig and Hunt's (1984) behavioral molecule model.

Behavioral molecule. Drawing from Richard Carter's (1973) behavioral molecule, J. Grunig and Hunt (1984) proposed a behavioral molecule that illustrates how people (e.g., an organizational manager) make decisions about what to do in problematic situations. The molecule consists of several segments that capture the processes individuals or systems go through to plan and select behaviors. Its segments are in order: detect, construct, define, select, confirm, behave, and detect. The segments or steps are described as sequential and theoretically endless and if followed thoroughly will lead to more successful problem solving.

Detect is the segment in which a person discovers a problem and begins to think about a solution. *Construct* is the segment in which a person begins to formulate a solution to the problem he or she detected. In this segment, he or she tries to be totally objective and abstains from making a judgment about what to do. The major task here is to be effortful in cognitive processing to define the problem, choose appropriate objectives pertaining to a problem, and formulate alternative solutions to the problem. *Define* is the step in which a person specifies distinctly how each alternative can be implemented. The define segment ends when a single plan of action has been elaborated for each alternative. *Select* is the step in the sequence during which one chooses the best alternative in solving the problem. Here applicable prior decision rules (i.e., referent criteria) or one's values or attitudes exert greater influence to favor (or eliminate) one against the others. Next, *confirm* is the step in which a person reviews the reasonableness of the selected solution and finalizes it before enacting it. *Behave* is the segment in

which one translates the chosen course of action (solution) into action for problem resolution. Finally, the last segment is, again, *detect* to evaluate whether the intended effect—problem resolution—has been achieved.

J. Grunig and Hunt (1984) suggested that ideally the segments should occur in sequence because that maximizes the potential to make the best behavioral decision about a problem. However, in real life, the full sequential order might be shortened because of situational constraints. The steps of the behavioral molecule provide a useful way to describe some common mistakes in decision making. Often decision makers omit some of the segments in the behavioral molecule or change the sequence from the model. Some common mistakes are:

Dogmatism (detect—select—behave--).

Rationalization (detect—select—behave—construct--).

Habit (detect—behave--).

Procrastination (detect—construct—construct—construct--).

Indecision (detect—construct—define—select—construct—define—select—construct --).

Perfectionism (detect—construct—define—select—confirm—construct—define—select—confirm—construct—define—select—confirm—construct--). (J. Grunig & Hunt, 1984)

Within the previously described framework of the entrepreneurial cognitive approach and the CAOS terminology, *dogmatism*, *rationalization*, and *habit* are special cases of *backward reasoning*, whereas *indecision*, *procrastination*, and *perfectionism* are examples of a forward reasoning strategy.

The sequence between information collection and decision-making can be interchanged in some cases. In the forward reasoning approach, information helps to *construct* and *define* the alternatives—i.e., a *prospective* use of information. In the backward reasoning approach, information is used to justify the omitted steps (i.e.,

construct and *define*) and to reinforce the selected alternative—i.e., a *retrospective* use of information.

Temporal Order between Will and Action

In the present model of cognitive entrepreneurship in problem solving, I postulate that human cognitive strategy in judgmental situations is a variant, rather than a constant (e.g., an enduring personal trait). That is, the temporal order between conclusion and evidence is bidirectional across situations. The problem of discerning the temporal order between our will and an act is analogous to the problem of discerning the temporal order between our evidential reasoning and drawing a conclusion. Because of the similarity of the problem sets, I look to the past half century of research in psychophysiology regarding the problem of discerning the temporal order between intention and action to better understand the problem of judgmental sequence. Many cognitive psychologists have investigated the temporal order between “intention” or “will” and “action.” Among them, Libet, Gleason, Wright, and Pearl (1983) found a perplexing pattern that shattered our conventional beliefs about the order between “will” and “action.” He found reversal time sequence between one’s *will* to act and our *movement preparation*. That is, our *subjective will* for moving is preceded by brain movement preparation, so called, “Readiness Potential (RP).”

Experimental finding. Obhi and Haggard (2004) summarized the groundbreaking finding from Libet et al., (1983) study on the “source of control” as follows:

...participants watched a small clock hand that completed one full revolution in 2.56 seconds. While fixated on the clock, a participant voluntarily flexed his wrist at a time of his choosing. After the movement, the clock hand continued to rotate for a random time and then stopped. Then, a participant reported the position of the clock hand at the time when she first became aware of the will to move...this subjective judgment W, for “will.” In other parts of the experiment, participants judged when

they actually moved...this judgment M, for “movement.” The timing of the W and the M told...when—subjectively speaking—a participant formulated a will to move and actually moved. In addition, Libet’s team measured two objective parameters: the electrical activity over the motor areas of the brain, and the electrical activity of the muscles involved in the wrist movement. Over the motor areas, Libet recorded a well-known psychophysiological correlate of movement preparation called the readiness potential (RP)...[RP] is measured using electroencephalographic recording electrodes placed on the scalp overlying the motor areas of the frontal lobe, and appears as a ramplike buildup of electrical activity that precedes voluntary action by about 1 second. By also recording the electrical activity of the muscles involved in the wrist movement, Libet precisely determined the onset of muscle activity related to the RP. (Obhi & Haggard, 2004, pp. 358-359)

Libet et al. (1983) studied the temporal order of conscious experience and neural activity by comparing the subjective W (will) and M (movement) judgments with objective RP and muscular activity. Their finding first showed that W came before M. This means that the participants in the experiment “consciously perceive the intention to move as occurring before a conscious experience of actual moving,” which is consistent with our common conception (Obhi & Haggard, 2004, p. 359). However, Libet et al. found an intriguing temporal order that “actual neural preparation to move (RP) preceded conscious awareness of the intention to move (W) by 300 to 500 milliseconds” (Obhi & Haggard, 2004, p. 360). Obhi and Haggard (2004) restated the meaning of this surprising finding:

Put simply, *the brain prepared a movement before a subject consciously decided to move!* This result suggests that a *person’s feeling of intention* may be *an effect of motor preparatory activity* in the brain *rather than a cause...this finding ran directly contrary to the classical conception of free will* [italics added]. (Obhi & Haggard, 2004, p. 360).

Libet et al.’s (1983) finding, however, did not totally upset the relationship between intention and action, that is, that conscious processes such as intention cause actions. Subsequent findings suggested that “conscious processes *could still* exert some effect over actions *by modifying the brain processes already under way*” and thus it would be

more accurate to call “*free won’t*” rather than “*free will*” [italics added] (Obhi & Haggard, 2004, p. 360). The temporal order between intentions and actions can be bidirectional—i.e., either from intention to action or from action to intention. According to Obhi and Haggard (2004), our brain feels the intention of an action when the prediction of movement fits well with the actual movement. Thus, when the fit takes place—e.g., the past examples of the similar action can guide current action well, the person might feel a euphoric sense of control. In addition, a strong sense of intention can script an action subsequently.

In addition, a mental illness known as *utilization behaviors* in which “patients uncontrollably interact with and use every object that they come across,” provides a piece of interesting evidence that the cognitive backward approach can be found in some cognitive neuroscience studies (Obhi & Haggard, 2004, p. 364). Utilization behavior patients are not aware of what they are going to do until after the action has been made. In such a case, there is “no awareness of intention before the movement;” and thus “the patient is left to rationalize the behavior *afterward*” (Obhi & Haggard, 2004, p. 365).

The bidirectional reasoning conception (i.e., backward and forward reasoning) in the present model explains that a person flexibly situates oneself on either a cognitive forward strategy or cognitive backward strategy by one’s situational-perceptual variables. As psycho physiologists have found, at times our actions are followed by our will and vice versa at other times. Similarly, our problem solving acts (a conclusion for a judgmental task) are often done first and followed by a certain intention of why we did it. This is a case of backward reasoning that is one of the cognitive approaches in the present model. As in Libet et al.’s (1983) findings, in many situations, our intention or will to

perform a certain action is reconstructed backwardly. Often we are asked by others (e.g., experimenters) to explain our actions. Quite often in our routine life, the intention has little use until it becomes necessary to explain our acts to others. It is often reconstructed—*reasoned backward*—to make sense of our action (conclusion) to ourselves and others. Very often, intention is situated within a subjective time sequence *as if* it occurred ahead of an action (e.g., asked to reflect prior action).¹¹

Delimitation

If the main focus in theorizing about the routes that human problem resolution takes toward a *decision* or *chosen solution*, the resulting theory would only reiterate cognitive routes already described in popular social psychological theories (e.g., Heuristics Systematic Model, Chaiken & Eagly, 1989; Elaboration-Likelihood Model, Petty & Cacioppo, 1986). Typically, such theories contain either an *express* route (heuristics—i.e., a decisional shortcut) or an *effortful* route (elaborative or systematic cognitive working) in reaching a judgmental conclusion. However, in the present theory I deliberately focus on the *roles of cognitive efforts occurring before and after* a judgmental conclusion (decision) is made. The previous theories implicitly assumed predecisional cognitive working or at least were mute, about postdecisional cognitive working. Because their theoretical goal was narrowly aimed to *feature a typology of cognitive efforts* (e.g., amount of cognitive elaboration) by the parameters of motivation and cognitive capacity toward a decision (Kruglanski et al, 2003), those theories (e.g., the HSM or the ELM) were only interested in *predecisional cognitive processes*.

¹¹ If Libet et al's (1983) finding is a robust fact, then the theory of reasoned action and the theory of planned behavior have a problem because of the behavioral intention construct. If intention is often reconstructed, the theories have a serious limitation.

In contrast, I am introducing a model that encompasses not just *predecisional cognitive efforts* (how problem holders mentally invest their cognitive resources toward a given conclusion) but also *postdecisional cognitive efforts* (justification of a previously drawn conclusion). Consequently in the present model, it is unnecessary to assume that a problem solver ceases to make cognitive efforts once a decision is made. Neither ELM nor HSM, the two most popular theories of cognitive processing, conceives of the notion of *cognitive retrogression* in their conceptualizations. Yet, we observe often that problem holders mentally linger on or keep “elaborating” the decision even after favoring and finalizing solution (e.g., diligently reading about the great features of a product after purchasing it.).

Although one may have decided on a solution to a problem, arriving at the solution does not necessarily indicate the end of the problematic situation. Therefore, people under problematic situations could still be cognitively active and effortful even after making a decision. For that reason, we experience that decision making is not the end of our cognitive efforts in problem solving. I have moved the theoretical scope from decision-making to problem solving. Consequently, the reversed order cognitive working (conclusion→evidence seeking) becomes another key cognitive feature.

To summarize, current cognitive processing theories describe the *decision process* and put little theoretical emphasis on post-decisional thinking. In contrast, the present theoretical model describes a *problem-solving process* and a *cognitive process within a problematic situation*. Thus, I propose a model of our mental approaches that features the *role* of cognitive efforts during a problematic situation. It postulates distinct roles of two different sequences in cognitive efforts. One is to reach a better solution—thereby

being characterized by predecisional cognitive efforts; the other is to reach subjective confidence in the chosen solution—being highlighted by postdecisional cognitive efforts.

Conceptualizing Cognitive Entrepreneurship in Problem Solving

We respect those who are entrepreneurial in their work. They endeavor to progress and make desirable changes for themselves and for others. Thus, we train ourselves and our children to maintain an entrepreneurial life. However, the term, entrepreneur or entrepreneurial mindset, needs to be explicated further. J. Grunig (1968) conceived of entrepreneurs as those who drive individual and social development. He described the entrepreneurial problem solver as a:

strategic decision maker who skillfully manages the resources at one's command, which means she or he is more than a routine manager; she or he is always looking for the most efficient way of doing things. The entrepreneur is "rational" not in the sense that he is always a profit maximizer or seeks always to maximize a pre-set goal, *but rather in the sense that he recognizes alternative solutions to his problematic situation, evaluates these alternatives, and chooses one of them.* [italics added] (J. Grunig, 1968, p. 4)

I conceptualize *cognitive entrepreneurship in problem solving* (CEPS) here as a unidimensional *variable*. Cognitive entrepreneurship is a human *cognitive feature* used to cope with problematic life situations— in other words a mental approach to reduce a *perceived discrepancy*. It varies from an extremely entrepreneurial mindset to the least entrepreneurial mindset across problems. The absence of entrepreneurial cognitive effort, for convenience, can be called the *cognitive omega strategy*, whereas the strong presence of entrepreneurial cognitive effort in dealing with a problem is called the *cognitive alpha strategy*. To make the concept theoretically more useful, I break down the single construct, cognitive entrepreneurship in problem solving, into two dichotomies: the cognitive alpha strategy, wherein we find more cognitive entrepreneurial features, and the

cognitive omega strategy, wherein we find fewer cognitive entrepreneurial features. These are two conceptual faces of a single construct.

We typically construe entrepreneurship as a personal trait that varies *across individuals* and not *within* an individual mind. However, there is no reason for this conceptual limitation. I conceptualize entrepreneurship here as changing across different life situations, that is, as a *variable* that fluctuates with changes in one's situational conditions (e.g., situational constraints). Thus, I define *cognitive entrepreneurship in problem solving* as a situational mindset one opts for in a problematic situation wherein one's mental effort for problem solving has more cognitive features. In cognitive entrepreneurship 1) one's cognitive sequence progresses from evidence to a conclusion following the syllogistic reasoning process, 2) one increases cognitive effort by increasing the breadth of evidential knowledge and solution alternatives considered, 3) one is more likely to cognitively commit to ideas and alternatives under review (i.e., on average, entrepreneurs show more enthusiasm to the proposed ideas and solutions that are allegedly viable than non-entrepreneurs do), and 4) one has more cognitive heedfulness in finalizing a proposed solution—i.e., makes another confirmatory evaluation after *selecting* a solution.¹²

This new construct has a conceptual root in J. Grunig's (1966) distinction of two decisional approaches called habitual and genuine decisions. Following Katona (1951, 1953) and Carter (1965), J. Grunig distinguished two decisional approaches such that: "Most economic decisions...are made on the basis of habit, genuinely rational decisions are made in new situations where the decision maker has little previous decision

¹² In the behavioral molecule, one would "stop to confirm that the selected behavior will work and is the best alternative" (J. Grunig & Hunt, 1984, p. 107). This is a double checking effort for the decision-maker to assure the solution selected is the best available for the given problem before finalizing the decision.

experience and in important, ‘crossroads’ decisions” (J. Grunig, 1966, p. 93). The concept of cognitive entrepreneurship in problem solving is analogous to the “genuine decisions” (Katona, 1951, 1953) or “crossroads decisions” (J. Grunig, 1966), when a habitual decision is unsatisfactory. To make a workable crossroads decision, a problem solver must make an extraordinary mental effort. In the next section, I will conceptualize four subdimensions to further delineate cognitive entrepreneurship in a problematic situation.

Conceptual Dimensions of Cognitive Entrepreneurship: Cognitive Retrogression, Cognitive Multilateralism, Cognitive Commitment, and Cognitive Suspension

I theorize four conceptual subdimensions to highlight cognitive entrepreneurship under an extraordinary problem situation. They are cognitive retrogression in illation, cognitive multilateralism in considering solutions for problem solving, cognitive commitment to the identified solution proposals, and cognitive suspension before finalizing a solution.

The cognitive alpha and omega strategies, which I elaborated earlier, have their conceptual origins in part from what J. Grunig and Stamm (1979) called *hedging* and *wedging*. Hedging is a cognitive strategy that reduces risk from devotion to a single option by dividing one’s commitment to the options, whereas wedging is a one-and-only commitment to a certain option. The backward cognitive strategy shares its conceptual root with wedging, whereas the forward cognitive strategy shares its root with hedging. Problem solvers who hedge expend more effort during the illative process. Thus, they tend to build and consider more solution options than those using a wedging strategy. In contrast, problem solvers using the wedging strategy take advantage of achieving a

cognitive certainty quickly. Thus, they abstain from increasing cognitive complexities by considering fewer solution options.

For these reasons, wedging is close to the cognitive backward strategy, while hedging is close to the cognitive forward strategy. Each strategy either satisfies one's desire to be quick and firm or to be deliberate and take risk. In conceptualizing cognitive entrepreneurship in problem solving, I expand the hedging and wedging concepts to understand different cognitive strategies for problem solving. This conceptual specification of hedging and wedging will result in a construct that has more empirical content (Popper, 1999) as well as practical implications for problem solvers. I will now elaborate upon each dimension of cognitive entrepreneurship in problem solving.

Cognitive Retrogression

Previously, I conceptualized two cognitive strategies in judgmental situations; a forward illation strategy and a backward illation strategy. A backward illation strategy occurs when a problem solver reaches a conclusion quickly and engages in cognitive labor *primarily after* drawing a conclusion. In contrast, a forward illation strategy occurs when a problem solver makes more cognitive effort before a conclusion is reached. The referent point to decide backward or forward is *when* a conclusion is finalized. Human default decision-making is a non-entrepreneurial approach until a person faces an extraordinary, problematic situation (J. Grunig, 1968). Most of our routine judgments in non-problematic situations follow a backward reasoning strategy, whereas in extraordinary situations a forwarding reasoning strategy is required. What then is the merit of taking a backward reasoning mode?

To every living organism, living means a series of problem findings and certain ways of solving them (Popper, 1999). Some problems are not so difficult for a living organism when a solution is available from past problem solving experience. Novel problems can be very threatening if one has never experienced them previously. When confronted with a novel problem, one must exert extraordinary effort to find a solution. Hence, when we identify a problem, we immediately begin an internal search—i.e., *knowledge activation*.

If there is a solution or decisional referent available and applicable to the current problem, our problematic situation ends fairly quickly. However, if no applicable knowledge is available, we initiate an external search for knowledge and information—i.e., *knowledge action*—until we reach a threshold of subjective confidence in dealing with the problem. In the first case, by applying a readymade solution immediately we can take a fast track to closure of a given problem situation. In that case, we take a backward reasoning approach to reach a conclusive solution by searching for and applying a *decisional referent* immediately. We then need only to check *evidence subsequently* to confirm its utility for solving a given problem: i.e., cognitive retrogression that goes from conclusion to evidence. In contrast, forward reasoning requires sacrificing agile adaptation to a judgmental situation to some extent. Although it increases one's ability to reduce risk from potential problems, the forward reasoning approach heavily taxes cognitive resources. Thus, every living organism tends to use a problem-solving mode that allows for cognitive idleness so that one can invest surplus cognitive resources in alternative priorities (c.f., “cognitive economizer”).

Backward reasoning and the problem of sunk costs. Quite often problem solvers are lazy in seeking counter-examples to evaluate the soundness of an alternative solution. This happens more commonly when a congenial conclusion can be found that is consistent with the premises (Oakhill & Johnson-Laird, 1985). Problem solvers using a forwarding reasoning approach are more willing to change their mind (e.g., preference on a certain solution proposal) in the presence of contradictory evidence. Because they move forward from evidence to conclusion, they can change their course of action *rather easily* even when they find some countering evidence against a preferred solution. However, problem solvers who take a backward reasoning approach are less likely to be flexible because their conclusion makes it difficult to withdraw their commitment. This is the problem of *sunk cost*.

What dissonance studies have found over the last half century is closely related to the problem of sunk costs. Dissonance theory (Festinger, 1957) is centered on the recurrent human tendency to reduce experienced dissonance. According to Festinger (1957), people prefer “reinforcing” cognitive elements (information) that favor the chosen alternative, whereas they avoid reinforcing information that favors the “unchosen alternative” because of its dissonance arousal against the past choice. Brehm’s (1956) study found that once a choice is made, participants try to reduce dissonance “by making the chosen alternative more desirable and the unchosen alternative less desirable than they were before [the choice was made]” (Brehm, 1956, p. 384).

To be more adaptive, our cognitive commitment should be flexible and capable to shift among tasks to handle a stream of problematic situations. However, at the same time, our judgmental conclusion, regardless of its enactment status, ought to be

unshakable once finalized. To revoke a choice already made or to reverse a course of action to which one is already committed is prohibitively costly and laborious, especially when something interrupts our necessary transition to concurrent problems. Because of this, it becomes attractive and less costly to make the drawn conclusion more desirable and make the dropped conclusions less desirable. Under such conditions, we invest most of our cognitive labors to support the already drawn conclusion after a decision has been made. We go cognitively backward. Also, we similarly go backward when we engage in strong wishful thinking or willful thinking about the end state within a problematic situation. A strong desire for a certain outcome, despite obvious undesirability in the long term, drives one to pick a course of action that fits with the wished or willed *a priori* conclusion. In this case, we assign our cognitive resources to *postdecisional justification*—to confirm the wished or willed decision we prefer.

Although sunk costs “should not affect decisions about the future,” decision makers are often tempted to favor one alternative over others mainly because of irrevocable prior costs we have paid (Dawes, 1988, p. 22). As Dawes (1988) argued, the tendency to honor sunk costs and make a decision that preserves a prior investment might be rational or wise at the time. Yet, it becomes irrational in that it replaces the current and future consequences with past consequences. People honoring sunk costs in making a decision, then, are likely to pursue a backward reasoning approach for a most salient alternative—an option that has the most prior investment. The decision maker cognitively reasons backwardly to honor a favored alternative (conclusion). One searches internally and externally to justify, support, and honor a given solution candidate with the highest nonrefundable sunk costs. In sum, the more problem solvers employ an

entrepreneurial mindset in problem solving, the less likely they are to use backward reasoning or to honor the nonrefundable deposits (sunk costs).

Cognitive Multilateralism

From the first day, education preaches to us that we should be more *open* and willing to *tolerate* even somewhat distasteful ideas in dealing with important life problems. A mindset that is open and willing to tolerate even distasteful ideas when considering alternative solutions to important life problems is a core value in entrepreneurship. J. Grunig (1968) conceptualized “the second stage of the decision process” in problem solving as “a process of discrimination” (p. 26). He reasoned that the number of discriminations that problem solvers make “among competing relevant alternative courses of action” is a critical quality with which to measure the entrepreneurial cognitive process (J. Grunig, 1968, p. 26). Entrepreneurial problem solvers are willing and capable to “discriminate” available solution proposals by their merits. In doing so, entrepreneurial problem solvers first identify and increase the potential solutions (information) relevant to the problem. Hence, cognitive entrepreneurship in problem solving is closely related to the problem solver’s cognitive breadth. This breadth is measured by the *number of alternatives* one generates and one’s *tolerance of rival information* during the problem-solving process.

Within the syllogistic reasoning framework, we illustrate such cognitive breadth as the number of syllogism models one would bear in judgmental situations. Johnson-Laird and Bara (1984) proposed that we are capable of constructing multiple mental models to make syllogistic inferences. Johnson-Laird and Bara (1984) reviewed psychological theories of syllogistic inferences and presented the theory of mental

models. Their theory proposes that logically competent reasoning is feasible without any use of rules. The way people reason is through attempting to test whether a conclusion must be true given that its premises are true. The specific steps in this process are 1) construct a mental model of the premises; 2) formulate an informative conclusion that is true in all models of the premises that have been constructed; and 3) if able to make a conclusion, try to *construct an alternative model(s)* of the premises that renders it false (if there is such a model, abandon the conclusion. Otherwise, the conclusion is valid.) (Johnson-Laird & Bara, 1984). Ordinarily, people attempt to build multiple models and to “search for counterexamples to putative conclusions.” They have “no machinery for making the search in a systematic way, and consequently often lapse into error” (Johnson-Laird & Bara, 1984, p. 51). This implies that people vary in their reasoning in terms of the number of models constructed and their degree of effort in conducting an evaluative search for counterexamples to the premises.

At times, we seek out or construct a large number of alternative models, whereas at other times, we do not. More deliberate problem solvers (i.e., entrepreneurs) are more likely to set up multiple syllogistic models that consist of *multiple sets* of major and minor premises and conclusions. By doing so, they increase the potential to produce effective solutions. During the syllogistic inference process, entrepreneurial problem solvers *have not finalized a conclusion at the expense of dropping alternatives*. Instead, they utilize *multiple* fully constructed syllogistic models to increase their confidence in their finalized solution. This becomes *a rite of passage for the selected*— the value of which is measured by how many rivals it has encountered and overcome to be crowned as the final one. I postulate here that the more a problem solver is cognitively

entrepreneurial, the more one becomes effortful to increase the number of solution options (i.e., syllogistic mental models). With breadth of knowledge, information, rules, and abundance of proposed solutions available, individuals greatly enhance their potential to solve problems.

Measurement strategy. A problem solver with a more entrepreneurial mindset is likely to increase his or her breadth of information, knowledge, decisional referents, and solution proposals. As a consequence, entrepreneurial problem solvers not only *hold*—i.e., *accept*¹³—a greater number of cognitive beliefs (e.g., information, decisional referents, or solution proposals) but they also *tolerate* somewhat conflicting and even incompatible beliefs in their cognitive inventory. We can use these tendencies as a “yardstick” to distinguish non-entrepreneurial problem solvers from entrepreneurial problem solvers for measuring cognitive multilateralism. Thus, to delineate the two types, it is necessary measure the degree to which an individual is familiar with and will tolerate *incompatible information*. By letting respondents review and express agreement (disagreement) with a set of competing or contradictory statements about a problem we can measure their level of cognitive multilateralism regarding that issue. For example,

statement ₁ ()

statement ₂ ()

:

:

statement _i ()

¹³ It is important to note that “even if one is *aware of some contradictory view points*” if not “*accepting*” it, then it is *not considered* “to have cognitive breadth” about the issue. J. Grunig and Hunt (1984) provided a useful taxonomy of objectives regarding communication effectiveness (p. 134). Retention of messages or acceptance of cognitions is not necessarily to lead a behavioral intention or behavior. By communication efforts, problem solvers would increase their cognitive inventory to facilitate problem solving. Here, I expect problem solvers with high cognitive entrepreneurship to have cognitive breadth and tolerance for incompatible ideas.

(Followings are *contradictory* or *competing* statements to the former set of statements)

statement_{i+1} ()

statement_{j+2} ()

:

:

statement_j ()

The following formula computes one's cognitive multilateralism:

Cognitive Multilateralism =

$$\frac{((st_1 + st_2 + \dots + st_i + st_{i+1} + st_{i+2} + \dots + st_j) - |(st_1 + st_2 + \dots + st_i) - (st_{i+1} + st_{i+2} + \dots + st_j)|)}{\text{Number of Statements}}$$

Cognitive Commitment

Cognitive multilateralism conceptually taps an entrepreneurial problem solver's *tolerance to somewhat incompatible ideas or proposals*. In contrast, cognitive commitment conceptually taps an entrepreneurial problem solver's *degree of enthusiasm and the extent of patronizing the proposed solution for a given problem solving*.

Entrepreneurial problem solvers are typically excited by new ideas. They have a voracious appetite for information that will help them solve a problem they face. At the same time, entrepreneurs are energetic and enthusiastic about a wide range of ideas, even wild ones, as long as they increase the potential to solve a problem. They welcome and encourage unconventional thoughts and can leave commonsensical assumptions behind. Entrepreneurial problem solvers value challenging ideas, fresh approaches, and original concepts, even those that might be considered distasteful to others.

Entrepreneurial problem solvers are more committing—i.e., enthusiastic, *patronizing*, and *incubating*—to any ideas under consideration until they reach a final solution. Although there may be stark contradictions and incompatibility between rival

proposed solutions, most share the common quality of viability or feasibility. Thus, at least temporarily, entrepreneurs show a higher level of commitment toward ideas under consideration than do non-entrepreneurs. On average, their level of commitment to the ideas—as if they will be useful—are stronger than non-entrepreneurial problem solvers. Thus, the more the problem solvers become cognitively entrepreneurial, the more one is, provisionally, committing to the proposed ideas.

Measurement strategy. Problem solvers with a more entrepreneurial mindset tend to be more cognitively committing to or patronizing of those considered ideas while moving toward problem resolution. They become more motivated to problem solving so that their level of cognitive energy and enthusiasm to the potential solutions increase situationally. In addition, to be deliberate in selecting and evaluating solution proposals, problem solvers have to patronize any potentially useful pieces of information until they finalize their decision to choose one solution over the others. Hence, a more entrepreneurial problem solver shows a greater level of cognitive commitment to the ideas and thoughts around the problem. Thus, the degree of attachment to pieces of information around a problem regardless of their interrelationships (e.g., incompatibleness among rivalry solution proposals), has to be higher for entrepreneurial problem solvers. We can compute it as following:

statement $_1$ ()
 statement $_2$ ()
 :
 :
 statement $_i$ ()

(Followings are *contradictory* or *competing* statements to the former set of statements)

statement $_{i+1}$ ()
statement $_{j+2}$ ()

$$\begin{array}{l}
: \\
: \\
\text{statement}_j (\quad) \\
\text{Commitment} = \frac{(st_1 + st_2 + \dots + st_i + st_{i+1} + st_{i+2} + \dots + st_j)}{\text{Number of Statements}}
\end{array}$$

Cognitive Suspension

Although an entrepreneurial problem solver is more enthusiastic, incubating, and patronizing toward the proposed ideas for problem solving, he or she will withhold *final commitment* to any single idea/option until all the necessary steps of scrutiny have been taken. Successful problem solving is closely related to the *discriminatory power* one can exert in a given problem solving period. Cognitive entrepreneurship in problem solving, thus, closely correlates with one's heedfulness in drawing a final conclusion. In problem solving, it is one thing to *welcome and patronize* many different ideas and another to *discriminate and finalize* (i.e., select and confirm in behavioral molecule terms) a specific solution from a set of rivaling options. In successful problem solving and decision-making, "a relatively large number of discriminations are normally required...except when decision rules are formed" (J. Grunig, 1968, p. 31).

In contrast, most routine decisions "seldom take more than the simple discrimination of recognition of a single alternative" (J. Grunig, 1968, p. 31). To deal with a "genuine problem," not a "routine problem," problem solvers should discriminate between available solutions by considering the problem solving potential of each. Their high level of patronage and enthusiasm does not mean a blind commitment. Entrepreneurial problem solvers discriminate the virtue and viability of a given solution by merits, not by any affection they might have incidentally developed (e.g., wishful thinking). Therefore, some period of extended cognitive labor is required to fully

evaluate and confirm a solution. Even after a solution is isolated, an entrepreneur will take one additional step of scrutiny—i.e., finalizing it by evaluating what can go wrong if I select this option (checking the possible “Murphy’s law,” J. Grunig & Hunt, 1984)—before taking action.

However, cognitive heedfulness is different from cognitive indetermination in that inaction caused by too much procrastination can actually worsen a situation. In other words, sometimes no decision is worse than a less than optimal decision. Inaction brought on by too much cognitive processing is as non-entrepreneurial as backward cognitive processing. I delimit cognitive suspension as focusing on the cognitive process, not to encompass the behavioral process of problem solving. Entrepreneurship requires a problem solver to be agile in translating a selected solution into action (agility in the behave stage in terms of the behavioral molecule or in the effectuating phase in the CAPS). Thus, behavioral suspension—one’s abeyance to act on a chosen solution, is non-entrepreneurial. However, cognitive suspension—defined as taking *all the steps* of generating, evaluating, selecting, and finalizing a solution— makes problem solvers reach better problem solving outcomes. Thus, *suspension of an action after* a conclusion (a confirmed solution) is problematic because it delays problem resolution. This often prohibits early problem solving and thus, it is non-entrepreneurial problem solving. In contrast, cognitive suspension as mental heedfulness to take all steps of the behavioral molecule *before finalizing* a solution increases problem-solving effectiveness. Cognitive suspension en route to a finalized solution is thus part of an entrepreneurial approach to problem solving, whereas behavioral suspension en route to problem solving is non-entrepreneurial.

In summary, cognitive suspension refers to a problem solver’s heightened willingness to invest discriminatory efforts in evaluating options and *reevaluating a selected option before finalizing* it. The behavioral molecule captures this subtlety with the *confirm* step, which occurs after *select* and before *behave*. I characterize a problem solver with high cognitive entrepreneurship as having stronger cognitive suspension in problem solving. Entrepreneurial problem solvers give closer consideration in drawing and finalizing a conclusion; therefore, they are more willing to take extended steps of scrutinizing and discriminating before making a final choice.

Summary. I have constructed a conceptual model that highlights the four dimensions of cognitive entrepreneurship in problem solving in Figure 8.

Figure 8: A model of cognitive entrepreneurship in problem solving.

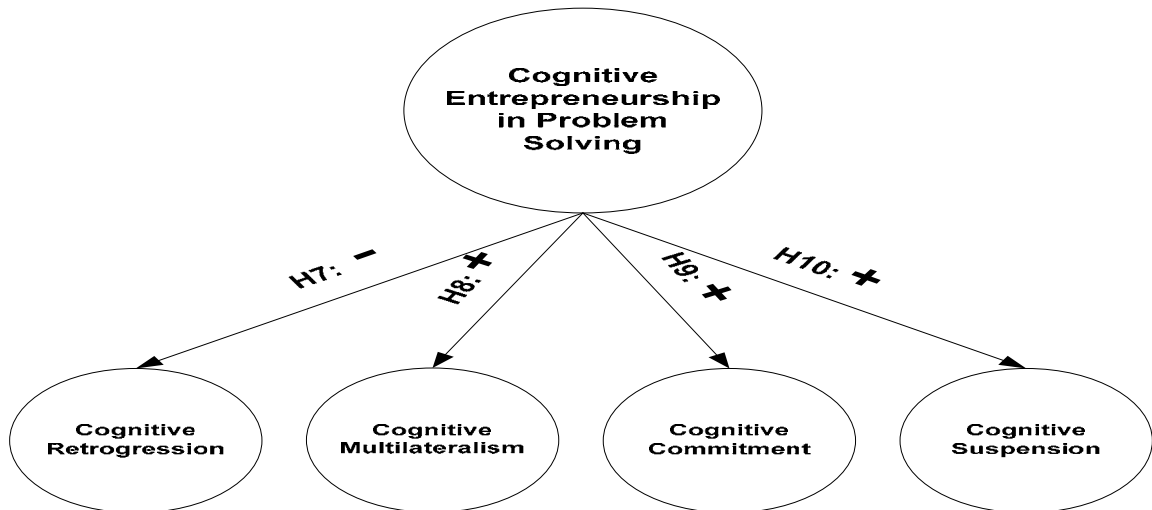


Figure 8 shows that the more a problem solver becomes cognitively entrepreneurial in dealing with a problem, the less one reasons backward, the more one vies for cognitive breadth and tolerance, the more one commits to potential solutions, and the more one is heedful in drawing conclusions and finalizing proposed solutions.

Thus, I summarize the hypotheses:

- H7: The higher the cognitive entrepreneurship in problem solving, the lower the cognitive retrogression
- H8: The higher the cognitive entrepreneurship in problem solving, the higher the cognitive multilateralism.
- H9: The higher the cognitive entrepreneurship in problem solving, the higher the cognitive commitment.
- H10: The higher the cognitive entrepreneurship in problem solving, the higher the cognitive suspension.

Cognitive Alpha and Omega Strategies (CAOS)

From the model of cognitive entrepreneurship in problem solving, I conceptually derive the cognitive alpha approach as the heightened state of situational cognitive entrepreneurship and the cognitive omega approach as the diminished situational entrepreneurial mindset toward a given problem. The two conceptual strategies differ only quantitatively but not qualitatively. Table 2 summarizes the relationships between cognitive alpha and omega strategies and four dimensions of cognitive entrepreneurship in problem solving.

Table 2

Cognitive Alpha and Omega Strategies and Cognitive Entrepreneurship in Problem Solving

	Cognitive Alpha Strategy	Cognitive Omega Strategy
Retrogression	More forward reasoning	More backward reasoning
Multilateralism	More cognitive tolerance	Less cognitive tolerance
Commitment	More committing	Less committing
Suspension	More heedful in finalizing a solution	Less heedful in finalizing a solution
Entrepreneurial Cognitive Approach	More entrepreneurial	Less entrepreneurial

Behavioral molecule and CAOS. J. Grunig & Hunt (1984) used the behavioral molecule to classify common managerial mistakes in problem solving. CAOS provides a simpler typology to explain the differential problem solving approaches. They are:

Dogmatism: detect—select—behave [omega]

Rationalization: detect—select—behave—construct [omega: justification—a more sophisticated omega approach]

Habit: detect—behave—detect [omega]

Procrastination: Detect—construct—construct—construct [alpha]

Indecision: detect—construct—define—select—construct—define—select—construct [alpha]

Perfectionism: detect—construct—define—select—confirm—construct—define—select—confirm—construct—define—select—confirm—construct [alpha]

Default cognitive strategy. I postulate that the human default cognitive strategy is cognitive omega rather than cognitive alpha. People generally only adopt a cognitive alpha approach when they face a problem without a readily available solution—i.e., non-routine or extraordinary problems. In contrast, people more often will take a cognitive omega approach when they have a problem with a readymade solution—i.e., routine problems. This gives us an intuitive explanation for why the cognitive omega approach becomes the default mental approach. Problems are always fewer than non-problems. The cognitive omega strategy lessens cognitive effort for the present problem to economize problem-solving capacity for other concurrent or more urgent tasks at a given moment. When encountering familiar problems, the cognitive omega approach increases one's ability to adapt to other problems by speeding up the problem-solving process. However, when encountering unfamiliar problems, we cannot maintain our non-thinking and minimal cognitive investment. Then, we are likely to shift from a cognitive omega to a cognitive alpha strategy to compose a new solution and to restore one's default cognitive idleness (c.f., Carter, 1965, "evaluative mode" and "reinforcement mode").

To summarize, the cognitive omega approach could be described as the shortest path through the behavioral molecule using the fewest steps, that is, “detect—behave,” whereas the cognitive alpha approach is the longest path using all the steps and completing the full process of the behavioral molecule, that is, detect—construct—define—select—confirm—behave until a problem situation has ceased to be problematic (J. Grunig & Hunt, 1984). Many human motor behaviors (e.g., blinking if a person detects a sudden movement near the face) are done by the cognitive omega strategy. Many times, we do not have any *intention* regarding a certain behavioral decision beyond simply acting itself. However, if we detect an out-of-the-ordinary situation for which the motor-behavior-like response will be ill-suited, we are likely to make a transition to the cognitive alpha approach to better adapt to the new problem. Here the model of cognitive alpha and omega strategies (CAOS) captures the human tendency to establish and recycle certain knowledge that allows us to extend the use of the cognitive omega state. Thus, when perpetuation of a readymade solution is difficult, our cognitive working goes into an ‘extraordinary cognitive mode’ until we have decided upon a novel solution. Such an extraordinary cognitive modus operandi is the cognitive entrepreneurship in problem solving.

A normative implication of CAOS is that it is problematic if a person does not have *cognitive aptness*—i.e., a cognitive ambidexterity in changing one’s mental approach from cognitive alpha to omega and vice versa. For instance, many serious health problems become worse because of the problem holder’s cognitive ineptness (e.g., maintaining a cognitive omega approach to a new problem either deliberately or otherwise). At the other extreme, many people also suffer from unnecessary cognitive

stress by employing a cognitive alpha approach even though a cognitive omega approach would adequately deal with the problem. Therefore, neither cognitive alpha nor a cognitive omega strategy is invariably superior over the other.

Rationality assumption in cognitive alpha and omega strategies. J. Grunig (1968) criticized the rationality assumption in major programs in economics and communication because they considered a rational person to be a “profit maximizer” or one who “seeks always to maximize a pre-set goal” (p. 4). Against such a presumption, he extended the meaning of rationality to be construed as one’s ability to find out and evaluate alternative solutions to a problem and to choose one by its merits. Thus, he studied the conditions under which a person becomes a rational entrepreneur. His conceptualization of the entrepreneur paved the way for decision-makers to become more rational in problem situations. In contrast, I conceptually separate rationality from entrepreneurship in the model of cognitive alpha and omega strategies.

J. Grunig’s (1968) seemed to equate high entrepreneurial decision-making with high rationality in tackling a problematic situation. However, the model of cognitive alpha and omega strategies considers the highly entrepreneurial approach—i.e., the cognitive alpha strategy—and the low entrepreneurial approach—i.e., the cognitive omega strategy—as *orthogonal* from judging one’s rationality in problem solving. In other words, to be more entrepreneurial is not always to be rational. For example, with situational constraints in a problematic situation such as *low* cognitive capacity (i.e., lacking cognitive resources)—“hardware aspect”—and high cognitive capability (i.e., having a ready solution)—“software aspect” (Kruglanski & Thompson, 1999), a problem holder would be considered more rational by adopting a cognitive omega strategy (e.g.,

backward reasoning strategy) with a well rehearsed conclusion (prior solution applicable to current problem).

To determine what is considered rational problem solving requires thinking about unique situational conditions (e.g., constraints) in problem solving contexts. Specifically, the cognitive alpha and omega model no longer equates an entrepreneurial approach with rationality in problem solving. The less entrepreneurial approach can actually be more rational if it reaps the reward of economizing cognitive capacity for the problem solver. With this concept, I identify a key problem from which many decision-makers suffer. This is the problem holder's ineptness to make flexible shifts from cognitive alpha to cognitive omega and vice versa when situational contexts demand mental dexterity. The more one decision-maker is inept at this changing, the less the person is able to adapt to the environment.

CAOS as a descriptive and normative theory. Rational decision-making theory is a normative theory in that it extracts a portion of the phenomenon of the human decision-making process. In contrast, CAOS is a descriptive theory in that it encompasses both notions—i.e., rational and (somewhat) irrational aspects of decision-making. In Carter's (1972, September) terms, most theories derived from the rationality assumption are used to construct a *procedure*—to make a practice better—whereas the CAOS conception here aims to construct a conceptual narrative toward a *process*—i.e., to describe a phenomenon better.

In the cognitive alpha and omega model, I conceptualize that either the entrepreneurial alpha approach or the less-entrepreneurial omega approach can be rational or irrational. The prime factor demarcating the boundary between rational or

irrational in cognitive strategy is the problem holder's choice made with consideration of his or her situational constraints (e.g., internal and external such as knowledge necessary and resources necessary to deal with the problem). If one keeps procrastinating in making a decision even with an applicable prior solution (i.e., referent criterion), his or her over-deliberativeness (i.e., cognitive alpha approach) should be called irrational. Likewise, if someone hastily completed a problematic situation without creating an applicable solution but used only strong wishful thinking (i.e., cognitive omega approach), his or her lack of due consideration would also be considered irrational. Problem solvers should be able to shift from cognitive omega to alpha and vice versa in accordance with situational constraints. We can describe a problem solver's incapability of changing as lacking *meta-rationality*—that is, rationality about rationality during the problem resolution period. The lack of meta-rationality causes a *meta-problem*—that is, a problem in dealing with a problem. Thus, the CAOS dichotomy offers a normative lesson for problem solvers by decreasing meta-irrationality, hence making them better problem solvers.

Summary

Cognitive entrepreneurship in problem solving and the cognitive alpha and omega models describe different mental approaches under problematic situations. A problem solver with heightened cognitive entrepreneurship tends to 1) generate a large number of mental syllogistic models before he or she finally selects one for problem solution; 2) generally commits more to proposed solution proposals, as if they are a solution, during evaluation; 3) is more heedful in finalizing a conclusion; and 4) is more likely to invest

cognitive labor *prior to* finalizing a conclusion (i.e., an *evaluation purpose*) rather than to spend cognitive efforts *after* finalizing a conclusion (i.e., *justification purpose*).

To define the situational variations of cognitive entrepreneurship in problem solving, I introduced the alpha and omega cognitive strategies. Sometimes, problem solvers internally and externally scrutinize available and applicable knowledge and evaluate its “situational relevance” in warranting a conclusion from the identified evidence. Thus, one follows a process of *reasoning* → *conclusion*. However, in some situations, problem solvers take an alternate approach such as (reasoning) → conclusion → reasoning. People make a decision very quickly and then ferret out evidence (reasons) that justifies the hastily made decision. In such an instance, external and internal evidence seeking compensates for an ill-conceived prior decision. I distinguish the latter reversal approach called a backward cognitive strategy from the former, which I call a forward cognitive strategy. The backward reasoning strategy is likely to result from willful or wishful thinking to achieve a certain decision outcome (the inclination to take a stand without just grounds or sufficient information) or from premature engagement of influential prior decisional rules.

At times, our behavior precedes any cognitive elaboration—i.e., cognitive omega (or even absence of it), such as when we make a decision (action) and subsequently justify the preceding action. At other times, our cognitive effort precedes any overt action—i.e., cognitive alpha. A problem solver using the cognitive alpha strategy is vying for a perfect solution selection for a problem, whereas a problem solver using the cognitive omega strategy is vying for a perfect justification for a preceding decision. A cognitive omega problem solver may have lower aspirations for information but has *no*

lower aspiration for problem resolution. However, determining the rationality of problem solvers by their choice of cognitive strategy is futile without considering the situational conditions under which the decision was made. Rationality should be judged only through the eyes of the beholders—i.e., the problem solvers.

Evans (1989) noted that human reasoning has many variations. He wrote that one's "apparent competence in...reasoning exhibited under one set of circumstances is so frequently absent in others" (p. 7). Across various problematic situations they encounter, problem solvers take different mental approaches in dealing with the problems. Then, we should question how and why such situational variations occur. In the remainder of chapter, I will turn to antecedent conditions to account for such situational variations in communicant behavioral patterns and cognitive strategies under problematic situations.

ANTECEDENTS OF COMMUNICANT ACTIVENESS

AND COGNITIVE ENTREPRENEURSHIP:

AN INTRA-INDIVIDUAL ACCOUNT OF PROBLEM SOLVING

All organisms are problem finders and problem solvers.

Karl Popper

The objective of this chapter is to build a theoretical account of the antecedent conditions that explain two new constructs: CAPS and CEPS. These two communicative and cognitive features are recurrent phenomena that bear important theoretical and practical implications to problem solving. The two previous sections identified the phenomena to be accounted for—i.e., conceptualizing two *dependent variables*—by the independent variables I am going to elaborate here. In what follows, I describe the

conditions that precede communicant activeness and cognitive entrepreneurship in problem solving.

Human Perception

We see a map of the world, not the world itself.

Albert Einstein

Our universe dives into a sea of our perceptual experience. Once we perceive that something is problematic, that we are not constrained from doing something about it, or that we feel close connection to a problem, we act on our perception. We do not act directly on the actual sources that trigger perception. In the situational theory of problem solving, I delimit the scope of antecedent variables to *perception*, not to *sources* of perception. In other words, what prompts our actions to do something about a problem is our *subjective perception* of feeling problematic, unconstrained, and connected, not the *objective things* that trigger such senses. Therefore, to gain conceptual coherence, we need to theorize from our internal *perceptions* to our *action* rather than to theorize from the external or internal *sources* of those perceptions to our *action*. In the latter theorizing approach, external *object variables* as independent variables (e.g., expert estimation of problem seriousness) explain the dependent variables of *action* (e.g., a public's information seeking about a problem). In contrast, in the former approach, subjective variables as independent variables (e.g., a public's perception of problem seriousness) explain the dependent variables of action (e.g., a public's information seeking about a problem).

Problem solvers will not initiate a communicative behavior or perform any cognitive labors unless they perceive a reason for it. For that reason, a message (a *source*

of perception) cannot trigger action unless it triggers a sense of problem recognition (perception). Our perception is often biased and inaccurate. However, regardless of how seriously our perceptions are flawed, people consistently respond to their own subjective perceptions. Therefore, knowing about people's perceptions can help in predicting their subsequent behaviors. For example, some people mistakenly overestimate current obstacles against them to do something about their perceived problem. Even if a barrier is simply exaggerated or illusory, one will not do anything because his perceived obstacle (constraint recognition) lowers his motivation to act. Thus, he would not take any action. Misperceptions are illusory, but their consequences are substantial.

Suppose that a doctor knows that her patient misperceives and overestimates barriers to improve his health. The doctor may not understand why her patient cannot do something to change a problematic situation. To use a doctor's more objective evaluation of the actual level of constraints cannot necessarily predict the likelihood of the patient taking action to do something about his problem. Rather, despite being pathetically inaccurate, people's *own misperceptions* will become stronger predictors of their subsequent behavior in dealing with the problem, even if less than optimal. What this suggests to us is that many theoretical efforts in communication behaviors adopt, more or less, the objective criteria of non-perceptual variables (e.g., education level, income, and psychographics) rather than subjective criteria dealing with matters of perception (e.g., problem recognition, constraint recognition, level of involvement). We perceive and construct our own reality, and then behave on that subjective reality. Thus, to understand how people approach their problems, we need to explain better how "the eyes of the beholders" perceive the situations that confront them.

Therefore, I delimit the following conceptual efforts to apply to the situational perception found in “the eyes of problem beholders.” Drawing a conceptual boundary in this way is necessary because, without such a delimitation, external versus internal distinctions can complicate the resulting account. For example, in a prior study of the situational theory of publics, the temporal order of involvement and problem recognition questioned whether problem recognition precedes involvement or involvement precedes problem recognition (J. Grunig & Childers, 1988). It remains a chicken-and-egg debate unless we can delimit our conceptual boundary to only the perceptual variables. By demarcation of independent variables to perceptual ones, we can solve the debate. Without a perceived problem state, there is nothing to evaluate how it is connected to us. We never evaluate the importance of something until we know its existence. Therefore, our perceptual awareness of a problematic state precedes our evaluation of its importance to our life. Next, I will construct a perceptual account of what kind of situational perceptions would prompt our problem-solving efforts within cognitive and communicative dimensions.

A Hierarchical Model of Problem Detection

How do we learn that a problem exists? Or, when do we notice that there is something so problematic that it subsequently initiates our problem-solving efforts? Specifically, how do we begin to pay attention to something as being *problematic* in a crowd of alternate candidates vying for our attention? Here, I propose a conceptual model—a verbal theory¹⁴—that answers these questions. This theoretical account is a hierarchical model of problem detection that provides a conceptual basis for concepts and

¹⁴ In terms of Popper’s (1999) terminology, the verbal theory I introduce in this section is a theory with high “logical content” rather than “empirical content” that lead me to a testable study (Popper, 1999, p. 19).

propositions of antecedent parameters within the situational theory of problem solving (STOPS). A hierarchical model of problem detection originates from what Karl Popper called “conjectural knowledge” (1963). Popper (1963, 1999) said in his evolutionary epistemics that *all perceptual knowledge presupposes a priori knowledge* for any living organism. *Conjectural knowledge* may or may not be valid. Regardless of its validity, it becomes a referent frame to judge what is presently wrong *perceptually*. Human beings become cognizant of something *problematic* when they perceive a perceptual discrepancy—“the clash between hypotheses and reality” (Popper, 1999, p. 47). In the following, I will discuss in detail how we come to perceive something as problematic.

Problem Detection

How do we know when something is problematic? Most psychologists and philosophers agree that *person perception* comes ahead of some *cognitive needs*. Earlier schools of social psychology (e.g., Associationists) believed in “data as strictly driving perception and humans as seeking accurate knowledge (truth)” (Gollwitzer & Moskowitz, 1996, p. 377). However, Instrumentalists such as C. S. Peirce and John Dewey challenged the assumption of accurate knowledge-seeking by pointing out that “people seek not truth, but simply an end to doubt” (Gollwitzer & Moskowitz, 1996, p. 377). Gollwitzer and Moskowitz (1996) made a comprehensive historical review about the shift of the assumptions. They succinctly summarized:

Peirce states (1877, p. 66) that the irritation of “doubt is an unhappy and dissatisfied state from which we struggle to free ourselves and pass into a state of belief, while [the feeling of believing] is a calm and satisfactory state which we do not wish to avoid, or change into a belief in anything else.” The struggle to end doubt was labeled as a process of Inquiry that produced what Gestalists called *closure*. According to Dewey (1938), this *process of turning indeterminate situations to determinate ones, of turning a state of inconstancy to one of constancy*, “like all activity is stimulated by discomfort, and the particular

discomfort concerned is called ‘*doubt*,’ just as hunger is the discomfort that stimulates eating and thirst is the discomfort that stimulates drinking.” Thus, the *processing system operates in the service of needs to gain a sense of control, seeking meaning and reducing doubt* (similar to what Festinger, 1957, labeled avoidance of dissonance). *An upset or imbalanced system, one beset by doubt, sets the person off on to what Dewey (1929) called a quest for certainty.* This quest can occur *through perusing accurate knowledge or through the pursuit of any knowledge* that will end doubt quickly and produce closure (so long as it is experienced as being a good enough or sufficient conclusion). [italics added] (Gollwitzer & Moskowitz, 1996, p. 377)

A *need* to do something arises when a living organism perceives a doubtful situation, because an indeterminate situation is problematic to a living organism. Unless the “doubt” or indeterminacy turns into a determinate state (i.e., “closure”), the living organism will avoid this situation of “discomfort.” This imposes a most fundamental problem—to live on. Thus, a living organism initiates a “quest for certainty,” maybe through “accurate knowledge” or through “any knowledge” that can achieve a satisfactory degree of closure. Naturally, any living organism evolves to have an internal detection mechanism to anticipate a potentially doubtful or discomforting situation.

Related to this detection mechanism, Simon (1967) proposed a model of dual mechanisms—goal-terminating and interrupt mechanisms—in the human nervous system. He reasoned that the human mind needs an interrupt mechanism to redirect cognitive resources to the most important tasks. Marcus, Neuman, and Mackuen (2000) reviewed Simon’s model of the working of the nervous system in proposing their model of affective intelligence.

The human nervous system...is primarily a serial processor of information. He [Simon] reviews research on attention, temporal response intervals, and memory to support this contention. Such serial processors require *two support mechanisms*, first a *goal-terminating mechanism* (Simon’s term is *satisficing*) to redirect attention when goal-oriented behavior has reached a satisfactory state in terms of an initial goal. Second, the human organism living in a demanding environment requires an *interrupt mechanism* to redirect human attention to

higher priority real-time needs, no matter the ongoing effort to secure some antecedent goal. [italics added]. (Marcus et al., 2000, pp. 6-7)

To answer for why we need a detecting mechanism, thus, we must consider that it helps living organisms mobilize their limited problem-solving capacity (i.e., cognitive and communicative resources) to generate a better fit with their living conditions.

Specifically, a perceptual detecting mechanism for impending problematic states allows us to know when we turn how much of problem-solving resources in what direction for how long of a time period.

Expectation, Observation, and Unbearable Badness-of-fit

How do we detect a problem? To understand this process, we need to know the basic mechanism of perception. Two key concepts that comprise the perceiving mechanism are *expectation* and *observation* (c.f., “conjecture”) and their joint interaction, the *perceived degree of goodness-of-fits* between two (c.f., “refutation”) (Popper, 1963). We continuously expect something out of living. At the same time, within the limits of our perceptual capacity, we continuously test the validity of our expectations. Observation tests the reasonableness of our expectations. By expecting something about what we are about to experience and by testing its fit with experiential objects or events (i.e., perceived reality), we get an internal sense of *experiencing*.

The content of what we expect can be anything. It could be transferred from *experiential knowledge*—i.e., our past experience or learning in a very specific form such as “after a cold winter, there comes a warm spring.” It could be derived from simple *inferential knowledge*—i.e., a guess or a wish about something to experience such as pulling the arm of a slot machine with a hope to get a jackpot, thinking the time for a jackpot has come after a series of losses. Or it could be even genetically-coded *inborn*

knowledge in a living organism such as a newborn baby who expects to be fed by its mother (Popper, 1963).

However, *without expecting* something or some state of conjectural *a priori* knowledge, no matter how crude its content, we cannot experience anything (Popper, 1963, 1999). A biological research finding suggests that the role of expectation-observation-refutation would be essential in our perception of the world (Radnitzky & Bartley, 1987). According to McCulloch (1965), frogs register only four kinds of visual effects because only four types of signals can be sent to their brains. McCulloch (1965) summarized:

The frog does not seem to see or, at any rate, is not concerned with the detail of stationary parts of the world around him. He will starve to death surrounded by food if it is not moving. His choice of food is determined only by size and movement. He will leap to capture any object the size of an insect or worm providing it moves like one. He can be fooled easily, not only by a bit of dangled meat but by any moving small object.... His choice of paths in escaping enemies does not seem to be governed by anything more devious than leaning to where it is darker. (p. 231)

To live, frogs only need four kinds of visual effects that enable them to accomplish such tasks as catching small moving objects (e.g., flies) and leaping towards dark spaces if they encounter a predator. To frogs, the world consists only of the contrasts, the small dark objects, the moving shadows and sudden dimming of light that they perceive. A frog's knowledge of the world is *not given* (i.e., data drive perception like the Associationists' claim), but is the *product of* the evolved sense organs and conjectural knowledge that only reflect some, but not all, aspects of the world (i.e., *a priori* conjectural knowledge drives us to perceive some aspects of world).

Why cannot frogs perceive things other than four objects in this world? Our experiential world, obviously, consists of many more than four things. Irrespective of

their presence, frogs have difficulties in perceiving them because they have no matching *internal theory* to be used for expecting the immediate environment they face. Like frogs, other living organisms cannot perceive without the available content material of expectations and the very act of expecting toward the immediate world. Unlike frogs, we human beings are far more evolved in our sensory organs and in our repertoires of conjectural knowledge.

We constantly apply and evaluate the *adequacy* of content we are expecting via observing the areas of experience that are defined by content material of an expectation. We are “anticipation machines” (Dennett, 1991, p. 177) that project the beams of expectation onto our environment in the same way a sonar or radar would. Without transmitting a pulse of sound and receiving its rebounding echo, we cannot ever detect anything regardless of its presence to us. The pulse of sound in sonar or radar is like our mental scan of the world we are about to experience. Experiencing an object or an event presented to us is only possible by the mental pulse we project and the rebound that we perceive through our sensory organs—*the act of expecting*. We may expect consciously or unconsciously. However, we cannot perceive without the very act of expecting.

In addition, just as we load bullets into a gun, we can load anything into our *expecting gun*, from pleasant events to boring routines, or from very general ideas to very specific knowledge. We are able to perceive by our act of expecting. Moreover, we are able to expect many things at the same time. The perceptual gun in our mind has its outstanding capacity to load and shoot multiple and seamless mental pulses simultaneously.

By way of analogy, we are like a turned-on projector loaded with various slides or films (conjectural hypotheses or lay theories about our living). We select and load contents into our mental projector corresponding to the life tasks we have to deal with at a given moment. Our continuous projection of *what will (should) be* to the screen (world we are experiencing) is then compared with *what is* on the screen. The lack of fit between what will be and what is redirects our cognitive resources to it. As mentioned, expecting an *a priori* theory/hypothesis is a necessary condition for any perceptual process and experience. However, a *variance*—a *psychological distance*—is created when our cognitive recycling attempt (expecting by applying a hypothesis of *what will (should) be*) yields a failure of fit to *what is*. Once a person identifies a variance, he or she tries to explain the variance by mending conjectural hypotheses (i.e., changing cognitive knowledge) or by modifying observational contents (i.e., changing reality through action).

To summarize, the expectation of things (conjecture) always comes first. Once an expected state (e.g., “The meeting will be pleasant”), which is the *content* of expectation (*conjecturing*), is found to be discrepant from the observed state (e.g., encountering hostile remarks from others), one detects a problem. This is a problem in that one experiences a failure to confirm the adopted hypothesis (e.g., pleasant meeting)—i.e., a lay theory about a present state. This is how we begin to perceive something as problematic.

Role of Emotion in Problem Detection

A problem must be felt before it can be stated.

John Dewey (1938)

Studies about information seeking draw heavily on the notion of uncertainty, treating it as if it is a *triggering mechanism* for the subsequent pursuit of information. Uncertainty perceived by a person would lead to negative emotional strain such as *anxiety*. Anxiety can be described as “the affective (emotional) equivalent of uncertainty” (Gudykunst & Nishida, 2001, p. 59), and it tends to motivate a person to seek information to reduce the experienced negative psychological state (Afifi & Weiner, 2002). Thus, affective states such as anxiety are commonly used to account for bridging the conceptual distance between *uncertainty* and *motivation* in information seeking (Afifi & Weiner, 2002). However, in the present study, I adopt a more general view, considering affective states other than anxiety. In essence, *any* affective state can allow us to detect a problematic situation.

Dispositional vs. surveillance system. What causes us to draw our attention from a present mental task to a new one? What kind of “interrupt mechanism” redirects our attention to a newly emerging problem? Simon (1967) pointed out that, in general, theories of human information processing are muted about the interaction of cognition and affect. Simon foresaw some role of emotion in cognitive systems (e.g., goal-terminating systems and interrupt systems), but he himself did not work on it (Marcus, Neuman, & Mackuen, 2000). Marcus et al. (2000) found a few theoretical works on the affect-cognition interaction and developed a model of two distinct systems consisting of a disposition system and a surveillance system in cognitive processing. Marcus et al. (2000) explained the dispositional system:

Strategic action, behavior designed to achieve a purpose, requires an ongoing evaluation. That is, it demands an assessment of the effort, the prospects of success, the current stock of physical and psychic resources, and feedback on the success and failure of the sequence of actions. For humans, these strategic

considerations are only occasionally governed by conscious calculation. More often these executive functions are done subconsciously. *Importantly, the emotions of the disposition system provide precisely this guidance.* When our feelings are focused on ourselves, changes in mood from gloomy to enthusiastic tell us that we are bursting with confidence, energy, and eagerness. Alternatively, when our mood changes in the direction of depression, we conclude that we are exhausted and beaten. Shifts in the direction of increased elation strengthen the motivation to expend effort and strengthen confidence in a successful outcome. Shifts in the direction of increased depression weaken the motivation to expend effort and undermine confidence that the outcome will prove successful. Accordingly, *this emotional calculus is translated into a summary disposition toward the action... the disposition system relies on emotional assessment to control the execution of habits: we sustain those habits about which we feel enthusiastic and we abandon those that cause us despair.* The disposition system provides people with an understanding, an *emotional report card*, about actions that are already in their repertoire of habits and learned behaviors. [italics added] (pp. 9-10)

About the surveillance system, they described:

The second system, the surveillance system, acts to scan the environment for novelty and sudden intrusion of threat. *It serves to warn us when we cannot rely on past learning to handle what now confronts us and to warn us that some things and some people are powerful and dangerous.* This system uses emotion to signal the consequences of its ongoing analyses. It generates moods of *calmness*, on the one hand, and *anxiety*, on the other. Here we focus on its attention-related properties. Identifying two systems in the limbic region of the brain suggests that people *rely on their feelings to assess how well they are doing*, and they *rely on their feelings to scan for signs of threat and uncertainty.* What is interesting about this second emotional system is that the onset of increased anxiety stops ongoing activity and orients attention to the threatening appearance so that learning can take place... So long as the comparison shows no discrepancy between expectation and reality, the system generates a sense of calm and remains unobtrusive. When the system detects unexpected or threatening stimuli, however, it evokes increasing anxiety, it interrupts ongoing activity, and it shifts attention away from the previous focus and toward the intrusive stimuli. [italics added] (Marcus et al., 2000, pp. 10-11)

A key contribution of their model is that emotion plays not only a role in managing routine tasks but also in redirection toward an emerging task. This is a straightforward extension of Simon's (1967) model of the workings of the human nervous system (i.e., goal-terminating vs. interrupt mechanism). However, to make a

more general accounting of the roles of emotion, their “emotional report card” concept should include more than “anxiety” or “calmness.” As I discuss next, any emotional states can play the role of an emotional report card.

Trade cognitive complexity for simple affective knowledge. We must adapt and handle multiple life problems simultaneously. For example, breathing, seeing, listening, answering the phone, writing, and meeting deadlines can come all at once. Hence, we develop and apply certain ways of behaving, responding, and adapting to such recurrent situations in an efficient way. Once we get used to maneuvering through a common problem, we find few reasons to maintain our cognitive investment to supervise each solution application. This is “automaticity”—defined as “capable of operating by itself without any need for conscious guidance, once put in motion” (Bargh, 1996, p. 173).

To handle multiple specific tasks simultaneously (which is a mandate for any living organism), we need to devise some way of “efficient supervision.” This requires some simplifying mental mechanism to reduce the complexity of handling multiple tasks. Prototype hypotheses can simplify by *trading complexity for a certain type of simpler cognitive information*, often in the form of affective information (e.g., confidence in dealing with the problem, good or bad, pleasant/comfortable vs. unpleasant/uncomfortable).

Prototype hypothesis. Popper (1999) described our epistemic hypothesis testing about future states to life itself:

So we reach the conclusion that life must from the start anticipate in some degree the future of the environment: that is, all future states of the environment. Perhaps it is just a question of hours, or perhaps of millions of years. Life must be adapted to the future conditions of the environment; and in this sense *general knowledge* comes earlier than momentary knowledge, than *special knowledge*. [italics added] (p. 49)

Anticipating with a general knowledge such as affective knowledge allows us to test our hypotheses about current and impending future states. Unless the general knowledge is invalidated, our mental process has no reason to be interrupted. The prototypic hypothesis testing is, thus, managing and supervising multifarious living tasks.

We are routinely challenged by a number of mental tasks arising at the same time. We need a meta-cognitive function that guides and manages routine tasks. Meta-cognition supervises how we are doing, rather than what we are doing. Hence, we have evolved to deal with such a juggling problem by trading cognitive complexity for a simple affective state. By lumping various forms of meta-cognitive feedback into a single piece of affective state—i.e., “emotional report card” (Marcus et al., 2000), we can condense and load them as one bullet into our mental gun of expectation. We can effectively test our hypothesis of “going well” by summarizing the status of many mental tasks with a single prototypical content such as “feeling pleasant.”

A fishing analogy can illustrate the role of *general knowledge* and *special knowledge* in managing multiple cognitive tasks efficiently. Suppose that we throw out many fishing lines (e.g., ten) simultaneously. How can we efficiently handle these multiple fishing lines without sacrificing our need for other mental commitments? Of course, watching them individually makes us busy, indeed too busy to handle any other work (e.g., reading books). A way to control multiple fishing lines is *knotting* them together. By merging all the lines into one and holding them as a bundle—i.e., *lumping*—we can reduce the necessary mental resources in supervising all of the individual lines. Until this system fails, we can efficiently meet our need for managing multiple tasks through the cheapest expenditure of cognitive resources. Once the bundle

as a whole is in motion, we next look for which specific line causes the movement. We economize our cognitive work until a sudden move arises. Similarly, a human being recognizes a problem and its source, first by lumping manifold life tasks together. Once we detect a strike—experiencing a betrayal of our expected content by observation, we then investigate the causes of the betrayal. Indeed, just a few mental *knots* (i.e., many clusters of prototype hypotheses) can handle numerous mental supervisory tasks. Once a betrayal of such a prototype hypothesis is experienced, it is quite conveniently detectable and the person can look for which part caused the problem.

By loading affective knowledge in our expectation gun (e.g., the sense of being pleasant), we can efficiently abstract many physiological, physical, and psychological tasks at any given moment. Any malfunction in any area of these life tasks will refute our expected mental hypothesis of “affective knowledge” (e.g., sense of being pleasant). This will break into our mental placidness—i.e., *perceptual arousal*. It then redirects our cognitive resources until we found a cognitive solution for the perceptual problem. If we are not able to find a solution (e.g., an explanation of why the “unpleasantness” happened and/or how to deal with it), then we enter into a situation that is a meta-problem—i.e., a *cognitive problem*. Emotion is a kind of “general knowledge” (e.g., pleasantness will be continued) that is supervising other mental tasks (Popper, 1999). Once general knowledge that is loaded in expectation does not fit well with observational knowledge, it then triggers a subsequent search for and identification of “special knowledge” (e.g., an explanation about how it arises and how to behave in response). Before a problematic situation, we can manage many critical living tasks with very simple, general, and

abstract knowledge. The *general conjectural* knowledge that often comes in the form of affective knowledge is sufficient to supervise other mental tasks.

General knowledge is very primitive, but it provides substantial cues to detect an eruption of a problematic state. However, we subsequently demand more *specific knowledge* about what causes the discrepancy and how we can narrow the gap. Our prototypic knowledge evolves from primitive conjectural knowledge (e.g., emotion) to comprehensive special knowledge as we continue our problem solving efforts. When a situation is over, we seal the problematic situation by means of the primitive conjectural knowledge (e.g., emotion such as pleasantness of confidence). By reloading the affective state right after a situation (e.g., expecting to be pleasant again), we reduce cognitive complexity that we generated from problem solving. We are trading meaning (confidence that we can handle such a problem) for complexity. In summary, our repertoire of expected knowledge moves to and fro along the general-to-specific continuum in corresponding to opening and closure of problematic situations. We travel a hierarchy of abstractness in conjectural knowledge from “general” to “specific” sequentially in a problematic situation.

Entering and closing a situation. We not only start a problematic situation with a tradeoff between a meaning and complexity (e.g., unpleasantness), but also end it with a tradeoff between a meaning and complexity (e.g., pleasantness). Once we build a solution successfully, we *seal* the problematic situation again by trading cognitive complexity for a certain meaning (i.e., a simpler prototype state such as *confidence*). If we are satisfied with the new solution, we then confidently trade the complexity (i.e., the procedural knowledge of how to deal with such a problem) for a simpler affective state

such as restoring pleasantness or feeling competent in dealing with a problem. Earl and Cvetkovich (1995) keenly captured our aspiration for achieving simplicity out of cognitive complexity in dealing with life problems:

Men, endowed with limited human capacities, are troubled by the complex environments into *which they are thrown*. They seek the key that will make the complex simple, *that will give meaning to the complexity*—trade meaning for complexity—and *thus allow them to forget it*.... And Veyne stresses the crucial distinction *between a key and explanation*. *A key is meaning and requires no argument, no evidence. It works because it reduces complexity*, not for any matter of reason. *It is only the result—simplicity—that counts*. The force of an explanation, in contrast, depends on the quality of its supporting arguments and evidence. [italics added] (1995, p. 34)

We are always struggling to cope with complexity. After our problem-solving efforts, a solution, a procedure suggesting what to do, may result. Yet, it taxes our mental resources to maintain these details. Thus, epiphenomenal mental work is necessary to close or seal a situation with endowed confidence about our newly acquired problem solving capability while letting one forget about technical details (complexity). In other words, the person now summarizes the details in problem solving by making it into affective knowledge.

Summary. People go through the steps of *trading* affective knowledge for cognitive complexity from the opening of a problematic situation to its closure. Emotion (affective knowledge) enables one to detect what goes wrong as an interruption mechanism. With the perceptual mechanism of expectation, affective knowledge makes it possible to conduct prototypical hypothesis testing—i.e., a *detection mechanism* (cf., “*attention operator*,” Simon, 1994). By an eruption of some emotion, such as uneasiness in a given moment, we recognize that something is falling outside of our expected state. Subsequently, we trace back what specifically triggers such a disruptive feeling.

Additionally, emotion plays a role in cognitive closure of a problematic situation. It finalizes and seals the mental chasm. If one successfully learns and understands the details of what to do in a problematic situation (e.g., information), people then assign an affective summary about one's competence in problem solving (e.g., confidence). After making efforts to come to an end of a situation, the end state should be the newly updated expected state or a renewed observed state that reflects our efforts at problem solving (e.g., changing conditions in and around the problem). Whereas a situation arises through an emotional signal, a problematic situation is resolved, again, with some emotional sealer. It is a *compression of information* that plays a functional role as a *mnemonic device*¹⁵ and an interruptive mechanism that diverts our mental concentration to other emergent tasks—i.e., new problems. In other words, emotion plays an indexing role that summarizes and sorts out cognitively complex information. It is a tag or label of a given set of detailed information contained within a solution. Here, a tradeoff occurs between complicated cognitive contents of how to deal with a problem and an emotional conclusion that summarizes one's competence in dealing with that kind of problem (e.g., a euphoric feeling such as pleasantness, high self-esteem, or confidence regarding the problem). Therefore, the closure of a problematic situation occurs with a tradeoff between cognitive complexity (information) and the relatively simple affective knowledge (emotion).

However, in some situations, people cannot solve a problem because of severe constraints, despite their strong desire for problem resolution. Under such constraints, they might skip the process of accruing information (i.e., cognitive details) to construct a

¹⁵ Mnemonic device refers to “an active, strategic kind of learning device or method, a rehearsal strategy” which provides an excellent means of retrieving the information (Ashcraft, 1994, p. 199).

solution but turn instead to alternate fillers—i.e., negative emotion seeking. Whereas information helps to close the gap between expected and observed states by fixing appropriate new expectations and/or improving observational states, emotion can create a similar state of closure by filling up the gap with emotional content (e.g., anger). That is, emotion can become *a solution of discrepancy* that reduces the perceived gap from badness-of-fit between expected and observed states. In such a case, affective knowledge becomes a special form of information that is functionally equivalent to information about a situation. Thus, when one perceives a problem and feels a strong connection to it, yet also feels strong constraints against doing something about it, one may engage in *emotion seeking* rather than information seeking (i.e., not *by cognitive complexity*).

Definition of Problem and Situation

For there is nothing either good or bad but thinking makes it so.

Hamlet, William Shakespeare

What is a *problem*? Are problems always negative? And what is a *situation*? J. Grunig (1968) viewed a problematic situation as “a function of a change in the situation” (p. 52). He explained environmental factors (e.g., economic resources), individual factors (e.g., psychological attributes), and their interactions as antecedent conditions of a situation. He explicated problem solving and situation as such:

Problem solving behavior begins when a change occurs in the individual’s antecedent situation or he finds himself in a new situation. The situation then becomes lacking or indeterminant. The lacking situation creates a state of tension in the individual and “motivates” him to find a solution to his problem. Recognition of the existence of an indeterminacy converts the indeterminant situation into a problematic situation, in that recognition of a problem is the first step in solving it. (J. Grunig, 1968, pp. 32-34)

Problem recognition occurs right after an observation refutes the content of an expectation. The situational theory of publics defines problem recognition as “detecting that something should be done about a situation and stop to think about what to do” (J. Grunig, 1997, p. 10). To explain two new dependent variables of communicant activeness and cognitive entrepreneurship in problem solving, I will explicate in the following section conceptual meanings for *problem*, *meta-problem*, *situation*, *problematic situation*, and *problem recognition*.

First, I confine *problem* to those only already perceived. It is of little use to extend the range of problem definition to something unperceivable to a decision-maker. Let's take an example of poor minority residents who are exposed to high levels of lead in their houses, but who have not yet perceived how serious the situation is. Government officials may initiate a massive health campaign to do something about it. However, if the most of the affected residents are heavily constrained by more urgent problems (e.g., making a daily living), the lead problem would not be a problem to the residents. Despite the danger, they do not perceive themselves to be in a problematic situation. They still feel happy and secure. The problem of lead contamination exists in the health communicator's mind and not yet in the residents' minds. Putting aside the normative issue of the urgency of doing something about it, a problematic situation will not exist until the residents perceive its consequence themselves (e.g., illness from the lead).

Human beings can perceive changes in their environments (a change in the situation) only when one has adopted a frame of reference that gauges degree of departure from it. Without a state to compare with what we psychologically carry at the moment, nothing can be perceived as change or difference and thus as problematic. In

terms of the situational theory, people perceive something missing or sense a change in a situation when the *a priori* expectation they hold is not met as anticipated. They perceive a problem, a difference or change, when they experience such a betrayal of content material on an expectation. I define *problem* as a perceptual discrepancy between expected and observed states to the unbearable extent of badness-of-fit. This is a *perceptual problem* in that it arises when an *assumed hypothesis* about a current state and *perceived reality* collides. In Popper's (1963, 1999) terminology, a *problem* is the occurrence of which conjectural knowledge is refuted by reality. *Problem detection* is the moment that a living organism perceives the refuted conjectural knowledge. A *perceptual problem* triggers subsequent cognitive efforts to mend the discrepant cause of conjectural knowledge or to change or deflect perceivable reality.

In the past, we considered the term *situation* as an identical concept with the term *problem*. However, here I distinguish the terms *situation* or *problematic situation* to have exclusive connotation of a *temporal period* from the point of time at which one detects a meta-problem to that the point in time when the problem solver reduces the perceived discrepancy by *any* means.¹⁶ In other words, a situation refers to the temporal distance between the refuted conjectural knowledge and the establishment of an irrefutable new conjecture—i.e., a period of recovery from badness-of-fit to goodness-of-fit between expected and observed states. Whereas a problem is about a *perceptual aspect*, a situation or a *problematic situation* is about a *cognitive aspect*.

Although problems may arise, situations may not occur. I make this distinction because a situation starts only when a *meta-problem* occurs, *not when a perceptual problem occurs*. We deal with an almost infinite number of problems throughout our

¹⁶ The reduction of perceived discrepancy—i.e., problem solving—can be reached in several ways.

lives. At every moment, we encounter more than a manageable number of perceived discrepancies between our expected states and observable states. However, not all problems lead us to desperate *situations* that make us “stop to think about what to do.” We learn from past problematic situations and thus anticipate and carry a past solution for similar problems. Because we have an inclination to develop solutions for problems we commonly encounter, we attempt *preconscious problem solving* by applying an available past solution. In case we experience a special moment in which our solution *cannot* solve the problem, we experience a problem in dealing with a problem. This is a *meta-problem*.

I define a *meta-problem* as a perceived discrepancy between expected states (e.g., “I think I have a solution for this kind of problem”) and observed state (e.g., “I have no idea what to do for this problem”), *specifically when* the anticipated state is one’s belief that one has a readily accessible, available, and applicable new hypothesis pertaining to a problem. This problem, the *absence of a readymade solution to a problem* at hand, is a *cognitive problem*. When we fail to do preconscious problem solving and experience a meta-problem, we then enter into a problematic situation. A problematic situation thus requires two prerequisites. One is problem detection and the other is meta-problem detection. The closure of a problematic situation occurs when one establishes an applicable solution *and* one can successfully effectuate it enough to restore goodness-of-fit between an expected state and an observed state. I will thus limit my theoretical focus to *problematic situations* (i.e., only problems coming with a meta-problem) rather than all *problems* from now on.

Analogy for problem and situation. To illustrate, I compare problem and situation with the notion of *time* and *space*. A problem is analogous to a geographic concept,

space, whereas a situation is analogous to a time concept, *period*. As noted, the STP did not distinguish between problem and situation. Researchers have used the two concepts interchangeably and synonymously. However, I illustrate the differences between the two terms as follows. A *problem* is a *mental space* that is opened in a *subjective field of experiential interest*. This mental space takes up the area between the expectation of a certain state and the observation of certain state in the perceiver's mind. The chasm between the two states creates a temporal mental space. In other words, a problem is a mental space that is temporarily opened in a perceiver's *psychological field*, which is defined as *a domain of experience* at a given moment. In contrast, a *problematic situation* is a *subjective time period* that is demarcated and exists when a *meta-problem* occurs. To close a mental chasm (problem), a perceiver makes efforts in narrowing the mental space.

A situation can end, but a problem continuously exists. A perceiver would thus terminate the period of thinking of something as problematic by leaving the mental space (e.g., avoid thinking about the problem on which he or she feels little difference can be made). It may be through fixing the expected state (e.g., setting up a new expectation regarding the problem) or through subjectively deflecting the observed state (e.g., wishful thinking or selective information seeking). In brief, problem recognition is *a summary construct* encompassing *the opening of mental space over a certain time period*.

The field conception of a problem is useful in accounting for the differential contents of problems between information forwarder and information processor. Two communicants may be in the *same field* but existing with or without problem recognition. Perhaps the problem content for the information giver on some issue is different (e.g., a

pick-up truck salesman under pressure to meet the minimum quota for monthly sales) from the problem content for the information taker (e.g., a browser who may buy a car in the remote future but not immediately). The contents are different, but the field (subjective field of interest) is the same—that is, car buying. By the fit between the expected and observed states of each perceiver, a problem may exist on one side but not the other side (e.g., the car dealer is active but the customer is not active).

Correspondingly, one may become very active in giving information, while another is not active in seeking information (e.g., potential customer is lukewarm but the salesman is desperate in promoting his car). Problems can often present differently even in the same field (e.g., car trade) by the function of fit between the individual perceiver's content of expectation and observation implied by the expected content.

Problem and negativity. We assume that negative events are easier to notice than positive events. For example, Slovic (1993) in his asymmetry principle of trust-building and trust-destroying suggested that negative events carry much greater weight than positive events when events come to our attention. However, this is not necessarily so, at least in problem detection. If some series of event history consists of a larger number of failures than successes, the failures (negative events) will be more visible. Likewise, once attention is drawn, negative information gets more weight in judgment than positive cases do.

However, we need to distinguish the salience of negative information between the *attention phase* and *judgmental phase*. Although, in the judgmental phase, negative information naturally carries more weight for its potential consequence, in the attention-phase, there is no reason for it to garner more attention than positive information.

Because attention depends on *context*, rather than on severity of consequence, the noticeability of negative and positive information at the attention-phase has no reason to differ. In other words, attention is not *content-sensitive*, but *context-sensitive*—how conspicuous it is among others.

The way I define problem pertains to the *attention phase* rather than the *judgmental phase*. Hence, this frees the concept of problem from its *content characteristics* (e.g., negativity). Problem is a *detection of ill fit between expected state and observed state*. For problem detection, the content of expectations does not necessarily play a role in perceiving something as problematic. For example, if one receives notice from a doctor that one has a terminal illness, a *negative problem* is likely to be perceived. However, if the poor person is again notified that the prognosis was in error, he must experience a pleasant surprise—that is, a *positive problem*. The person had detected problems similarly in either case, in that they betrayed his expectations at the moment. His doom problem and delight problem were equally discrepant. We perceive any pleasant problem through *an identical detection process* as we do for any unpleasant problem. Failure of our expectation does not mean a failure of our interest.

In addition, what makes a problem from the attention phase continuously problematic in the judgmental phase is not *the content of observation*, but the content of expectation. To clarify, I offer the example of chess players. In a chess game, one player's strategic and successful move against the competitor's queen can be perceived in starkly different ways. Although two chess players share a *single identical event*, one player feels successful and the other player feels defeated. Although the strategic move is perceived as a negative problem for the threatened player, it is not a negative problem

for the winning player. Likewise, one team's scoring of a touchdown in a football game will likely be perceived as a problem for one side, but not a problem for the other. A problem is a *subjective state* if and only if it presumes, intentionally or unintentionally, consciously or unconsciously, some state of being within the situation. For that reason, a change of situation from normal to problematic happens because of the discrepancy of expectation from what the person observes now. To be precise, nothing can be necessarily considered problematic solely because of observed content.

Problem-solving strategies. Generally speaking, the proposed hierarchical model of problem detection suggests three strategies for dealing with problems once a person perceives a psychological distance between the expected and observed states in one's domain of experience. A problem solver's strategies in dealing with a problem vary from 1) *revision strategy*, 2) *deflection strategy*, to 3) *flight strategy*. The first strategy is to remedy the contents of the expectation—i.e., *revision of expectation content* (e.g., lower one's aspiration). The next strategy is to fix the contents of the observation—i.e., *changing or deflecting the observed content* (e.g., being selective, such as avoiding discrepancy-causing information). The last way is flight from the problem—i.e., *leaving the problem field* (e.g., avoiding thinking about the problematic situation). The first two approaches directly intervene into either of the sources that cause the discrepancy. Specifically, one may look for revising or reinforcing information through communication behaviors by taking a certain cognitive strategy (e.g., cognitive omega strategy).

A problem solver's *subjective perception about the problematic situation* will influence what kind of problem-solving strategy one would subsequently take. Thus, it is

necessary to inquire what kind of perceptual antecedents influence the choice of subsequent problem-solving strategies. They are problem recognition, constraint recognition, level of involvement, referent criterion, and situational motivation in problem solving.

*Antecedent Parameters of Communicant Activeness and
Cognitive Entrepreneurship in Problem Solving*

Problem Recognition

No problem exists until we recognize it. We do not discover a problem external to us. It is born and lives *inside* of us. Thus, a problem is not independent of our individuality in thinking. A problem is a joint product of our mind-working and the perceived world in which we reside. The interaction between *what we expect* and *what we observe* jointly creates a problem. The size and characteristics of a new-born problem are solely defined by the extent of cohesion or collision between the contents of expectation and observation. I have explicated the differences between *perceptual problem (problem)* and *cognitive problem (meta-problem)*. A perceptual problem is the early and necessary part of a problematic situation that mainly involves the attention phase in a problematic situation. In contrast, a cognitive problem is the latter part of a problematic situation. It primarily concerns the judgmental phase of what to do about the perceived psychological discrepancy. The judgmental phase concerns the perceiver's evaluation of what caused it, how it can be resolved, and to what extent one is competent in problem solving of this kind.

Definition. The situational theory of publics adopts a definition of problem recognition as when "people detect that something should be done about a situation and

stop to think about what to do” (J. Grunig, 1997, p. 10). In the previous section, I conceptually illustrated how we detect something as an unbearably poor fit by a hierarchical model of problem detection. Following the introduced concepts, I define *problem recognition* as *one’s perception that there is something missing and there is no immediately applicable solution to it*. It is, thus, a *meta-problem following a perceptual problem*—i.e., a perceptual state one experiences after the failure of *preconscious problem solving*.

It is not only a *perceptual problem*, but also a *cognitive problem* in that one recognizes something discrepant and experiences the absence of a handy solution. A person who perceives a problem but feels incapable of finding an immediate solution (i.e., a mechanism to narrow the *perceived* psychological discrepancy) then enters into a problematic situation. As a result, the person is likely to stop one’s current routines to think about a solution. However, it increases only the probability of “stop to think about what to do,” not determine it. There are other factors such as the extent of perceived connection to the problem and perceived obstacles in doing something. These additional factors jointly influence whether one “stops” things one is doing “to think about what to do.” In other words, a person may or may not *stop to think* about what to do even with a high level of problem recognition

To conceptualize problem recognition, thus, we need to incorporate two aspects of a problem simultaneously—the perceptual problem and the cognitive problem (attention phase and judgmental phase). Without a precedent perceptual problem, we never feel a modicum of reason to “stop to think about what to do” (J. Grunig, 1997, p. 10). Our *motivation for stopping* our routines *to think about what to do* presumes that we

recognize what is currently missing: detect a discrepancy between what we expect and what we observe and experience absence of a solution.

Level of Involvement

Communication and marketing research heavily uses the concept of involvement (Salmon, 1986). The involvement concept demonstrates its utility in segmenting and discriminating between people with varying levels of involvedness. The level of involvement correlates with the differential behaviors regarding products, issues, or problem solving behaviors (J. Grunig, 1989). Specifically, when we know one's level of involvement, communicators can predict how an individual would behave differently regarding problems, products, and ideas. Singling out a cohesive but distinct group of people from a general population almost always rewards communicators with its economy, efficiency, and effectiveness in pursuing communication objectives. However, there is much confusion that arises from overuse of the concept among communication researchers. Therefore, I next delimit the conceptual meaning of involvement adopted in the present study.

Definition. Lovelock and Weinberg (1984) gave a “common-sense” definition of involvement as “degree of importance or concern” that a product or behavior generates in different individuals (p. 73). Previously, the involvement concept carried meaning in a non-perceptual way. For example, Krugman (1965) defined involvement as a characteristic of a “medium” (1965) and Rothschild and Ray (1974) saw it as a characteristic of a “product.” However, J. Grunig (1976) defined it as a “perception” that people come to have within a given situation. He defined *level of involvement* as “the extent to which people connect themselves with a situation” (J. Grunig, 1997, p. 10).

People enact their communicative action *by their perceived connection*—involvement—of self to the problematic situation. When their perceived connection is low, they are likely to be passive in communication behavior. When they perceive a close connection, they are likely to be active in communication behavior. Thus, it is better to capture the notion of a perceptual variable of involvement, rather than capturing the notion of triggering variables of perception. Even if the *actual connection* of some events or problems to us is important, we will not initiate behavior to do something about the problem until we consciously perceive a connection.

Without awareness of an existing problem, a situation will never start. We never feel something needs to be done without a preceding perception of something missing. Knowing what is missing is a logical *a priori* step to estimating how closely we are connected with it. We should see there is a significant leap from one's *actual connection* to one's *perceived connection*. We do not live in an objective world, but live in a perceived world. We construct our reality subjectively, not taking a single standard version of reality. We thus translate our *perception* of the world, not the *world* itself. We cannot do anything at all before we happen upon this perception. *Actual* connection is, thus, different from *perceived* connection.

A person who is not aware that he is terminally ill (i.e., *actual connection* to the health problem) will not do anything about it until he finds abnormal signs of his physical condition—problem recognition. It is only after he recognizes his health problem that he evaluates how important this problem is to him (i.e., a perceived connection). Thus, to understand, explain, and predict subsequent problem-solving efforts (e.g., communicant

activeness), we need to delimit our conceptual scope to *what we perceive as being connected* rather than to *what we are actually connected*.

Constraint Recognition

Unlike the concept of involvement and problem recognition, few communication and marketing theories use a concept like constraint recognition explicitly (J. Grunig, 1989). Constraint recognition is one of two original conceptual variables developed by J. Grunig (1968) in the earlier version of the situational theory of publics. Constraint recognition has its origin from economics and management science rather than from psychology, unlike many variables in communication theories. A close parallel concept of constraint recognition from economics and management is a *discounting factor* in linear programming, a statistical process that can be used to maximize profits *within the constraints of resources available* to a decision maker (J. Grunig, 1968, 1989). Later in social psychology, Bandura (1977) proposed “personal efficacy” in his social learning theory, which is a very close concept to J. Grunig’s (1968) constraint recognition.

Definition. The situational theory of publics defines constraint recognition as when “people perceive that there are obstacles in a situation that limit their ability to do anything about the situation” (J. Grunig, 1997, p. 10). From studies about large land owners and peasants in Colombia, J. Grunig (1969, 1971) found that “people have little need to communicate in situations where constraints prevent people from making choices” (J. Grunig, 1997, p. 10). Constraint recognition discourages communication behavior such as information seeking and processing even if communicants have high problem recognition and/or level of perceived involvement. As noted by J. Grunig’s (1969, 1971, 1972) studies of Colombian peasants and landowners, people are less likely

to communicate about “problems or issues about which they believe they can do little or about behaviors they do not believe they have the personal efficacy to execute” (J. Grunig, 1989, p. 212).

Referent Criterion

People approach their problems by recalling relevant experiences of success similar to a current problem. If their search for prior experience is fruitless, they will turn to external sources for a solution. Originally, J. Grunig (1968) described a referent criterion as a “gross criterion” or “general guide” in which other more specific criteria will be required to fit (e.g., maximum profits, maximum sales, and survival of the organization) (pp. 27-28). According to J. Grunig (1968), a referent criterion is “determined by the antecedent condition, especially from the social contacts of the individual and from his past behavior which has partially determined the antecedent conditions” (p. 27). J. Grunig (1968) illustrated the need of a referent in *repeated problems* by Simon’s (1957) explanation. Simon (1957) explained such a need:

When a problem of a particular kind has several times arisen for decision, it may lead to a generalized query of the following kind: “what criteria can I discover which can be used whenever a problem of this kind arises?” For example, the experienced fire fighter asks, “Are there any underlying principles of fire fighting which can be applied to the *many fire situations* with which I deal?” [italics added] (p. 97)

Thus, J. Grunig (1997) formally defined a referent criterion as “a solution carried from previous situations to a new situation” (p. 11). We can also construe referent criterion as a cognitive “schema” and “cross-situational attitude” to those bits of cognitive and attitudinal knowledge that guide problem-solving and decision-making (J. Grunig, 1997). It generally reduces the need for a problem solver to search for additional information. However, the referent criterion as an independent variable has not been a

good predictor for communication behavior as intended (e.g., J. Grunig & Disbrow, 1977). J. Grunig (1997) thus dropped it from the situational theory of publics. He omitted it because he concluded that referent criteria would be “more of an effect of communication than a cause” (J. Grunig, 1997, p. 11).

Although dropping the referent criterion has conceptual and empirical merits, I find that the notion has some conceptual utility in explaining the new variables in this dissertation. In the earlier chapter on communicant activeness in problem solving, I developed a set of new dimensions of communicant activeness such as information forwarding, information sharing, information forefending, and information permitting. I reason that the referent criterion a solution carries from previous situations would explain little variance for information seeking and processing empirically. However, I reason that it may explain and predict the dimension of information transmission and selection variables to some extent.

For example, we can run four more regression equations beyond the two conventional regression equations for information seeking and information processing (J. Grunig, 1997, p. 12). Should a referent criterion—a solution toward a given problem—be available to a communicant, we can logically predict that she or he would forward or share it with others, would forefend more and permit less in taking and giving newly available information. If the dropped variable, referent criterion, removes some variance in explaining those dependent variables of communicant behavior, keeping it out of situational theory should be a loss, not only in the empirical sense but also in terms of theoretical validity. In the following section, I will refine its conceptual meaning in detail.

Definition. Although it has some perceptual aspect, referent criterion is closer to cognition because it conceptually taps and measures the *available* knowledge and inferential rules from one's prior problem-solving experiences. I define referent criterion as *any knowledge or subjective judgmental system that exerts specific influence on the way one approaches problem solving*. This can include *decisional guidelines* or *decision rules perceived as relevant to a given problem*. Problem solvers bring them over from prior problematic situations. However, I discriminate between decisional referents *on-duty*—that is, applicable and workable referents of which a problem solver is aware—and *off-duty* ones—those which are applicable and workable but *not yet recognized* for their value to the given problem-solving situation. Even if we store some useful knowledge or decisional referents in our memory, unless they are available and evaluated for their workability within a given problem, they are of no use. By the success of internal searching for retrievable solutions or pieces of knowledge to construct a new solution, one's degree of cognitive entrepreneurship and communicant activeness in problem solving varies. If a problem holder finds a retrievable and workable referent criterion, he or she is less likely to have an entrepreneurial mindset and less eager to seek for information in dealing with a current problem. In contrast, if one has difficulty in retrieving a workable solution from internal storage, then one is more likely to take an entrepreneurial mindset and communicant activeness to compose a novel solution.

In addition to the knowledge aspect of a referent criterion, I now include the *presence and extent of wishful thinking and/or willful thinking* toward an end state in problem solving. Generally speaking, such self-fulfilling decisional referents as wishful thinking or willful thinking lower one's problem solving effectiveness because of their

tendency to result in misdiagnosis of problem characteristics and self-fulfilling solution building and evaluation. Once a problem holder retrieves such a self-fulfilling referent (e.g., a goal, a desire, or a preference), this will strongly influence the interpretations and selection of the data encountered during problem solving. The stronger presence of such self-fulfilling decisional referents will result in more information forefending and a less entrepreneurial approach in problem solving.

In summary, problem solvers do carry referent criteria from previous problematic situations. Or they instantly improvise by configuring available knowledge, experience, or judgmental rules derived from similar problems. In the latter case, problem solvers often use subjective decisional referents such as wishful or willful thinking about the end result. However, irrespective of the differential contribution to problem solving effectiveness, any decisional referent is functionally identical in that problem solvers deploy it to gain closure on a problematic situation. They become a *major premise* of syllogistic reasoning in a given decision-making or problem-solving scenario. In case one adopts a more self-fulfilling referent (e.g., a terminally ill patient may think my illness must not be that serious), subsequent choice and drawing of the minor premise would be a more self-fulfilling one that corresponds with the subjective major premise components (e.g., *sampling of observational reality* that is more compatible with self-fulfilling referent: “Look, most of my physical conditions are not different from normal people”).

Situational Motivation in Problem Solving

Situational theory offers a means to predict publics’ differential responses with its three *perceptual* variables and the referent criterion one activates after detecting a

problem. One's perception is *subjective* to the individual perceivers (individual differences with the same perceptual object and event), *situational* across time periods (they dissipate and no longer exist after problem resolution), and *antecedent* to motivation (may or may not do something about the perceived state), cognitive processing (one may or may not think further about the perceived state), and communication behaviors (one may or may not seek, forward, and forefend information). People act on their perceptions, whereas motivation and cognition (i.e., referent criterion) are enacted by the perceptions. We can say that the perception of a problematic state, perceived capacity or capability regarding problem, and perceived connectedness are the prime movers at least in our mind that trigger subsequent adaptive behaviors about the perceived states (i.e., problems).

Source of redundancy in problem recognition and level of involvement. J. Grunig (1997) has defined problem recognition as a situation wherein “people *detect that something should be done about a situation and stop to think about what to do*” (p. 10). He defines level of involvement as the perceived “extent to which people connect themselves with a situation” (J. Grunig, 1997, p. 10). The measurement item for problem recognition is “how often do you stop to think about” the issue; whereas for level of involvement the measure is “to what extent do you see a connection between yourself, personally, and each of these situations” (J. Grunig, 1997, pp. 45-47). These two constructs are complementary but independent in predicting different communication behaviors. However, we need to take a finer look at how we come to “stop to think.” Our perceptual mechanism detects countless “discrepancies” or cases of “something is lacking” routinely. Whenever we detect a lack, we instantly judge whether and how it

would affect (i.e., *connect* to) our current or future state of being (e.g., “Will this ruin my interest?”). By instant judgment (i.e., preconscious problem solving), we tend to keep only a handful of “lacking situations” out of the countless “something missing situations.” The resulting “stop to think about” state is, thus, *an end state* from our judgment about *relevance*—to the extent of connection between ourselves and a missing state.

Even if we detect a problem, unless it affects us significantly, we will soon leave the situation. There is a sequential cognitive process that people lead themselves to a certain communicative behavior. To illustrate, we need to look at the behavioral molecule that dissects the developmental stages for the human decision-making process. We *perceive* a certain state as problematic when our current expectation about things turns out discrepant from it. The *detect* of the behavioral molecule is thus an initial point at which we experience the existence of some problem. J. Grunig thus explained that “problem recognition represents the detect segment of the behavioral molecule...people do not stop to think about a situation unless they perceive that something needs to be done to improve the situation” (J. Grunig & Hunt, 1984, p. 149). Even if we momentarily “stop to think about” something that has a close connection, we will not continue to pay cognitive taxes in sustaining us to keep us “stopping to think.” We are under other situational demands from more closely connected problems. We are cognitive investors who selectively distribute our limited cognitive resources in terms of some prioritization principle. “Stop to think about” is thus the outcome of a *cognitively active* state resulting from a joint function of three *perceptual* prerequisite conditions: the *internal presence* of a problematic situation (detect), the *perceived connection* close enough to keep our mind

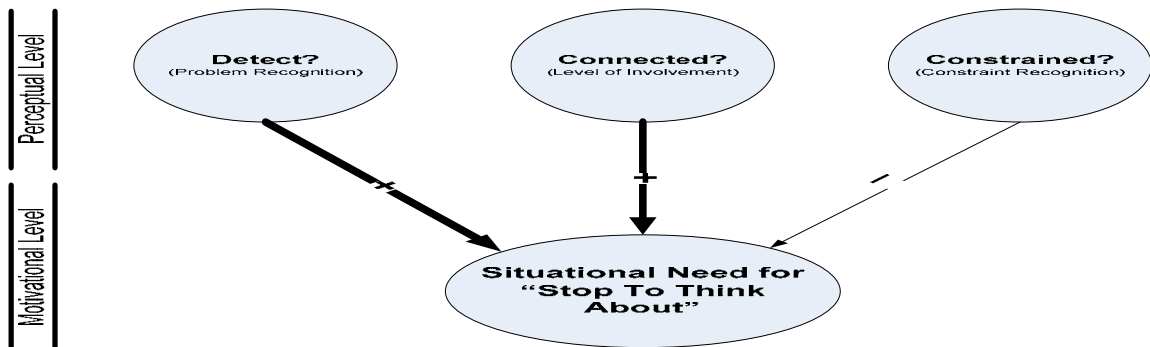
alive to think about the problem, and the *perceived obstacles* prohibiting us from doing something about the detected missing state:

$$\text{Stop to think} = f(\text{detection, connection, constraint}).$$

Detection that something is missing in a situation alone is not sufficient to *stop to think*. Both detection and connection are two perceptual *necessary* conditions for “the state of *stop to think*” about the discrepancy further. Putting it differently, when people “stop to think” about something then there would be a sufficient level of “perceived missing,” “perceived connection,” and “perceived lack of obstacles” that make cognitive efforts meritorious to the perceivers.

Additionally, three of the independent variables in the situational theory are *perceptual variables* such as “perceived lacking,” “perceived connection,” and “perceived obstacles that limit one’s ability to do anything.” To enhance the conceptual coherence among the independent variables, the situational theory needs to eliminate the “stop to think” notion from its conceptual definition of problem recognition. Again, one’s state of *stop to think* is not perceptual, but *motivational*. The following diagram illustrates the conceptual sequence between situational perception and situational motivation.

Figure 9. Situational motivation and perceptual antecedent conditions.



Three perceptual variables jointly predict one's "heightened cognitive readiness" and "augmented epistemic motivation" as cognitive and motivational outcomes during a problematic situation. The situational perceptions and the epistemic motivation are confounded in the current definition and operationalization of problem recognition. It contains a built-in confoundedness that is tapping the level of involvement.

We are cognitive economizers who selectively "*stop to think*" about only those problems that are closely *connected with* us. For this reason, "the extent to which people connect themselves with a situation" is already incorporated into the concept of problem recognition. As a natural consequence, the questions used to measure two constructs, problem recognition and level of involvement, become conceptual Siamese twins; measuring one thing unavoidably taps the other. To summarize:

People do not stop to think *unless they perceive* that something is lacking in the situation (problem recognition), *unless they perceive* that their connection with the lacking state is causing some threats or opportunities, and *unless they perceive* a lack of barriers that prohibit one's problem-solving efforts. Thus, *stop to think about tendency* is defined as a *situational motivation—i.e., a situational need for cognitive working to fill out the discrepancy* between expected and observed problematic states and to improve the problematic situation.

Summary

In this section, I reviewed and elaborated key independent variables to account for communicant activeness and cognitive entrepreneurship in problem solving. I first explained the concepts of problem and situation by introducing conjectural knowledge and its testing—i.e., expectation and observation of a living organism. In so doing, I

discussed the role of emotion (e.g., knotting) in managing multiple cognitive tasks. That is, a piece of general and abstract affective knowledge (e.g., pleasantness) becomes the content of a conjectural hypothesis to be tested by observation. I called this prototype hypothesis testing. It gives a supervisory summary of many mental and physical tasks at a given moment. Once we experience a refutation in prototypic hypothesis testing, we subsequently pursue more specific knowledge to explain what happens, why it happens, and how something should be handled. Entering and closing a situation is thus signified with conjectural affective knowledge that trades cognitive complexity for simpler affective meaning.

Next, I reviewed and refined four situational antecedent variables from the situational theory of publics (J. Grunig, 1989, 1997). They are problem recognition, level of involvement, constraint recognition, and referent criterion. I distinguished problems as emergent in two different phases: perceptual (attention phase) and cognitive (judgmental phase) problems. I refined problem recognition to be *one's perception that there is something missing and there is no immediately applicable solution to it*. This reworks the previous definition of problem recognition, “people detect that something should be done about a situation *and stop to think about what to do*” (italics added, J. Grunig, 1997, p. 10). Although one detects discrepancies between expectation and observation, not all detected discrepancies make one “stop to think” about what to do. One’s “stop to think” tendency is the outcome of situational perceptions such as detection, connection, and constraints. Thus, I remove the notion of “stop to think about what to do” from the definition. Conceptual refinement resolves the multicollinearity problem among situational antecedent variables (Kim, Downie, & De Stefano, 2005; J. Grunig, 1997).

I also delimited involvement to a perceptual scope—that is, only *perceived connection*, not an *objective or actual connection* that is not yet perceived. Constraint recognition refers to any perceived obstacle or barrier that a problem solver perceives in making efforts to gain closure on one’s problematic situation.

Next, I reintroduced a dropped variable, referent criterion, as a potentially useful situational antecedent parameter. I modified its conceptual meaning to include any objective knowledge (i.e., a solution carried from past success in problem solving) and/or subjective beliefs (i.e., wishful or willful thinking on an end state after problem solving) that becomes a decisional referent. Decisional referents could be any knowledge as far as they are perceived as relevant to problem solving.

Finally, I introduced a motivation variable, situational motivation in problem solving. People differ across problems whether they are willing to invest their cognitive capacity and capability to the problem-solving tasks. I argued that the motivation toward problem solving fluctuates across problems. Specifically, the situational antecedents such as problem recognition, constraint recognition, and level of involvement affect the extent of situational motivation in problem solving. In the next section, I will integrate these refined situational antecedent variables with the new dependent variables (i.e., CAPS and CEPS).

Integration of Dependent and Independent Variables

In this section, I integrate the antecedent and consequent variables that have been developed thus far. These integrated variables consist of a new version of the situational theory of publics. I call this a situational theory of problem solving.

The Situational Theory of Problem Solving

Up to this point, I have taken a backward approach to building a situational theory of problem solving. In the first two sections of this conceptualization, I tried to establish two dependent variables. Dependent variables are the most important and often the most problematic variables in any theory. Finding or establishing a dependent variable therefore means *problem recognition* to the theorist. After constructing two dependent variables or two focal phenomena of interest, I attempted to construct the *how* and *why*—i.e., independent variables—of the two phenomena: communicant activeness in problem solving and cognitive entrepreneurship in problem solving. To summarize, I put them into a single theoretical framework. One good way to summarize a theory is to specify a mathematical system of equations with key variables. J. Grunig (1968) noted the utility of such a formal system and the limitation of estimating the mathematical relationships among variables at his original theorizing of situational theory. He (1968) wrote,

The system is presented here primarily for its summary and general summary power. Some day it may be possible to determine the exact functional nature of the mathematical relationships; then the model would have tremendous predictive value. In this study we are primarily concerned with determining whether the equations are valid in their present crude form, and, if so, whether the independent variables—as measured for Colombian latifundistas—have a positive, negative, or neutral effect on the dependent variables. (pp. 50-51)

Since the time the original situational theory was proposed, theorists have made impressive progress in methodological approaches. Because of this, researchers can propose and test mathematical systems of equations to test the viability of their theoretical propositions fairly easily. I here summarize the variables and systems of the situational theory of problem solving.

S = Situation;
 ES = Expected State;
 OS = Observed State;
 t = time, one given process;
 PP = Perceptual Problem;
 CP = Cognitive Problem;
 AS = Absence of Solution;

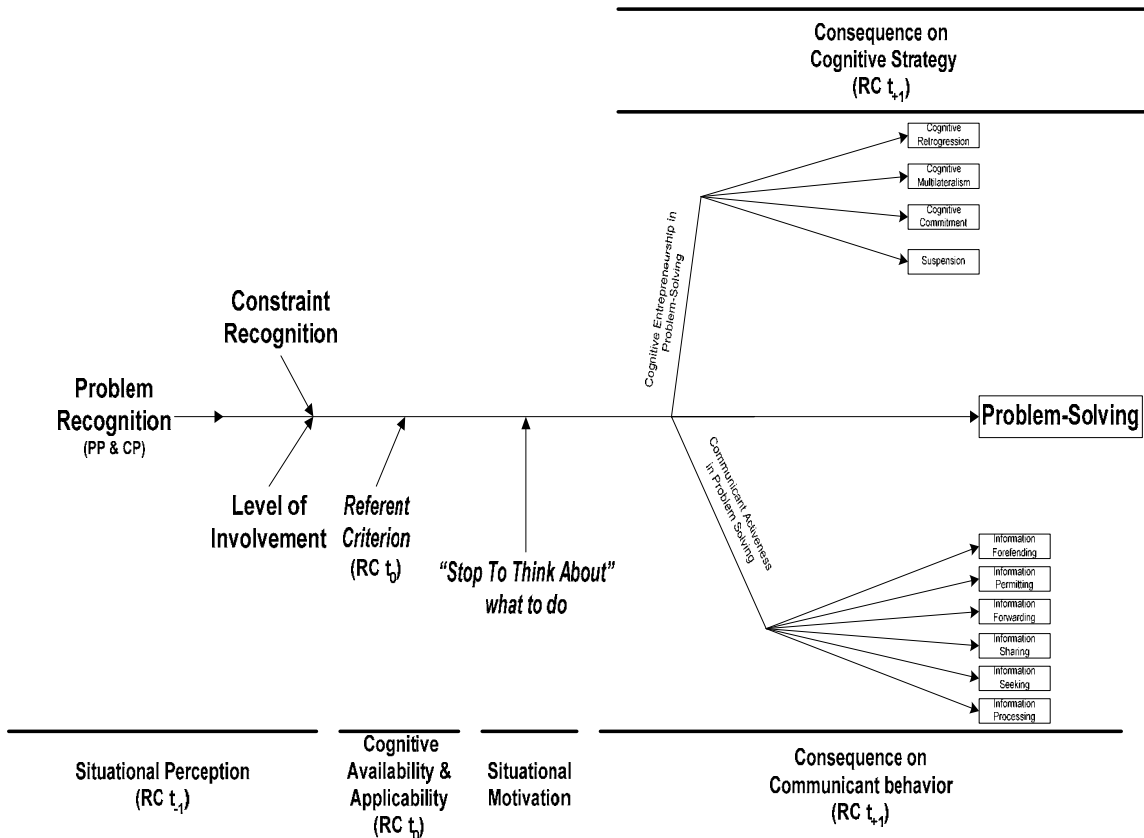
PR = Problem Recognition;
 CR = Constraint Recognition;
 LI = Level of Involvement;
 SM = Situational Motivation;
 CE = Cognitive Entrepreneurship;
 CA = Communicant Activeness

The system is as follows:

1. $PP = f(dSt/dt) = f(ES-OS)$
2. $CP = f(ES-OS | AS) = PR$
3. $SM = f(PR, CR, LI | RC)$
4. $CE = f(SM)$
5. $CA = f(SM)$

I illustrate the sequential process from situational perception to subsequent problem-solving acts in the following figure.

Figure 10: Sequence illustration of the situational theory of problem solving.

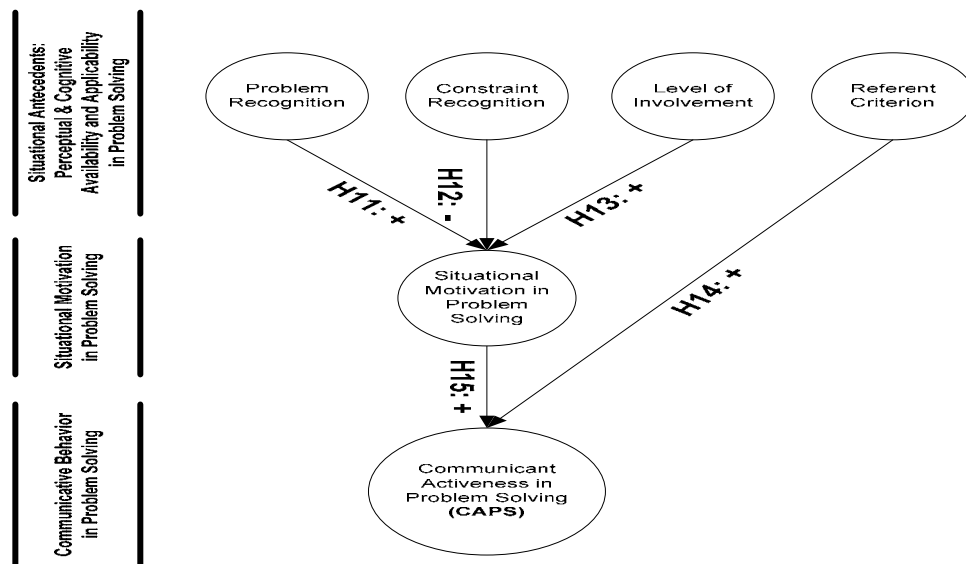


Situational Theory of Communicant Activeness in Problem Solving and Situational Theory of Cognitive Entrepreneurship in Problem Solving

We can break down the structural model of the situational theory of problem solving to highlight each dependent variable. Each derived model can stand on its own as an independent theory. They are as follows:

A model of the situational theory of communicant activeness in problem solving (SITCAPS). The first dependent variable I have thus far elaborated is communicant activeness in problem solving. It takes six subdimensions related with information selection, transmission, and acquisition. Four situational antecedent variables explain the likelihood of a problem solver’s communicative activeness regarding a given problem. The following model summarizes the valences of causal paths from problem recognition, level of involvement, constraint recognition, and referent criterion to communicant activeness.

Figure 11: A model of the situational theory of communicant activeness in problem solving (SITCAPS).

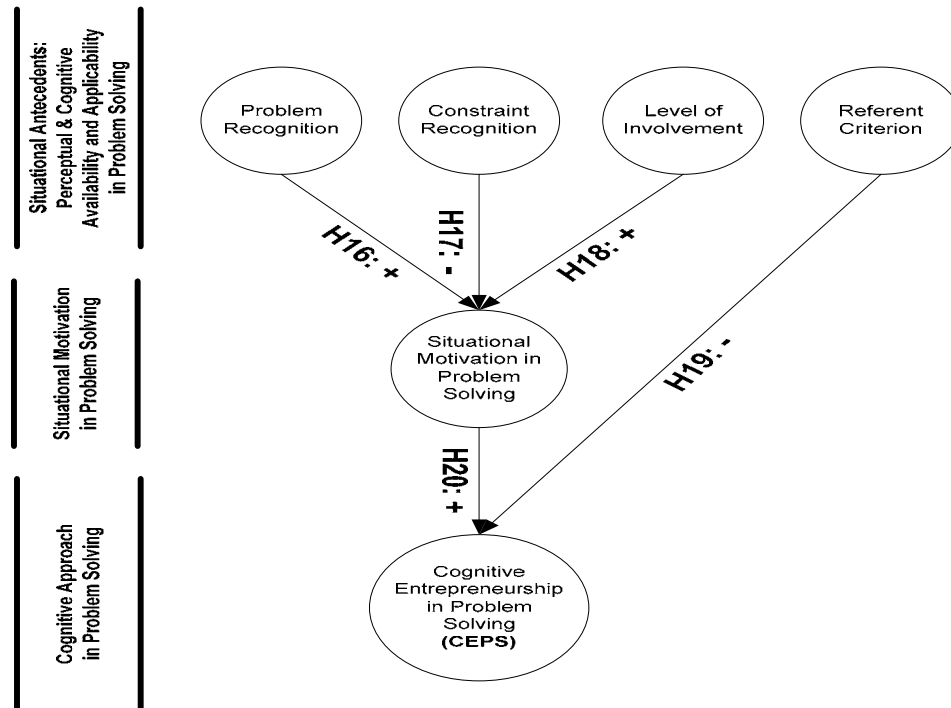


- H11: The higher the problem recognition, the higher the situational motivation in problem solving.
- H12: The higher the constraint recognition, the lower the situational motivation in problem solving.
- H13: The higher the level of involvement, the higher the situational motivation in problem solving.
- H14: The higher the referent criterion, the higher the communicant activeness in problem solving.
- H15: The higher the situational motivation in problem solving, the higher the communicant activeness in problem solving.

A model of the situational theory of cognitive entrepreneurship in problem solving

(SITCEPS). The second dependent variable I introduced was cognitive entrepreneurship in problem solving. This construct has four subdimensions: cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. The following model summarizes the theoretical relationships between four situational independent variables and cognitive entrepreneurship as a dependent variable.

Figure 12: A model of the situational theory of cognitive entrepreneurship in problem solving (SITCEPS).



- H16: The higher the problem recognition, the higher the situational motivation in problem solving.
- H17: The higher the constraint recognition, the lower the situational motivation in problem solving.
- H18: The higher the level of involvement, the higher the situational motivation in problem solving.
- H19: The higher the referent criterion, the lower the cognitive entrepreneurship in problem solving.
- H20: The higher the situational motivation in problem solving, the higher the cognitive entrepreneurship in problem solving.

SITCAPS and SITCEPS set the CAPS and CEPS as dependent variables

explained by situational antecedent variables. Both models consist of a family of the situational theory of problem solving. However, it is interesting to integrate two models into one by setting CAPS and CEPS as dependent variables simultaneously. However, from the empirical model testing perspective (structural equation modeling), combining the two models into one will create a model identification problem. Both CAPS and CEPS constructs are accounted for by the same situational antecedent variables. When merging the two models of SITCAPS and SITCEPS, the resulting model becomes just-identified or under-identified (if specifying bidirectional causality between CAPS and CEPS) and thus not testable.

Despite testing difficulty, it is interesting to speculate which variable comes ahead of the other. CAPS, featuring communicative behavior, and CEPS, featuring the cognitive approach in problem solving, seem to explain each other to some degree. However, it is hard to define which comes first. A plausible relationship is bidirectional causality between the two constructs. This requires a nonrecursive model to test relative effects from each other simultaneously. Such a nonrecursive model testing is desirable but often methodologically difficult (e.g., the non-converging issue in model solution).

To test simultaneous causal relationships between CAPS and CEPS, I constructed the model in Figures 13 and 14.

As noted, a nonrecursive model is hard to solve empirically. To identify the bidirectional causality model, it is necessary to specify one exogenous variable as an exclusive cause for one of the endogenous variables. I specify the referent criterion as such an exogenous variable to identify the model. Surely, it is arguable that a referent criterion affects both CAPS and CEPS. However, as noted, simultaneous causal paths from referent criterion to both CAPS and CEPS as endogenous variables will not be identified. The primary interest in this test is how CAPS and CEPS would affect each other. Thus, for the model identification, I will specify that the referent criterion affects one over the other. Figure 13 and 14 are two possible models (N. B., both models contain the same hypotheses and predictions.). I will analyze both models and will compare the results.

Figure 13: A model of a nonrecursive relationship between CAPS and CEPS (Model I).

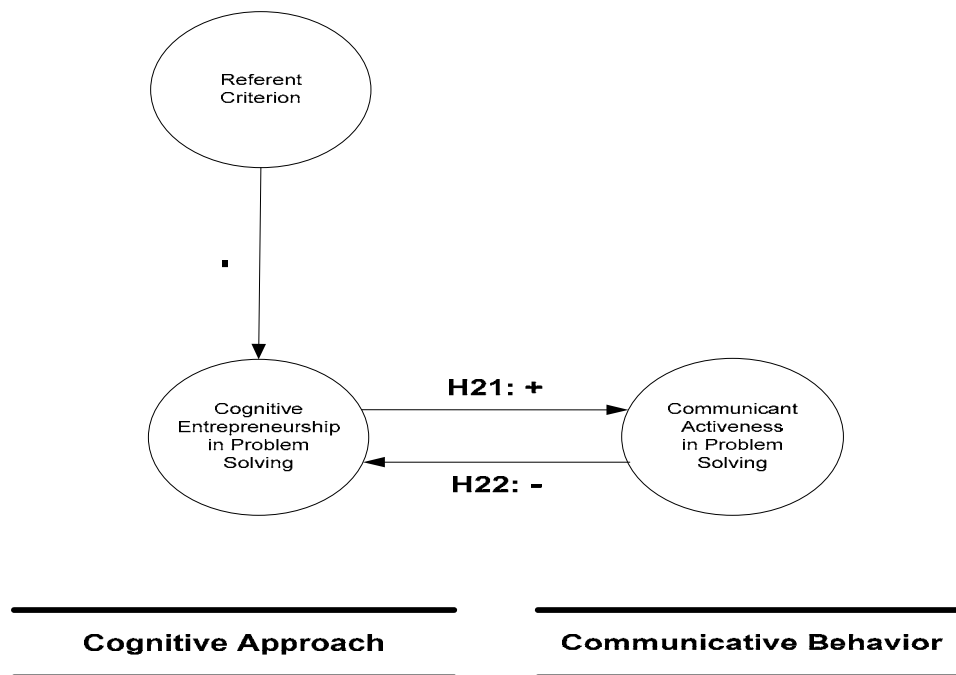
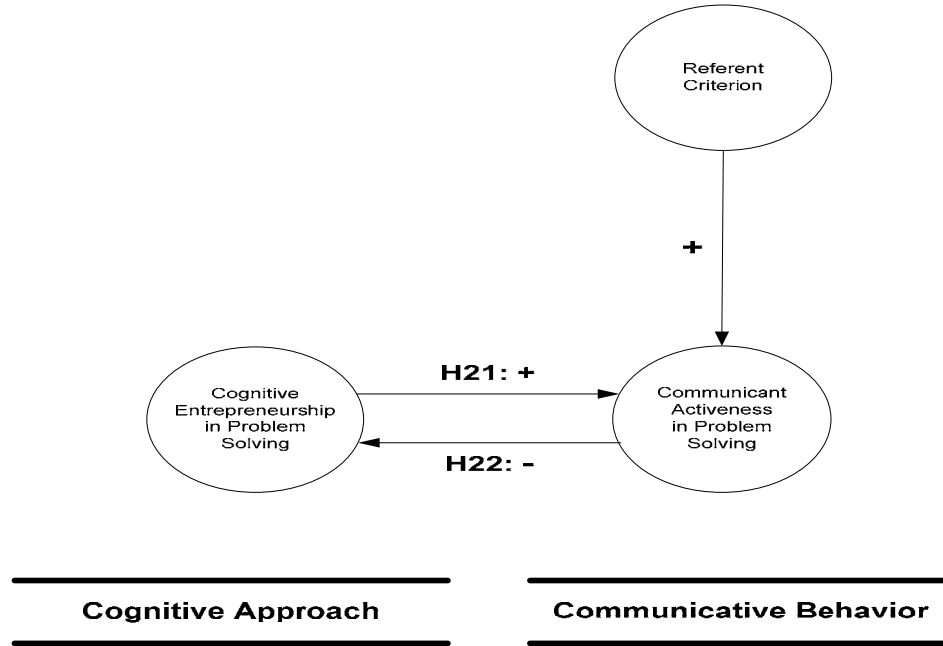


Figure 14: A model of a nonrecursive relationship between CAPS and CEPS (Model II).



A problem solver with high cognitive entrepreneurship tends to be high in communicant activeness. Particularly, someone with high cognitive entrepreneurship is more likely to be more enthusiastic in broadening candidate solutions (more information seeking), more tolerant of competing or incompatible ideas (less information forefending), and more willing to disperse knowledge and information to others (more information forwarding). Thus, I expect a positive effect from cognitive entrepreneurship to communicant activeness.

In contrast, I expect a problem solver with high communicant activeness to be less entrepreneurial in problem solving. As a result of heightened communicant activeness in problem solving, a problem solver will be more selective, transmissive, and knowledgeable about the problem. Thus, the problem solver is likely to be more likely to optimize his or her favored solution (high cognitive retrogression), show less tolerance for incompatible solutions (less cognitive multilateralism), be less enthusiastic about

available solutions and ideas (less cognitive commitment), and be less heedful in evaluating new ideas and candidate solutions (less cognitive suspension).

H21: The higher the cognitive entrepreneurship, the higher the communicant activeness in problem solving.

H22: The higher the communicant activeness, the lower the cognitive entrepreneurship in problem solving.

Summary. I claim that the situational theory of problem solving (STOPS) is a more general theory on the basis of its generality in subsuming variables of STP. The STOPS with the CAPS model takes a further step. This study challenges the traditional sender/receiver dichotomy by treating communication as both a dependent and independent variable. For example, a business communicator prepares advertising campaigns for promoting a new product (information transmission). Here, the message sender not only initiates a communication process to solve a problem (i.e., information forwarding to increase sales) but also should learn about products and target segments of the population (e.g., information seeking to prepare messages). In contrast, a father with an ill child vigorously seeks information about treatment of that disease. Here, he initiates a communication process (information seeking to learn about the disease) to cope with his life problem. Often, such accumulated knowledge for a specific problem leads a communicant to share or transmit information to others (information forwarding with forefending). Communication is a coping mechanism that increases problem-solving potential for problem holders. The situational theory of problem solving accommodates both communicative directions and explains ill-captured aspects of informational giving with its general conceptualization of communicant behaviors.

Furthermore, the situational theory of problem solving introduces a new variable, cognitive entrepreneurship in problem solving. With this new construct, we can better

understand how people mentally approach their life problems. At times, we have a more entrepreneurial mindset. We take in information to evaluate by its merits before selecting a solution. We value and tolerate incompatible ideas, become enthusiastic about new ideas, and are eager to finalize a solution (i.e., cognitive alpha approach). At other times, we are less entrepreneurial and use information not to evaluate, but to justify a decision that we have already hastily drawn. We value more ideas that are incompatible with a decision we made. We are less committed to new ideas, and we want to be firm and conclusive as fast as possible (i.e., cognitive omega approach). However, our mental approach should be best viewed as rational when we adopt a problem-solving strategy in a more dexterous way. We simply become irrational when we are so entrepreneurial with small problems (e.g., low-involvement problem such as what to have for lunch). Likewise, we become irrational when we are recklessly non-entrepreneurial with big problems (e.g., highly involved problems such as a risky behavior).

In this chapter, I first proposed and explicated two new concepts of communicant activeness and cognitive entrepreneurship. Then, I refined the situational antecedent variables that affect our communicative and cognitive approaches in problem solving. These are integrated and referred to as a situational theory of problem solving. The new situational theory consists of two models, the situational theory of communicant activeness in problem solving (SITCAPS) and the situational theory of cognitive entrepreneurship in problem solving (SITCEPS). The situational theory of publics (J. Grunig, 1997) now becomes a more general theory that describes unique human communicative and cognitive features in dealing with life problems. I expect the new situational theory to host further normative theorizing in the areas related with human

problem solving. In the following chapter, I will discuss how I designed and conducted the tests for the new theory and constructs. In addition, I will discuss the methodological and ethical consideration in the study.

CHAPTER III: METHODOLOGY

In the previous chapter, I first conceptualized two new variables of communicant activeness and cognitive entrepreneurship in problem solving. They become the dependent variables of the situational theory of problem solving. Next, I elaborated the independent variables from the situational theory of publics. Integration of two new dependent variables with the independent variables of the STP introduces a situational theory of problem solving. This theory consists of a situational theory of communicant activeness and a situational theory of cognitive entrepreneurship in problem solving.

The new situational theory includes a set of propositions and hypotheses that are subject to tests. Empirical tests can never prove any theoretical claims, they only add support for the inferred plausibility of the theory. Therefore, as the first step of testing, I generated measurement items for each conceptual dimension in communicant activeness; cognitive entrepreneurship in problem solving; and problem recognition, level of involvement, constraint recognition, referent criterion, and situational motivation in problem solving. Conceptual explications and definitions of each variable in earlier chapters guided the operationalization process (i.e., generating item pools). After the operationalization, the derived measurement scales were submitted to analytic procedures of item analysis and the assessment of reliability and validity studies. Given that those measurement systems are reliable and valid for each key variable, I proceeded to test causal path models derived from the situational theory of problem solving. Specifically, I first tested the causal paths from situational antecedent variables to communicant activeness in problem solving and cognitive entrepreneurship in problem solving as separate models. Then, I tested a nonrecursive model of the situational theory of problem

solving wherein two new variables specified as bidirectional each causes each other. In the following sections, I will discuss the choice of research method (survey) to test the models, the data collection approach such as sampling strategy (non-probability sampling), estimation of sample size and power (Monte Carlo simulation), data collection procedure, data analysis procedures (CFA and SEM), and ethical considerations in the study.

Survey Research

A survey is “systematic data collection about a sample drawn from a specified larger population” by using questions (Schwarz, Groves, & Schuman, 1998, p. 143). Researchers use a *sample* and *questions* to make inferences about the *population* and *concepts* of interest. Thus, researchers sample populations and operationalize a concept instrumentally to infer from something observable to something unobservable. Typically, survey research consists of 1) setting research objectives for information collection, 2) designing the study, 3) preparing a reliable and valid survey instrument, 4) administering the survey, 5) managing data collection (e.g., making efforts to attain high response rates, editing and coding), 6) analyzing survey data, and 7) reporting the results (Fink, 2003).

Strength and Weakness of Survey Research

Surveys generally are used to describe the characteristics of a large population when probability sampling is used. Furthermore, surveys work well for a study with an explanatory purpose, such as this study, even though nonprobability sampling is used (Weisberg, Krosnick, & Bowen, 1996). When the research purpose requires a large number of participants (e.g., explanatory analyses), surveys make large samples feasible. In the present study, the purpose was to test a theory in which many variables need to be

analyzed simultaneously. Thus, survey research design was an appropriate choice for data collection. Surveys are flexible enough to allow researchers to operationalize definitions from actual observations in a backward manner. Such flexibility is hard to attain in experimental design in which an operational definition is a manipulation of a variable of interest. If the measurement items are well established (i.e., they are reliable and valid measurement scales) with an adequate sample selection and size, researchers have more ability to generalize.

However, survey research requires the standardization of questions, which leads toward superficial results. Standardized measurement items often measure the least common denominator among the participants' characteristics of interest (Babbie, 1998). Survey research is inflexible and blind to natural processes inherent in a research setting. Qualitative research methods not only allow and encourage a researcher to modify and elaborate theory, questions, and design; but they also provide in-depth contextual information (McCracken, 1988; Marshall & Rossman, 1995). In contrast, survey research cannot provide such flexibility and makes it impossible for researchers to change their initial design and research questions (Babbie, 1998). A survey makes serendipity impossible, which is only feasible when there are interactions between the researcher and participants. Finally, survey research cannot directly measure social action but can only measure the self reports of past action or hypothetical action (e.g., behavioral intention). For that reason, the data collected are often artificial and could misrepresent the participants' characteristics of research interest. This, in turn, makes it difficult to establish the validity of measures (Babbie, 1998).

Rationale for Choosing Survey Research

I have chosen the survey research method as the most appropriate approach for the purposes and specific constraints inherent in this study. I chose the survey method because the purpose of the study was to test causal structures and hypotheses derived from a situational theory of problem solving. If I could follow the necessary procedures (e.g., random assignment) and selection of design frame (e.g., a Solomon four-group design), the experimental method would be the best research design to study causal propositions among the constructs of interest. However, the number of causal variables in the systems of equations was more than five. This unnecessarily complicates the design and procedure (e.g., manipulations for independent variables) beyond the researcher's control. Alternatively, survey research design allows the study of multiple variables economically. A survey study can yield data of adequate size and quality for a causal analysis (i.e., structural equation modeling).

Secondly, the present study aimed to explain publics' perceptions of their life problems and their subsequent cognitive and communicative features in dealing with the problems. Thus, asking publics for their *own perceptions* about their problems was critical to testing the viability of the proposed theory. Weisberg, Krosnick, and Bowen (1996) cogently presented the advantage of survey research for such a study:

The explanation of mass behavior often requires mass attitude data that can only be obtained by a survey. You cannot assume that people think in certain ways without asking them what they think. You cannot regard aggregate data as equivalent to individual data, nor can you use experiments as alternatives to the collection of data in the natural environment. If it is possible to ask people questions, you can gain much information about what they are thinking—and why they do things. When public attitudes and mass behavior are of interest, surveys play important roles in social science. (p. 20)

To measure publics' perceptions, cognitive approaches, and communicative behaviors, therefore, survey research was a most appropriate data collection method.

The third consideration is the practicality of the scale-development procedure. Developing a measurement instrument requires a huge number of respondents. Necessary steps such as pilot testing of initial item pools, item analysis for reliability and validity, and cross-validation all demand multiple and large samples. Survey research makes it possible to collect a large amount of data through standardized questionnaires economically and quickly (Babbie, 1998).

In addition, practical research situations for public relations practitioners must be considered. The situational theory of publics has been widely adopted for planning communication programs (e.g., public information campaigns). Practitioners segment relevant focal publics for their communication program not only through qualitative study but also through formative survey research. Because the situational theory of problem solving is designed to assist public relations practitioners with applied communication practices (e.g., health and risk communication campaigns), it is crucial to establish a set of reliable and valid measurement systems. To meet that purpose, survey research was desirable.

Research Design

Design of Study

This dissertation research required two phases. The first phase was to develop a set of reliable and valid scale items for the two new variables of communicant activeness in problem solving and cognitive entrepreneurship in problem solving. In the previous chapter, I theoretically specified the two variables to be explained by a set of antecedent variables, including problem recognition, level of involvement, constraint recognition, referent criterion, and situational motivation in problem solving. To test these concepts

and propositions (i.e., the specified inter-variable relationships), I first developed corresponding measurement systems for these consequent—“explanandum” and antecedent variables—“explanans” (Hempel & Oppenheim, 1953). This task was to describe the phenomena in an empirical way for the purpose of making it possible to falsify the concepts and propositions proposed (Popper, 1963).

The second phase was to test the viability of the newly developed situational theory of problem solving. Researchers cannot test a theory directly, but they can test a derived model through empirical observations of the theoretical propositions. From the first phase of study design, I produced a testable measurement system with acceptable levels of reliability and validity. With this measurement system, I proceeded to test causal relationships between antecedent conditions and consequent phenomena. This was an attempt to falsify the models for the purpose of demonstrating the viability of the situational theory of problem solving. In testing logic, if the falsifying attempts fail, we can gain some confidence in the theoretical plausibility of the concepts and propositions. However, the tenability of the theory is only provisional. In the following sections, I will describe the procedure used in the first phase of this dissertational study.

Scaling Procedure

A typical way to develop a scale is to start by refining the purpose of the scale. My purpose in this study was twofold. The first was to test the concepts and propositions in the situational theory of problem solving. The second purpose was to identify a scale that could be used both for theoretical and practical research related to people’s problem solving. Specifically for practical research, applied communication researchers such as public relations professionals or risk and health communicators can apply the scales to

segment a population into more meaningful chunks based on their differential cognitive and communicative features.

Netemeyer, Bearden, and Sharma (2003) presented a clear and efficient model to illustrate the process of scale development. The first step is to define constructs clearly. The researcher should carefully explicate a construct and its dimensions. Otherwise, subsequent measurement scales have little use in theory and practice. Also, a scale developer should be concerned about construct dimensionality—whether it is unidimensional, multidimensional, or a second-order construct. Netemeyer, Bearden, and Sharma (2003) recommended having an effect indicator (“reflective” items) rather than causal indicator (“formative” items) (Bollen, 1989). In the present study, the two new constructs, CAPS and CEPS, were hypothesized as a second-order construct structure¹⁷ with effect indicators.

The second step was to construct and choose the best items. Conceptual explication should precede the task of generating item pools so that theoretical meaning can guide the composing of measurement instruments. In doing so, “nontrivial redundancy” among items was necessary to allow the phenomenon of interest to manifest itself in different ways (DeVellis, 1991, p. 56). Such nontrivial redundancy among items was critical because “the content that is common to the items will summate across items while their irrelevant idiosyncrasies will cancel out” (DeVellis, 1991, p. 56). A rule of thumb in item construction is clarity. DeVellis recommended having a pool of items three

¹⁷ In developing CAPS and CEPS, I took a higher-order factor structure approach with a theoretical purpose. Both constructs had enough conceptual generalness that allow further decomposition of the concepts. For example, whereas cognitive entrepreneurship in problem solving can generate knowledge to understand differential problem solving approaches among people, we can further segment it in a conceptually meaningful way. Theorists should explicate conceptual meanings and dimensions to the extent it generates understanding of the phenomenon. Indeed, I intended that researchers can use each subdimension of two constructs as an *independent* construct if necessary.

to four times larger than the final scales. He and other scholars suggested that good scale items should be unambiguous, relatively short (e.g., avoid wordiness), easy to comprehend, without multiple negatives (e.g., innuendos), not double barreled, without ambiguous pronoun references, and without misplaced modifiers (Netemeyer, Bearden, & Sharma, 2003; Specter, 1992; DeVellis, 1991). In addition, the researcher should choose items that prevent some common respondent biases such as *acquiescence*, *affirmation*, or *agreement*. Wording items both positively and negatively within the same scale can be a good preventive strategy (DeVellis, 1991). Following item construction, the researcher should choose a response format. In the present study, I used a 9-point Likert format spanning from “*not at all*” to “*extremely*.” I used a unidirectional format (e.g., from *absence of agreement* to *extreme agreement*) rather than bidirectional (e.g., from *strong disagreement* to *strong agreement*). Finally, the scale developer should ask both experts and laypeople whether the items match theory—i.e., to make item judgments. This makes it possible to test content and face validity (Netemeyer, Bearden, & Sharma, 2003). To get a laypeople perspective in item selection, I recruited three graduate students who were not familiar with the situational theory. To get an expert perspective, I asked Dr. James E. Grunig, the developer of the STP, to review the fit between theory and the proposed items.

The third step was to design and conduct empirical tests to develop and refine the scale. By drawing a relevant sample, the scale developer can do item-trimming (e.g., rewriting items), test psychometric properties, do exploratory factor analyses (e.g., checking dimensionality), check internal consistency estimates (e.g., Cronbach’s alpha),

make initial estimates of validity, and sort out items for cross-validation (Netemeyer, Bearden, & Sharma, 2003).

The last step was to finalize the scale. By using several samples, scale developers can design and conduct various types of reliability and validity analyses. These analyses consist of exploratory factor analysis (e.g., removing low or cross loading items) and confirmatory factor analysis (e.g., checking factor structure equivalence). In addition, researchers should test conventional reliability statistics and validity testing procedures. In the present study, I first did a series of principal component analyses. I conducted an *internal consistency test* using Cronbach's alpha. I also examined *construct reliability*, using coefficient *H*, and the variance extracted confirmatory factor analysis for CAPS and CEPS (Hancock & Mueller, 2001) to check as construct validity.

Regarding validity, I checked *face validity*—whether the measurement items appear to represent well the construct to be measured; *concurrent validity*—whether two or more related measures were statistically related with each other (i.e., the nonrecursive model between CAPS and CEPS); and *construct validity*—whether the scale has theoretically relationships with other relevant variables (e.g., SITCAPS and SITCEPS).

Above all, construct validity was the most important testing procedure in scale development. I tested construct validity of two new dependent variables by connecting their measures to other theoretical variables in the situational theory. Earlier, I theoretically specified *a priori* causal relationships among the key constructs in the situational theory of problem solving. The structural interrelationships between the situational antecedent variables and two new variables were tested against the data.

Should there be close fit between the specified model and the observed data, I could infer a corresponding degree of construct validity for the scale developed here.

Sampling Strategy

Rationale for non-probability sampling strategy. For the present study, I have chosen a *convenience sampling* (i.e., a nonprobability sampling) strategy for practical and theoretical reasons. A nonprobability sample does not allow those members in a population to have an equal probability of being chosen. The choice of a nonprobability sampling strategy makes it impossible to estimate unbiasedness and sampling variability for a chosen sample. Thus, it does not allow the researcher to draw any inference about a population (Schwarz, Groves, & Schuman, 1998). In addition, data analysis with nonprobability sampling can result in statistical problems such as biased parameter estimates and standard errors.

Nevertheless, a nonprobability sampling strategy is best for the research problems in this study. The purpose of this study was to develop new variables and new theory. In practice, “most early tests of nascent theories” adopt non-probability student samples, and such a strategy is, not ideal, but useful for initial theorizing and hypothesis testing with “multivariate relationships” (Caplan, 2005, p. 732). Besides, I delimited the scope to “theoretical generalizability” rather than statistical generalizability. Calder, Philips, and Tybout (1981) pointed out that to make theoretical generalizations, a representative sample is not necessary if statistical generalization of the finding is not the goal. They emphasized that it is the theory that is applied beyond the research setting and thus “the research sample need only allow a test of the theory...any sample within the theory’s domain (e.g., any relevant sample), not just a representative one, can provide such a test”

(Calder, Philips, & Tybout, 1981, p. 200). In addition, Shapiro (2002) addressed the issue:

[R]ejecting a study that seeks to expand theory and that detects a potentially important effect on the basis of a nonrandom sample usually reflects a misunderstanding of the nature of generalizability. If a study detected an important effect, no matter what kind of sample is used, it is clearly true for some group of people, in some setting, at some time, for some message. The next step may be to conduct a theoretically driven boundary search to determine to whom the effect applies and to whom it does not. (p. 499)

Sample size demands for relational analysis are often huge. Meeting the required number of participants using probability sampling would not be practical. Thus, in this dissertation, I combined the two most common nonprobability sampling methods of convenience sampling and multiplicity sampling (a.k.a., snowball sampling or network sampling) to test theoretical propositions. Multiplicity sampling consists of using previously identified members of a group to find other members of the population. This sampling method was useful to trace patterns of influence among connected participants (Weisberg, Krosnick, & Bowen, 1996).

Sample Size Estimation

I have conducted a simulation study to estimate the minimum sample size for data collection. In most empirical research methods, the researcher can use Kraemer and Thiemann's (1987) classical guideline to estimate sample size and to determine power. However, they did not provide a procedure for estimating sample size for confirmatory factor analysis and causal path modeling, which are used in my dissertation. Hancock (2006) advised that "a priori" power analysis is more desirable than "post hoc methods," which are often merely a "self-pitying" (p. 103). He reminded us that a post hoc analysis

is “merely establishing what is already apparent” (p. 103)¹⁸. In this vein, I chose an *a priori* Monte Carlo simulation approach to determine appropriate sample size with power .80 and a .05 level of significance.

The necessary sample size for this study was estimated using *Mplus* Monte Carlo Simulation option (2004 Version 3.01). L. Muthén and B. Muthén (2002) illustrated how to estimate optimal sample size and to determine power by using *Mplus*. Notably, the *Mplus* approach focuses on individual parameters within the model, not the entire model.¹⁹ In my study, two confirmatory factor models (i.e., CAPS and CEPS) and two causal path model (SITCAPS and STICEPS) were of primary interest. To see the sample size and a rough check for power for individual path estimates, I used a model combined with all the variables in one model (i.e., problem recognition, constraint recognition, level of involvement, referent criterion, CAPS, and CEPS).

As a first step, I specified *a priori* conditions for key factors such as the size of the model, distribution of the variables, amount of missing data, reliability of the variables, and strength of the relationships among the variables (L. Muthén & B. Muthén, 2002). Then, each residual variance of endogenous variables is computed individually by considering *a priori* path weights. Normality of data in SEM was a key assumption. I presumed that data transformation (i.e., power transformation) before model testing will satisfy the normality assumption. No missing data assumption was made. Although such

¹⁸ Hancock (2006) provided a general guideline for a priori power analysis: “when $\epsilon = .02$ [$\epsilon = \text{RMSEA}$] and models have $df \geq 60$, to achieve power of $\pi = .80$, samples sizes of $n = 300$ or above appear to be sufficient for testing overall data-model fit; when $\epsilon = .02$ and models have $df \geq 30$, to achieve power of $\pi = .80$, samples sizes of $n = 500$ or above appear to be sufficient for testing overall data-model fit” (p. 103); “when $\epsilon = .02$ and models have $df = 10$, to achieve power of $\pi = .80$, samples sizes of $n = 1000$ or above appear to be sufficient for testing overall data-model fit” (p. 104).

¹⁹ Hancock (2006) clarified two different foci in power analysis: 1) parameter(s) within a model and 2) data-model fit as a whole. In the present study, I mainly focused on the structural parameters within the models assuming the models were specified correctly. Thus, I followed the *Mplus* simulation approach that hinges on the power for “parameters” within a model.

an assumption was too idealistic, I considered the possibility of using imputation options (e.g., EM algorithm) as a possible compensatory strategy. Reliability of factor indicators, factor correlations, and causal paths were all rough approximations from prior studies.

Specifically two pilot tests for the STOPS in addition to prior STP studies (e.g., regression weights in past studies of the STP) provided rough approximations to generate data in this simulation. Because the purpose of this Monte Carlo study was modest—i.e., to check a reasonable estimation of sample size with preset power (.80) and significance level, such gross estimation could be justified. Finally, I mainly focused on determining power to detect individual path coefficients. In doing so, I assumed the overall model had been correctly specified. Thus, the present simulation study could not guide any decision regarding power for entire model. Despite some inherent inaccuracy in a prior analysis, it is desirable in this study to use SEM analysis. Hancock (2006) recommended conducting preparatory analysis: “By choosing the values in models carefully and conservatively, researchers have the ability to ensure that they enter their studies hoping for the best and prepared for the worst” (p. 104).

Instruments. The key variables within the models derived from the situational theory of problem solving were as following: communicant activeness in problem solving, cognitive entrepreneurship in problem solving, problem recognition, level of involvement, constraint recognition, referent criterion, and situational motivation in problem solving. Explication of each construct in the conceptualization chapter guided the process of drafting measurement scale items for each variable. The instruments I used are as follows:

Instruments for Communicant Activeness in Problem Solving (CAPS)

Information Forefending

Others respect my perspective about this problem because it is simple and clear.

Some publicized statements about this problem are worthless.

I have invested enough time and energy so that I understand this problem.

I know where to go when I need updated information regarding this problem.

I have studied this problem enough to judge the value of information.

I feel like resisting some persuasive efforts around this problem.

I express my opinions confidently about what should be done to deal with this problem.

I am picky in choosing information sources when I think about this problem.

Information Permitting

To make better decisions regarding this problem, I listen to opposite views and information as long as they are related to the problem.

For this problem, I welcome any information regardless of where it comes from.

I am careful in accepting information about this problem because of the vested interests of those who provided the information. (R)

I listen to even opposite views on this problem.

At times, I find that I have accepted conflicting information about this problem.

Information Forwarding

Sometimes I find I am engaging in aggressive conversations on this problem.

It is one of my top priorities to share my knowledge and perspective about this problem.

If it is possible, I take time to explain this problem to others.

It is worthy spending some time to persuade others about this problem.

I look for chances to share my knowledge and thoughts about this problem.

I actively seek out opportunities to participate in public opinion polls about this problem.

I love to start a conversation on this problem with others.

I volunteer to inform others about the problem.

I feel happy when I provide new information about this problem to others.

I often play a leadership role in initiating conversation about the problem.

Information Sharing

I am sure that I will be quite active in passing on information related to this problem in the near future.

I am a person to whom my friends and others come to learn more about this problem.

In the past, I researched about this problem seriously.

At times, I am asked to give advice regarding this problem.

Information Seeking

From time to time, I contact people about this problem to learn what kind of solutions there are.

I regularly visit Websites relevant to the problem.

I regularly check to see if there is any new information about this problem on the Internet.

I would request booklets containing relevant knowledge about the problem.

I visit an online or regular bookstore to find useful information about the problem

My friends think that I take too much time for learning about this problem.

Information Processing

I am sure that I will be quite active in passing on information related to this problem in the near future.

I am a person to whom my friends and others come to learn more about this problem.

In the past, I researched about this problem seriously.

Instruments for Cognitive Entrepreneurship in Problem Solving (CEPS)

Cognitive Retrogression

I know how I should behave for this problem.

It is too late to change the position I now have on this problem.

I have spent too much time on this problem to change my position now.

It is too late to shake the conclusion I have drawn for this problem.

I have made efforts to justify my decision on this problem.

I will keep my current position even if someone challenges it with contradictory evidence.

I have found counter evidence that rejects the positions different from mine.

I feel it is costly to change my mind on this problem.

Cognitive Suspension

I want to take more time before making up my mind for this problem.

I hesitate to make up my mind about what should be done for this problem.

I need more time to think before I finalize my position on this problem.

For this problem, I will try to suspend any judgment until all the evidence is in.

Pro-War in Iraq Statements

The war in Iraq can be justified because the cost of controlling Saddam Hussein while he was in power was higher than that of war.

Saddam was connected with terrorists.

Saddam's human rights record, among the worst in the world, was enough justification to go to war.

Con-War in Iraq Statements

With the economic and domestic security problems the United States was facing, it was a bad time to go to war in Iraq.

A pre-emptive attack by the U.S. gives credibility to those who describe the U. S. as an aggressive nation.

The war in Iraq has increased anti-American sentiment.

Pro-Affirmative Action Statements

Affirmative action levels the playing field because minority students, generally speaking, start out at a disadvantage.

Diversity is desirable yet won't always occur if left to chance.

Con- Affirmative Action Statements

Affirmative action demeans true minority achievement because success is labeled as a result of affirmative action rather than hard work or ability.

Because of affirmative action, a wealthy minority student who doesn't put in much effort could be chosen over a poor white student who works harder.

Instruments for Situational Antecedent Variables

Problem Recognition

To what extent do you think there is something missing in this problem?

How much does the current situation differ from your expectation?

How strong do you feel that something needs to be done to improve the situation for this problem?

How much does the current situation deviate from what you think it should be?

Constraint Recognition

Please think of whether you, personally, could do anything that would make a difference in the way these problems are handled. If you wanted to do something, would your efforts make a difference? (R)

To what extent do you believe this problem is a problem that you can do something about? (R)

To what extent do you believe that you could affect the way this problem is eventually solved if you wanted to? (R)

Level of Involvement

In your mind, how much of a connection do you see between yourself and this problem?

To what extent do you believe this problem could involve you or someone close to you at some point?

How much do you believe this problem affects or could affect you personally?

How strong would you say your opinions or thoughts are about this problem?

Referent Criterion

I am confident about my knowledge about this problem.

I strongly support a certain way of resolving this problem.

I have a preference for how the problem should be settled.

I am pretty sure I know how to solve this problem.

Past experience has provided me with guidelines for solving this problem.

Situational Motivation in Problem Solving

How often do you stop to think about each of these three problems?

To what extent would you say you are curious about this problem?

Please, indicate how much you would like to understand each of these problems better.

Administering the survey instrument. The researcher may administer a survey instrument via a self-administered questionnaire, an interview, a structured record review, and structured observation (Fink, 2003). I chose a *self-administered questionnaire*. A self-administered questionnaire is cheap, produces data fast, is free of interviewer bias, and provides confidentiality and privacy, which encourage candid responses (Fink, 2003; Babbie, 1998). Participants completed question items through a Web-based survey form: i.e., computerized self-administered questionnaire (Babbie, 1998). Participants read questions and made choices on a screen by using a computer keyboard and mouse. Participants who did not have access to a personal computer or access to the Internet were offered a printed questionnaire, but no one requested one.

No opinion options. Experts (Weisberg, Krosnick, & Bowen, 1996) on survey research recommend including no-opinion options to prevent respondents from giving meaningless answers. Often, participants feel pressured to respond even when they are not familiar with the issue. Thus, a no-opinion option makes participants more comfortable and accurate. However, the experts also advise some caveats for the use of no-opinion option. Specifically, less-motivated respondents use the no-opinion option to avoid thinking about the question. Thus, survey experts recommend omitting no-opinion options concerning well-known issues (e.g., legalization of abortion). If the issue of inquiry is obscure or unfamiliar to participants, a no-opinion option should be used. In the present study, I omitted the no opinion option. However, participants were allowed to skip questions.

Pilot test. To prepare a final version of the survey instrument, I conducted four waves of pilot tests in August 2003, December 2003, May 2004, and December 2004.

These pretests tested preliminary item pools for the variables in the situational theory of problem solving (e.g., correlations between the testing items and social desirability scale items), determined response format (e.g., fractional scale vs. Likert-type scale), and tested the data collection method (a snowballing sampling strategy). Although I used the results of these to construct the final version of the survey instruments, I did not report them in this dissertation.

Data Collection Procedure

Data were collected during April and May 2005 at the University of Maryland. Students registered for an introductory communication course were invited to participate. To encourage participation in the study, students were all provided with extra credits in discussion with their instructors. The participation was voluntary, and they were given alternative assignments if they decided not to participate. Because I chose a snowball sampling technique, I devised a clustering method as follows.

First, I identified an initial contact person who was interested and volunteered for participation in exchange for extrapoints in the communication classes. Once the initial contact person agreed to participate, participants were instructed in how to recruit other candidate participants from their personal relationships. Importantly, participants were advised repeatedly not to force participation in “snowballing.” Instead, participants were encouraged to explain the purpose of study is to understand better about information trafficking patterns among people and that the recruiting student would get some extra-credit from participating.

Next, participants were shown the website that contained a survey questionnaire. The researcher explained how to find the survey website (URL address and log-in

method)²⁰ and illustrated how to complete the questionnaire directly. However, participants were asked to explain that the participation would be voluntary to the candidate respondents and, most importantly, confidential. Once the acquaintances agreed to participate, the initial contact person provided his or her own login code to the others to form a cluster under the initial contact person's login code.

To start the survey questionnaire, participants had to provide the first letter of their last name with the last four digits of their social security number. For example, a participant whose name is John Smith (Social Security Number: 123-45-6789) entered "S6789" to login in the first page of Website. Similarly, participants who were recruited indirectly through the initial contact persons entered the initial contact person's login code (e.g., "S6789") with their own code (e.g., Mary Adams with the 987-65-4321 would enter "A4321"). This login method ensured that the participant's identity was confidential because no other identity information was asked in the questionnaire.²¹

Once they successfully logged in, participants read the informed consent form. The consent form instructed participants that there was no foreseeable personal risk with their participation and that they had the right to withdraw participation at any time without any penalty and/or decline to answer certain questions. After participants read and agreed to the informed consent form by clicking an "agree" button, they started the questionnaire. Every participant read an identical set of questions.

²⁰ The website containing the questionnaire has been constructed by a professional online survey research firm, *CreateSurvey* (<http://www.createsurvey.com>).

²¹ For a confirmatory purpose to assign extra credits, the initial contact persons in the communication classes provided a confirmatory receipt that contained their names and the names of participated acquaintances after they learn their acquaintances have completed the questionnaires. The receipts was destroyed immediately once their participations are confirmed. Thus, there was no way to identify personal information with responses.

One possible risk that lowers the data quality was a multiple response by a single participant. To prevent such multiple responses, I used a “duplicate tracking function,” a technical service provided by the *CreatSurvey*. The *CreatSurvey* limited each respondent to one entry by using a special cookie device.

Data Reduction and Data Analysis

Model Testing

The first research goal was to develop and validate reliable and valid measurement scales for two new constructs, communicant activeness in problem solving (CAPS) and cognitive entrepreneurship in problem solving (CEPS). I here specified the theoretical models and subdimensions under CAPS (six dimensions) and CEPS (four dimensions). I adopted a two-step structural equation modeling approach (Kline, 1998; Byrne, 1994). In the first step, the measurement phase, I analyzed completely confirmatory models that allow covarying among all the latent variables and stand-alone variables in the model. Then, I checked for correlated residuals and cross-loadings using LM tests and removed low loading items for a given dimension. After a set of best measurement items was identified for each dimension, I tested its goodness-of-fit to the overall measurement structure. This required second-order factor analyses that subsumed subdimensions under the higher order constructs (e.g., communicant activeness in problem solving).

In the second step, the structural phase, I compared the final confirmatory models with the proposed structural models. I then respecified the initial structural models with applications of the LM test and Wald test, if necessary. It turned out that most of the

initial structural models were reasonable data-model fits based on multiple fit indices. Hence, most models were tested as they were originally specified.

To evaluate the proposed structural equation models, I adopted commonly adopted model fit indices. They are χ^2 and its degree of freedom, Comparative Fit Index (CFI), Root-Mean-Square-Error-of-Approximation (RMSEA), Standardize Root Mean Square Residual (SRMR), Non-Normed Fit Index (NNFI), and Akaike Information Criterion (AIC). Often χ^2 values are sensitive to large sample size. Thus, the χ^2 statistic would be significant even if the differences between observed data and model-implied covariances were small (Kline, 1998). A common treatment is to use χ^2/df to reduce the sample size sensitivity. Although there is no rule of thumb to use, researchers often consider the minimally acceptable value of χ^2/df ratio to be less than 3 (Kline, 1998).

CFI and NNFI are incremental measures of fit, and acceptable levels of fit are values close to 1.00. SRMR is a standardized summary of the average covariance residuals. When the average discrepancy between the observed and imposed covariances is perfect, the SRMR value becomes 0. As the discrepancy grows, SRMR values increase as well. SRMR values less than .10 are commonly accepted as indicative of an acceptable model. RMSEA (Steiger & Lind, 1980) tends to correct for “tendency of the chi-square statistic to reject a model” with a large sample size (Netemeyer, Bearden, & Sharma, 2003, p. 152). Its values of .08 or less are indicative of acceptable fit (Browne & Cudeck, 1993). AIC is a parsimony index, and values close to 0 or lower are considered as indicative of acceptable model (Akaike, 1987). AIC is useful when a researcher needs to compare nonhierarchical models, thereby direct comparisons, using the differences of χ^2 and its degree of freedom.

Recently, Hu and Bentler (1999) recommended the use of multiple indices, such as CFI, RMSEA, and SRMR. With the joint-criteria approach (Hu & Bentler, 1999), a model is considered viable when it has $CFI \geq .96$ and $SRMR \leq .10$ or $RMSEA \leq .06$ and $SRMR \leq .10$. Once the models have met this proposed model evaluation approach, I proceeded to interpret the individual parameter estimates to test hypotheses and explore research questions.

In using a sample, I made sub-samples from the data set by using the random selection function in SPSS 11.5. Thus, I divided the first subsample ($n = 457$) as the developmental samples of CAPS and CEPS and the other subsamples as validation samples (e.g., $n = 917$). Finally, I ran the models by using the total sample size ($n = 1,380$), once I reached the best models. For the CAPS model, I conducted a series of nested model tests among one factor, six factor oblique, and a second-order factor model to see its dimensionality. For the CEPS model, I directly proceeded to the second-order structure testing and found acceptable data-model fits. For the causal models of situational theory, I used the total sample ($n = 1,380$).

In addition to the tests of factor analysis structures, I analyzed conventional internal consistency and reliability measures such as Cronbach's alpha and construct reliability. In addition, I computed coefficient H (Hancock & Mueller, 2001) and variance extracted for the latent variables used in the structural model analysis.

At the next phase of analysis, I tested three models from the situational theory of problem solving. These specified models with *a priori* hypothesized causal paths were subject to first overall model testing by checking their goodness-of-fit to the data. When a

model achieved a reasonable model-data fit, I interpreted its paths to evaluate the hypotheses and research questions.

Model Identification

Communicant activeness in problem solving (CAPS). A measurement model with four or more indicators for the construct to be measured is always identified. CAPS has a second-order factor structure with six subdimensions under the construct of communicant activeness. Each subdimension (e.g., information seeking) had at least three or more measurement variables. Thus, the second-order factor model was identified and could be tested (see Figure 5 in the Chapter II: Conceptualization).

Cognitive entrepreneurship in problem solving (CEPS). CEPS has four subdimensions: cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. Notably, cognitive multilateralism and cognitive commitment had been measured by a single measurement item because they were computed by conceptually derived formulas. However, the overall model was identified because the remaining two dimensions had four or more measurement items. Thus, the CEPS model could be tested (see Figure 8 in the Chapter II: Conceptualization).

Three models derived from the situational theory of problem solving (STOPS). I derived three structural models from the situational theory of problem solving. Using CAPS, first, I constructed the model of situational theory of communicant activeness in problem solving (SITCAPS). Using CEPS, I constructed the model of situational theory of cognitive entrepreneurship in problem solving (SITCEPS). Both models had identical model specification in their structural relationships (see Figure 11 and 12 in the Chapter II: Conceptualization). Finally, I specified a nonrecursive model to test bidirectional

causal influences between CAPS and CEPS. This requires at least one exogenous variable that affects one of the endogenous variables while not affecting the other. I created two nonrecursive models with the referent criterion as exogenous variable (see Figure 13 and 14 in the Chapter II: Conceptualization). Both nonrecursive models were identified.

Ethical Considerations

In studies using human participants, two most dominant ethical issues are obtaining informed consent and protecting participants from potential harm (Bogdan & Biklen, 1998; Babbie, 1998). I chose a survey for the current study. Survey research, like other scientific inquiries, has ethical responsibilities in treating human beings as objects of investigation. Fowler (2002) advised informing respondents, protecting respondents, and explaining benefits, if any, to respondents. Similarly, J. Grunig and L. Grunig (2000) listed participant consent, prevention of deception, and preserving privacy as the three major ethical issues in public relations research. In research with human subjects, there almost always is a “tension” between a researcher’s “scientific need” and participant’s “right to decline” of participation (Schwarz, Groves, & Schuman, 1998). To manage such tension, I paid attention for those major ethical issues throughout the research.

After I finalized the research method and plan, I submitted the research protocols and instruments for review by the University of Maryland Institutional Review Board (IRB). Upon approval of the research, I contacted the faculty and instructors in the Department of Communication to get approval and make alternative assignments if participants refused to participate in the study. Thus, those participants or non-

participants in the respondent pool had equal opportunity to get extra-credit (i.e., 20 points).

As participants agreed to participate, they were first presented with the informed consent form, in which they found the title and purpose of the study, procedures such as time, assurance of confidentiality, possible risks and benefits, most importantly, their freedom to withdraw from study or decline for some questions. Respondents were given the researcher's name and contact information if they wanted to ask a question or had concerns to share.

All of the responses were kept confidential as promised, although respondents entered a self-made individual code (e.g., last four digits of social security number with first letter of their last name) for assigning responses to their clusters (i.e., who "snowballed" the participant). However, it was practically impossible for the researcher to connect the personal information with the individual responses. Thus, confidentiality was secured. Notably, it was acknowledged clearly that participation would not bring any possible harm and personal benefits to the respondents before they decided to participate.

In the next chapter, I will summarize what I found from the data analysis and hypothesis testing.

CHAPTER IV: RESULTS

Descriptions of Survey Participants

One of the main purposes of this study is to develop and test measurement items for the new concepts of communicant activeness and cognitive entrepreneurship in problem solving. Because of the number of conceptual factors in the study, the length of the survey questionnaire was very long (i.e., 100 question items regarding three individual and social issues). Thus, I removed basic descriptive measures regarding participants (e.g., gender, income, age) to reduce participants' fatigue.

A total of 1,380 University of Maryland undergraduate students participated in the survey. I invited students from an undergraduate communication course to participate in exchange for extracredit.

Preliminary Analysis

Missing Value Analysis (MVA) and Normality

The survey instruments in this study consisted of 100 items regarding three social and individual issues: war in Iraq, losing weight, and elimination of affirmative action in American higher education. There were 49 items to measure communicant activeness and its subdimensions, 20 items to measure the cognitive entrepreneurship and its subdimensions, and 22 items for the situational antecedent variables.

I conducted missing value analysis (MVA) and found no significant difference between this data pattern and a random data pattern: i.e., Little's MCAR test: χ^2 (11597, $n = 1,380$) = 35.204, $p = 1.000$. In addition, I conducted missing value analysis (MVA) for the individual constructs and their subdimensions. For the war in Iraq issue, the percentages of missing values varied from 3.8%-5.8%; for losing weight, the percentages

varied from 3.8%-5.9%; and for elimination of affirmative action, the percentages varied from 3.9%-5.9%. Little's MCAR tests showed that all of the variables had completely random missing patterns.

Before analyzing the data, I examined the univariate outliers and kurtosis and skewness in the univariate distribution of each variable. The majority of variables looked symmetric, whereas those non-symmetric variables did not seriously deviate from the symmetric distribution.

In all of the structural equation model analyses, I used the maximum likelihood (ML) estimation method to reduce the undesirable effects from non-normal distribution of data. West, Finch, and Curran (1995) suggested that given variables that are not substantially nonnormal, ML or GLS should be used as an estimation method. To secure the use of some nonnormal variables in the data set, I conducted several SEM analyses in which I fit the same models to two different data sets (i.e., transformed and non-transformed data). The comparisons resulted in similar fits and similar parameter estimates. Thus, I proceeded with a non-transformed data set with a "ML" estimation method in subsequent analyses.²²

Reliability Tests and Exploratory Factor Analysis of the Key Constructs

In the present study, I developed two new constructs of communicant activeness in problem solving and cognitive entrepreneurship in problem solving. Each construct has sub-constructs that they are correlated but possess unique conceptual meanings toward their higher constructs. As a first step, I examined these new constructs and

²² An alternative estimation method (i.e., ML, Robust) was run and gave comparable results. In general, ML, Robust estimation resulted in a similar estimation of parameters but more favorable model fit information (e.g., CFI and RMSEA) than ML estimation. Although I could report the ML, Robust estimation outcomes to highlight the better model fits, I chose ML outputs to be more conservative in interpretation.

subdimensions in terms of their effectiveness in measuring the intended constructs. Specifically, I assessed the reliability and internal consistency of the data using the Cronbach's alpha test. I also conducted an exploratory factor analysis (i.e., principal component analysis) to assess its loadings, dimensionalities, and Eigenvalues using the SPSS 11.5 program. The following section presents the items and the results of exploratory factor analyses and reliability tests for the items that I proposed.

Communicant Activeness in Problem Solving (CAPS)

In Table 3, I summarize the result of the reliability tests and principal component analysis (PCA) of communicant activeness in problem solving. I used three problems, war in Iraq, losing weight, and eliminating affirmative action, in this study. The Cronbach's alpha tests for CAPS in three different problems showed acceptable levels of alpha coefficients: .93 for war in Iraq, .94 for losing weight, and .95 for eliminating affirmative action. Although I treated CAPS as a unidimensional construct here, I proposed CAPS to have six subdimensions: information forefending, information permitting, information forwarding, information sharing, information seeking, and information processing. To see whether CAPS has multidimensionality, I conducted principal component analysis. PCA showed that there were five subdimensions for the war in Iraq and losing weight issues and four dimensions for the issue of eliminating affirmative action in terms of the Kaiser rule (i.e., Eigenvalues higher than 1.00). In war in Iraq and losing weight, five dimensions explained about 56.14% of variance and 55.33% of variance correspondingly. In eliminating affirmative action, four dimensions accounted for 54.28% of variance.

I found a multidimensional structure under CAPS (i.e., subfactors were emerged from the one factor analysis), thus, I further broke down CAPS into its six dimensions and examined its reliability and structure. I summarize the results and items in following tables. Table 2 reports the results from one factor analysis of all the variables as indicators of CAPS. Table 4-9 report the results of the separate factor analyses in six subdimensions of CAPS.

Table 3

Reliability for Communicant Activeness in Problem Solving (n = 1380)

<i>Construct</i>	<i>War in Iraq</i>	<i>Losing Weight</i>	<i>Eliminating Affirmative Action</i>
Cronbach's Alpha	.93	.94	.95
Eigenvalues	10.77	11.62	12.95
	3.38	3.04	3.15
	1.63	1.41	1.69
	1.18	1.16	1.21
	1.01	1.03	
Cumulative % of Variance Explained	56.14	55.33	54.28

Table 4

Items, Factor Loadings, and Reliability for Information Forefending (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Information Forefending	Others respect my perspective about this problem because it is simple and clear.	.57		.63		.61	
	Some publicized statements about this problem are worthless.	.54				.50	
	I have invested enough time and energy so that I understand this problem.	.81		.81		.82	
	I know where to go when I need updated information regarding this problem.	.68		.73		.67	
	I have studied this problem enough to judge the value of information.	.80		.81		.81	
	I feel like resisting some persuasive efforts around this problem.	.53				.59	
	I express my opinions confidently about what should be done to deal with this problem.	.75		.74		.76	
Eigenvalues		.49	.80	.50	.79	.46	.81
% of Variance Explained		3.45		3.01		3.54	
		43.08		50.21		44.23	

Table 5

Items, Factor Loadings, and Reliability for Information Permitting (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Information Permitting	To make better decisions regarding this problem, I listen to opposite views and information as long as they are related to the problem.	.74		.66		.70	
	For this problem, I welcome any information regardless of where it comes from.	.42		.57		.46	
	I am careful in accepting information about this problem because of the vested interests of those who provided the information. (R)	-.60		-.59		-.60	
	I listen to even opposite views on this problem.	.79		.75		.74	
Eigenvalues	.66	.65	.71	.65	.68	.64	
		2.14		2.19		2.07	
% of Variance Explained		42.88		43.71		41.31	

Table 6

Items, Factor Loadings, and Reliability for Information Forwarding (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Information Forwarding	Sometimes I find I am engaging in aggressive conversations on this problem.	.65		.66		.69	
	It is one of my top priorities to share my knowledge and perspective about this problem.	.77		.75		.78	
	If it is possible, I take time to explain this problem to others.	.78		.76		.77	
	It is worthy spending some time to persuade others about this problem.			.56			
	I look for chances to share my knowledge and thoughts about this problem.	.81		.76		.74	
	I actively seek out opportunities to participate in public opinion polls about this problem.			.64		.72	
	I love to start a conversation on this problem with others.	.80		.74		.76	
	I volunteer to inform others about the problem.	.76		.77		.78	
	I feel happy when I provide new information about this problem to others.	.67				.64	
Eigenvalues							
		.78	.89	.73	.88	.78	.90
		4.53		4.55		4.95	
% of Variance Explained		56.64		50.52		54.97	

Table 7

Items, Factor Loadings, and Reliability for Information Sharing (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Information Sharing	I am sure that I will be quite active in passing on information related to this problem in the near future.	.76		.74		.77	
	I am a person to whom my friends and others come to learn more about this problem.	.82		.83		.81	
	In the past, I researched about this problem seriously.	.76		.78		.78	
	At times, I am asked to give advice regarding this problem.	.78	.79	.81	.80	.83	.81
Eigenvalues	2.45		2.48		2.54		
% of Variance Explained		61.12		62.01		63.55	

Table 8

Items, Factor Loadings, and Reliability for Information Seeking (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Information Seeking	From time to time, I contact people about this problem to learn what kind of solutions there are.	.69		.66		.69	
	I regularly visit websites relevant to the problem.	.80		.80		.82	
	I regularly check to see if there is any new information about this problem on the Internet.	.77		.83		.83	
	I would request booklets containing relevant knowledge about the problem.	.76		.74		.73	
	I visit an online or regular bookstore to find useful information about the problem	.74		.79		.85	
	My friends think that I take too much time for learning about this problem.		.81	.73	.85	.79	.87
Eigenvalues		2.83		3.46		3.69	
% of Variance Explained		56.52		57.65		61.45	

Table 9

Items, Factor Loadings, and Reliability for Information Processing (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Information Processing	I am sure that I will be quite active in passing on information related to this problem in the near future.	.78		.75		.64	
	I am a person to whom my friends and others come to learn more about this problem.	.86		.85		.84	
	In the past, I researched about this problem seriously.	.73	.70	.78	.70	.72	.58
Eigenvalues		1.88		1.89		1.63	
% of Variance Explained		62.80		62.91		54.50	

Table 4 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for information forefending. In information forefending, I used eight items and found only one dimension: i.e., Eigenvalues = 3.45, 3.01, and 3.54 in war in Iraq, losing weight, and eliminating affirmative action. Factor loadings varied from .46 to .81. The amounts of variance explained were 43.08%, 50.21%, and 44.23% and the Cronbach's alphas were .80, .79, and .81, correspondingly. Therefore, I conclude that information forefending reached an acceptable level of reliability and internal consistency.

Table 5 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for information permitting. In information permitting, I used five items and again found only one dimension: i.e., Eigenvalues = 2.14, 2.19, and 2.07 for war in Iraq, losing weight, and eliminating affirmative action. Factor loadings varied from .42 to .79. The amounts of variance explained were 42.88%, 43.71%, and 41.31% and the Cronbach's alphas were .65, .65, and .64, correspondingly. Yet, I found the reliability coefficients were less than desirable (i.e., .70 to .80). The fewer number of items would be a possible cause for marginal reliabilities.

Table 6 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for information forwarding. In information forwarding, I used 10 items. I also found a single dimension: i.e., Eigenvalues = 4.53, 4.55, and 4.95 for war in Iraq, losing weight, and eliminating affirmative action. Factor loadings vary from .64 to .81. The amounts of variance explained were 56.64%, 50.52%, and 54.97% and the Cronbach's alphas were .89, .88, and .90, correspondingly. Therefore, I conclude

that information forwarding measures reached an acceptable level of reliability and internal consistency.

In information sharing, I used four items and found a single dimension: i.e., Eigenvalues = 2.45, 2.48, and 2.54 in war in Iraq, losing weight, and eliminating affirmative action. Factor loadings varied from .74 to .83. The amounts of variance explained are 61.12%, 62.01%, and 63.55% and the Cronbach's alphas were .79, .81, and .81, correspondingly. Therefore, I conclude that information forwarding reached an acceptable level of reliability and internal consistency.

Table 8 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for information seeking. In information seeking, I used six items and found a single dimension: i.e., Eigenvalues = 2.83, 3.46, and 3.69 for war in Iraq, losing weight, and eliminating affirmative action. Factor loadings varied from .66 to .85. The amount of variance explained was 56.52%, 57.65%, and 61.45% and the Cronbach's alphas were .81, .85, and .87, correspondingly. Therefore, I conclude that information forwarding reached an acceptable level of reliability and internal consistency.

Table 9 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for information processing. In information processing, I used three items and found a single dimension: i.e., Eigenvalues = 1.88, 1.89, and 1.63 in war in Iraq, losing weight, and eliminating affirmative action. Factor loadings varied from .64 to .86. The variances explained were 62.80%, 62.91%, and 54.50% and the Cronbach's alphas were .70, .70, and .58 correspondingly. Although the reliability of eliminating affirmative action resulted in a marginal alpha coefficient, the other alpha coefficients reached an acceptable level of reliability.

In summary, I found that the new construct communicant activeness in problem solving achieved a reasonable internal consistency and reliability. I treated CAPS not only as a unidimensional construct, but also as a set of multidimensional constructs. In both cases, I found acceptable agreements between data and proposition.

Cognitive Entrepreneurship in Problem Solving (CEPS)

The second new construct I proposed is cognitive entrepreneurship in problem solving (CEPS). CEPS consists of four conceptual subdimensions: cognitive retrogression, cognitive suspension, cognitive multilateralism, and cognitive commitment. I introduced multiple items for cognitive retrogression and cognitive suspension, whereas I used single items to measure cognitive multilateralism and cognitive commitment: two computational formulas in the conceptualization. For CEPS, I conducted an analysis of reliability and internal consistency analysis only for the subdimensions of cognitive retrogression and suspension. In the following tables, I summarize the results of the reliability and principal component analysis.

In Table 10, I summarize the result of reliability tests and principal component analysis (PCA) of cognitive entrepreneurship in problem solving. In CEPS measurement, I used two problems: war in Iraq and eliminating affirmative action. Cognitive multilateralism and cognitive commitment require different measurement strategies using respondents' evaluations about a conflicting social issue. Thus, I excluded the losing weight problem, which is a non-controversial issue.

I first conducted Cronbach's alpha tests for CEPS in two different problems. Here I treated CEPS as if it were a unidimensional construct by entering all items for four subdimensions. Analysis showed alpha coefficients of .66 for war in Iraq, which is

marginal, and .74 for eliminating affirmative action. To see whether CEPS has multidimensionality, I conducted principal component analysis. PCA showed that there are four subdimensions in both issues: Eigenvalues 2.71, 2.53, 1.37, and 1.01 for war in Iraq and 4.72, 2.43, 1.49, and 1.28 for eliminating affirmative action. For war in Iraq, four dimensions explained about 63.45% of variance, and for eliminating affirmative action, 58.39% of variance.

Table 10

Reliability for Cognitive Entrepreneurship in Problem Solving (n = 1380)

<i>Construct</i>	<i>War in Iraq</i>	<i>Eliminating Affirmative Action</i>
Cronbach's Alpha	.66	.74
Eigenvalues	2.71 (22.55%)	4.72 (27.78%)
	2.53 (21.10%)	2.43 (14.32%)
	1.37 (11.29%)	1.49 (8.77%)
	1.01 (8.41%)	1.28 (7.52%)
Cumulative % of Variance Explained	63.45	58.39

Table 11

Items, Factor Loadings, and Reliability for Cognitive Retrogression (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha
Cognitive Retrogression	I know how I should behave for this problem.	.63		.58	
	It is too late to change the position I now have on this problem.			.80	
	I have spent too much time on this problem to change my position now.	.68		.77	
	It is too late to shake the conclusion I have drawn for this problem.	.66		.74	
	I have made efforts to justify my decision on this problem.	.58			
	I will keep my current position even if someone challenges it with contradictory evidence.	.71		.71	
	I have found counter evidence that rejects the positions different from mine.	.62			
	I feel it is costly to change my mind on this problem.		.72	.74	.82
Eigenvalues		2.53		3.18	
% of Variance Explained		42.08		52.99	

Table 12

Items, Factor Loadings, and Reliability for Cognitive Suspension (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha
Cognitive Suspension	I want to take more time before making up my mind for this problem.	.77		.73	
	I hesitate to make up my mind about what should be done for this problem.	.68		.61	
	I need more time to think before I finalize my position on this problem.	.81		.79	
	For this problem, I will try to suspend any judgment until all the evidence is in.	.70	.72	.75	.69
Eigenvalues		2.20		2.07	
% of Variance Explained		54.90		51.73	

As I did for CAPS, I conducted subsequent analyses for cognitive retrogression and cognitive suspension in which I adopted a multiple-item measurement strategy.

Table 11 summarizes the items, loadings, Cronbach's alpha, and variance explained in two problems for cognitive retrogression. In cognitive retrogression, I used eight items and found single dimensionality in both issues: i.e., Eigenvalues 2.53 for war in Iraq and 3.18 for eliminating affirmative action. Factor loadings varied from .58 to .80. The amount of variance explained was 42.08 and 52.99% and the Cronbach's alphas were .72 and .82, correspondingly.

Table 12 summarizes the items, loadings, Cronbach's alpha, and variance explained in two problems for cognitive suspension. In cognitive suspension, I used four items and again found only one dimension in both issues: i.e., Eigenvalues 2.20 for war in Iraq and 2.07 for eliminating affirmative action. Factor loadings vary from .61 to .81. The amount of variance explained was 54.90 and 51.73% and the Cronbach's alphas were .72 and .69.

Antecedent Variables of the CAPS and CEPS

The situational theory of publics (J. Grunig, 1997, 2003) specifies situational antecedent conditions explaining when and why a communicant actively seeks or passively processes information. They are problem recognition, constraint recognition, level of involvement, and referent criterion. In addition, I introduced a variable called *situational motivation in problem solving* that conceptualizes and measures one's problem-solving motivation in a problematic situation. The primary purpose of the present study is to generalize the situational theory of publics by introducing two more general constructs of communicant activeness and cognitive entrepreneurship in problem

solving. Thus, it is necessary to investigate how the existing antecedent conditions would conceptually link with the two new variables. In doing so, I should note that two antecedent variables of problem recognition and referent criterion have been conceptually refined and thus their measurement items have been modified. Hence, to proceed, I checked the new and modified items' reliabilities and internal consistencies. In the following Tables 13-17, I will summarize the analysis and findings for the situational antecedent variables.

Problem recognition. Table 13 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for problem recognition. I used four items that had been modified from the past measurement items in the situational theory of publics (J. Grunig, 1997). I found only one dimension in all three problems: i.e., Eigenvalues = 2.26, 2.29, and 2.26 for war in Iraq, losing weight, and eliminating affirmative action. Factor loadings varied from .63 to .82. The amounts of variance explained are 56.50%, 57.21%, and 56.45% and the Cronbach's alphas were .74, .75, and .74, correspondingly. Therefore, I conclude that problem recognition reached an acceptable level of reliability and internal consistency.

Constraint recognition. Table 14 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for constraint recognition. I used three items as in the situational theory of publics (J. Grunig, 1997). I found only one dimension in all three problems: i.e., Eigenvalues = 2.17, 2.11, and 2.11 for war in Iraq, losing weight, and eliminating affirmative action, respectively. Factor loadings varied from .82 to .87. The amounts of variance explained are 72.29%, 70.40%, and 70.33% and the

Cronbach's alphas were .81, .79, and .79, correspondingly. Therefore, I conclude that constraint recognition reached an acceptable level of reliability and internal consistency.

Level of involvement. Table 15 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for level of involvement. I used four items as in the situational theory of publics (J. Grunig, 1997). I found only one dimension in all three problems: i.e., Eigenvalues = 2.07, 2.26, and 2.32 for war in Iraq, losing weight, and eliminating affirmative action, respectively. Factor loadings varied from .61 to .82. The amounts of variance explained are 51.71%, 56.54%, and 58.04% and the Cronbach's alphas were .69, .74, and .76, correspondingly. Therefore, I conclude that level of involvement reached an acceptable level of reliability and internal consistency.

Referent criterion. Table 16 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for referent criterion. I used five items that had been modified from the past measurement items in the situational theory of publics. For war in Iraq, I found two dimensions: i.e., Eigenvalues 2.57 (51.39% of variance explained) and 1.03 (20.64% of variance explained). In the other two problems, I found a single dimension: i.e., Eigenvalues = 2.67 (53.44% of variance explained) and 2.47 (49.35% of variance explained) for losing weight and eliminating affirmative action correspondingly. Factor loadings vary from .64 to .77 (in the first dimension) and the Cronbach's alphas were .76, .78, and .81, correspondingly. The two dimensions in the war in Iraq issue could be an issue specific result. Yet, the second dimension was relatively smaller than the first dimension. In addition, in the other two problems, I found single dimensions. Therefore, with some caution, I conclude that referent criterion reached an acceptable level of reliability and internal consistency.

Situational motivation in problem solving. Table 17 summarizes the items, loadings, Cronbach's alpha, and variance explained in three problems for situational motivation in problem solving. I used three items. I found a single dimension in all three problems: i.e., Eigenvalues 1.81 (60.34% of variance explained), 1.97 (65.65% of variance explained), and 1.62 (53.99% of variance explained) for war in Iraq, losing weight, and eliminating affirmative action, respectively. Factor loadings varied from .71 to .85 and the Cronbach's alphas were .67, .74, and .57, correspondingly.

In summary, the exploratory factor analysis and reliability analysis helped identify the dimensionality and the internally consistent and reliable measurement items. Items were reliable and internally consistent in most of the problems with a few exceptions. However, reliability analysis such as Cronbach's alpha assumes unidimensionality of the construct. Thus, although alpha level would be high, it does not mean the construct has achieved unidimensionality (Netemeyer, Bearden, & Sharma, 2003). Indeed, I conceptualized communicant activeness in problem solving to have six subdimensions as a second-order construct. Thus, it is necessary to find whether communicant activeness has such a multi-dimensional structure, especially a second-order structure. In the following section, I report the results from confirmatory factor analysis that tested the dimensionality of the new construct using *a priori* conceptual models.

Table 13

Items, Factor Loadings, and Reliability for Problem Recognition (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Problem Recognition	To what extent do you think there is something missing in this problem?	.79		.76		.72	
	How much does the current situation differ from your expectation?	.63		.73		.75	
	How strong do you feel that something needs to be done to improve the situation for this problem?	.79		.82		.80	
	How much does the current situation deviate from what you think it should be?	.78	.74	.70	.75	.74	.74
Eigenvalues	2.26		2.29		2.26		
% of Variance Explained		56.50		57.21		56.45	

Table 14

Items, Factor Loadings, and Reliability for Constraint Recognition (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Constraint Recognition	Please think of whether you, personally, could do anything that would make a difference in the way these problems are handled. If you wanted to do something, would your efforts make a difference? (R)	.84		.84		.85	
	To what extent do you believe this problem is a problem that you can do something about? (R)	.87		.85		.84	
	To what extent do you believe that you could affect the way this problem is eventually solved if you wanted to? (R)	.84	.81	.82	.79	.83	.79
Eigenvalues		2.17		2.11		2.11	
% of Variance Explained		72.29		70.40		70.33	

Table 15

Items, Factor Loadings, and Reliability for Level of Involvement (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Level of Involvement	In your mind, how much of a connection do you see between yourself and this problem?	.61		.74		.73	
	To what extent do you believe this problem could involve you or someone close to you at some point?	.77		.72		.78	
	How much do you believe this problem affects or could affect you personally?	.78		.82		.79	
	How strong would you say your opinions or thoughts are about this problem?	.71	.69	.72	.74	.75	.76
Eigenvalues	2.07		2.26		2.32		
% of Variance Explained		51.71		56.54		58.04	

Table 16

Items, Factor Loadings, and Reliability for Referent Criterion (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>			<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Referent Criterion	I am confident about my knowledge about this problem.	.75	-.13		.64		.69	
	I strongly support a certain way of resolving this problem.	.76	-.41		.77		.74	
	I have a preference for how the problem should be settled.	.75	-.45		.77		.77	
	I am pretty sure, I know how to solve this problem.	.68	.52		.73		.73	
	Past experience has provided me with guidelines for solving this problem.	.64	.61		.74		.56	
Eigenvalues		2.57	1.03	.76	2.67	.78	2.47	.81
% of Variance Explained		51.39	20.64		53.44		49.35	

Table 17

Items, Factor Loadings, and Reliability for Situational Motivation in Problem Solving (n = 1380)

<i>Construct</i>	<i>Item</i>	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
		Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Situational Motivation in Problem Solving	How often do you stop to think about each of these three problems?	.75		.80		.71	
	To what extent would you say you are curious about this problem?	.83		.85		.82	
	Please, indicate how much you would like to understand each of these problems better.	.75	.67	.78	.74	.68	.57
Eigenvalues		1.81		1.97		1.62	
% of Variance Explained		60.34		65.65		53.99	

Structural Equation Modeling Analysis

In the previous section, I reported the characteristics of the sample and results of exploratory analysis of the variables included in the study. I now proceed to the confirmatory analysis phase for the two new constructs of CAPS and CEPS. Using the EQS 6.1 program (Bentler, 2005), I analyzed the data to examine factor structures of the CAPS and CEPS. Then, I analyzed a series of causal models in which I specified conceptual relationships with other conceptual variables (e.g., level of involvement) to test the nomological validity of CAPS and CEPS. In the next section, I will first report the results from confirmatory factor analysis of CAPS.

Communicant Activeness in Problem Solving (CAPS)

Confirmatory Factor Analysis of CAPS

It is desirable to test a new measurement scale with different samples. In the current study, I have a large sample size ($n = 1,380$). Thus, using a sub-sampling strategy, I drew a few smaller developmental samples by using SPSS 11.5 random selection function. However, cross-validation for a new scale is best evaluated by using samples from different populations. Although the sub-sampling strategy has a limitation in conducting a cross-validation analysis, it still allows a better opportunity to evaluate the structure and conceptual validity of the measurement system and the factor model. The first developmental sample had $n = 467$, about 33% of 1,380 survey participants.

Following the two-step process of SEM, I first conducted the confirmatory analysis that allowed covarying all the factors in the models using the candidate measurement items. Subsequent analysis checking for poor or cross-loading items and residual covariances with LM tests in EQS 6.1 produced a set of best items across three

problems in the current study: war in Iraq, losing weight, and eliminating affirmative action.

Then, in the structural phase, I imposed three factor structures: one factor, six-factor oblique, and second-order structure model. These three models were nested hierarchically under a six-factor oblique model. Specifically, the one-factor model is the most parsimonious of the three models compared. Thus, I first compared the one-factor model with the six-factor oblique model. And, if the six-factor oblique model turned out to be a statistically better model, I compared the six-factor oblique model against the second-order structure model, which is more parsimonious than the six-factor oblique model.

I summarized the results from model testing in Tables 18-20. Table 18 reports the model goodness-of-fit indices and model comparison results for the war in Iraq issue.

Table 18

Model Comparisons: Chi-square Differences and Goodness-of-Fit indices (War in Iraq)

	<i>Model</i>	χ^2	<i>df</i>	χ^2/df	<i>RMSEA</i>	<i>SRMR</i>	<i>CFI</i>	<i>NNFI</i>	<i>AIC</i>	Δdf	$\Delta \chi^2$	<i>p</i>
Developmental Sample (n = 467)	Independence Model	4574.104	210	21.781					4154.104			
	One-Factor (Md A)	705.166	169	4.173	.083 (.076, .089)	.155	.877	.847	367.166			
	Six-Factor Oblique (Md B)	396.322	154	2.574	.058 (.051, .065)	.062	.944	.924	88.322	A vs. B		
	Second-Order (Md C)	399.529	159	2.513	.057 (.050, .064)	.063	.945	.927	81.529	B vs. C	15	$p < .001$
										3.207	5	$p > .250$
Validation Sample (n = 458)	Independence Model	4529.276	210	21.568					4109.276			
	One-Factor (Md A)	785.476	169	4.648	.089 (.083, .096)	.162	.857	.823	447.476			
	Six-Factor Oblique (Md B)	395.633	154	2.569	.059 (.051, .066)	.056	.944	.924	87.633	A vs. B		
	Second-Order (Md C)	408.366	159	2.568	.059 (.052, .066)	.057	.942	.924	90.366	B vs. C	15	$p < .001$
										12.733	5	$p = .025$
Validation Sample (n = 460)	Independence Model	4725.843	210	22.504					4305.843			
	One-Factor (Md A)	755.175	169	4.468	.087 (.081, .093)	.168	.870	.839	417.175			
	Six-Factor Oblique (Md B)	401.763	154	2.609	.059 (.052, .066)	.055	.945	.925	93.763	A vs. B		
	Second-Order (Md C)	408.322	159	2.568	.058 (.051, .065)	.056	.945	.927	90.322	B vs. C	15	$p < .001$
										6.559	5	$p > .250$
Total (n = 1380)	Independence Model	13239.663	210	63.046					12819.663			
	Second-Order	823.500	159	5.179	.055 (.051, .059)	.055	.949	.933	505.500			

Table 19

CAPS Model Comparisons: Chi-square Differences and Goodness-of-Fit indices (Losing Weight)

	<i>Model</i>	χ^2	df	χ^2/df	<i>RMSEA</i>	<i>SRMR</i>	<i>CFI</i>	<i>NNFI</i>	<i>AIC</i>	Δ df	$\Delta \chi^2$	p
Developmental Sample (n = 467)	Independence Model	4529.253	210	21.568					4109.253			
	One-Factor (Md A)	642.480	173	3.714	.076 (.070, .083)	.155	.891	.868	296.480			
	Six-Factor Oblique (Md B)	338.352	158	2.141	.049 (.042, .057)	.048	.958	.945	22.352	A vs. B		
	Second-Order (Md C)	342.799	163	2.103	.049 (.041, .056)	.049	.958	.946	16.799	B vs. C	15	$p < .001$
										4.447	5	$p > .250$
Validation Sample (n = 458)	Independence Model	4367.814	210	20.799					3947.814			
	One-Factor (Md A)	622.706	173	3.599	.075 (.069, .082)	.144	.892	.869	276.706			
	Six-Factor Oblique (Md B)	347.861	158	2.011	.051 (.044, .058)	.046	.954	.939	31.861	A vs. B		
	Second-Order (Md C)	365.788	163	2.244	.052 (.045, .059)	.048	.951	.937	39.788	B vs. C	15	$p < .001$
										17.927	5	$p \approx .005$
Validation Sample (n = 460)	Independence Model	4316.855	210	20.556					3896.835			
	One-Factor (Md A)	552.352	173	3.193	.069 (.063, .076)	.148	.908	.888	206.352			
	Six-Factor Oblique (Md B)	313.205	158	1.982	.046 (.039, .054)	.044	.962	.950	-2.795	A vs. B		
	Second-Order (Md C)	316.431	163	1.941	.045 (.038, .053)	.044	.963	.952	-9.569	B vs. C	15	$p < .001$
										3.226	5	$p > .500$
Total (n = 1380)	Independence Model	12612.329	210	60.059					12192.329			
	Second-Order	628.838	163	3.858	.046 (.042, .049)	.042	.962	.952	302.838			

Table 20

CAPS Model Comparisons: Chi-square Differences and Goodness-of-Fit indices (Eliminating Affirmative Action)

	<i>Model</i>	χ^2	df	χ^2/df	<i>RMSEA</i>	<i>SRMR</i>	<i>CFI</i>	<i>NNFI</i>	<i>AIC</i>	Δ df	$\Delta \chi^2$	p	
Developmental Sample (n = 467)	Independence Model	5151.735	210	24.532					4731.735				
	One-Factor (Md A)	802.480	175	4.586	.088 (.082, .094)	.179	.873	.848	452.480				
	Six-Factor Oblique (Md B)	383.278	160	2.395	.055 (.048, .062)	.056	.955	.941	63.278	A vs. B	419.202	15	$p < .001$
	Second-Order (Md C)	386.610	163	2.372	.054 (.047, .061)	.056	.955	.942	60.610	B vs. C	3.332	3	$p > .250$
Validation Sample (n = 458)	Independence Model	4714.072	210	22.448					4294.072				
	One-Factor (Md A)	698.447	175	3.991	.081 (.075, .087)	.158	.884	.861	348.447				
	Six-Factor Oblique (Md B)	388.616	160	2.429	.056 (.049, .063)	.048	.949	.933	68.616	A vs. B	309.831	15	$p < .001$
	Second-Order (Md C)	389.610	163	2.390	.055 (.048, .062)	.048	.950	.935	63.610	B vs. C	.994	3	$p > .750$
Validation Sample (n = 460)	Independence Model	4943.076	210	23.538					4523.076				
	One-Factor (Md A)	735.941	175	4.205	.084 (.077, .090)	.181	.881	.858	385.941				
	Six-Factor Oblique (Md B)	411.613	160	2.573	.059 (.052, .065)	.049	.947	.930	91.613	A vs. B	324.328	15	$p < .001$
	Second-Order (Md C)	418.846	163	2.570	.058 (.052, .065)	.050	.946	.930	92.846	B vs. C	7.233	3	$p \approx .05$
Total (n = 1380)	Independence Model	14145.572	210	67.360					13725.572				
	Second-Order	776.337	163	4.763	.052 (.049, .056)	.046	.956	.943	450.337				

In the developmental sample ($n = 467$), the one-factor model was a significantly better model than the independence (null) model: $\chi^2_{df}(169) = 705.166$ vs. $\chi^2_{df}(210) = 4574.104$ and χ^2/df ratios of 4.173 vs. 21.781. Next, I compared the one-factor model with the six-factor oblique model. The six-factor oblique model was better than the one-factor model: $\chi^2_{df}(169) = 705.166$ vs. $\chi^2_{df}(154) = 396.322$ and χ^2/df ratios of 4.173 vs. 2.574. The nested model test showed that the six-factor oblique factor model is a better representation of the observed covariances structure: $\Delta\chi^2_{\Delta df}(15) = 308.844, p < .001$. According to Hu and Bentler's (1999) joint criterion: i.e., $CFI \geq .96$ and $SRMR \leq .10$ or $RMSEA \leq .06$ and $SRMR \leq .10$, the six-factor oblique model is close to an acceptable fit in terms of the joint criterion: $CFI = .944$, $SRMR = .062$, and $RMSEA = .058$. However, the CAPS model is designed to be a second-order structure that is more parsimonious. Hence, I conducted the nested model testing between the six-factor oblique and second-order factor models. Comparison showed the second-order factor model to be better than the six-factor oblique model: $\chi^2_{df}(154) = 396.322$ vs. $\chi^2_{df}(159) = 399.529$ and χ^2/df ratios of 2.574 vs. 2.513. In addition, the nested model testing showed that the second-order model is more parsimonious than the six-factor oblique model: $\Delta\chi^2_{\Delta df}(5) = 3.207, p > .250$. The second-order factor model is also close to an acceptable fit in terms of the joint criterion: $CFI = .945$, $SRMR = .063$, and $RMSEA = .057$. Thus, I conclude that the proposed second-order model is a more viable model structure for the data.²³

Table 19 summarizes the model comparisons for the war in Iraq problem. In the losing weight problem with the development sample ($n = 467$), the six-factor oblique model was significantly better than the one-factor model $\Delta\chi^2_{\Delta df}(15) = 304.128, p < .001$.

²³ I added error covariances and disturbance covariances in modeling when they were conceptually reasonable. Thus, in some models, the degrees of freedom were slightly different even in the same factor models (e.g., the second-order factor models) across three problems.

The six-factor oblique model χ^2/df ratio was 2.141. It was close to an acceptable fit in terms of the joint criterion: CFI = .958, SRMR = .048, and RMSEA = .049. And, the nested model testing between the six-factor and second-order factor model showed the second-order model again to be statistically not worse: $\Delta\chi^2_{\Delta df}(5) = 4.447, p > .250$. The model fit indices were CFI = .958, SRMR = .049, and RMSEA = .049. Thus, I conclude that the proposed second-order model is statistically a more viable model structure for the data.

Table 20 reports the model comparisons results for eliminating affirmative action as done in previous two problems. In the development sample ($n = 467$), again the six-factor oblique model is significantly better than the one-factor model $\Delta\chi^2_{\Delta df}(15) = 419.202, p < .001$. The six-factor oblique model χ^2/df ratio was 2.395. It was close to an acceptable fit in terms of the joint criterion: CFI = .955, SRMR = .056, and RMSEA = .055. And the nested model testing between the six-factor and second-order factor model again showed the second-order model to be statistically not worse: $\Delta\chi^2_{\Delta df}(3) = 3.332, p > .250$. The model fit indices were CFI = .955, SRMR = .056, and RMSEA = .054. Thus, from the developmental samples, I conclude that the proposed second-order model structure better represents the observed data than the six-factor oblique model.

Next, I proceeded to the validation samples, which randomly selected 33% of the total sample ($n = 1,380$). Two validation samples of $n = 458$ and $n = 460$ were drawn. I conducted the same model tests of one factor, six-factor oblique, and second-order factor models. The results of model comparisons are summarized in Tables 16-18. In two validation samples for the war in Iraq, both six-factor and second-order factor models were better than the single-factor model. In the first validation sample ($n = 458$), however,

the second-order structure was statistically worse than the six-factor structure: $\Delta\chi^2_{\Delta df}(5) = 12.733, p = .025$. In the second validation sample (n=460), the second-order factor model was statistically not worse: $\Delta\chi^2_{\Delta df}(5) = 6.559, p > .250$.

Similarly, in the losing weight problem, both the six-factor and second-order factor models were better than the single-factor model. In the first validation sample (n = 458), again, the second-order structure was statistically worse than the six-factor structure: $\Delta\chi^2_{\Delta df}(5) = 17.927, p \approx .005$. However, in the second validation sample (n = 460), the second-order factor model was not worse: $\Delta\chi^2_{\Delta df}(5) = 3.226, p > .500$.

Finally, both the six-factor and second-order factor models were better than the single-factor model in the eliminating affirmative action issue. In the first validation sample (n = 458), the second-order factor model was statistically not worse: $\Delta\chi^2_{\Delta df}(3) = .994, p > .750$. In the next validation sample (n = 460), the six-factor structure was a better model representation than the second-order structure: $\Delta\chi^2_{\Delta df}(3) = 7.233, p \approx .05$.

In the validation samples, in three out of six tests, the six-factor oblique structure model better represented the data than the second-order structure, whereas the other three tests showed that the second-order factor models better represented the covariance structures. Despite the three tests favorable to the six-factor oblique structure, six out of nine nested model tests indicated the second-order structure as a better representation. The inconsistency (i.e., three tests out of nine) seems to be due to sampling fluctuation. In addition, the three tests favoring six-factor oblique models were close to non-significant and had almost identical model fit values in terms of joint-criterion. This suggests that the second-order structure is a viable representation of the data. In summary, I found six subdimensions in the CAPS observed datasets from the analysis. This provides evidence

that there are six sub-constructs, information forefending, information permitting, information forwarding, information sharing, information seeking, and information processing.

Hypothesis Testing

In the development samples, I found the second-order factor structure to be the best structure for the new CAPS construct. To test the hypotheses regarding the subdimensions of CAPS, I used the total sample ($n = 1,380$) across the three issues in the study. Tables 16-18 summarize the overall model fits in three problems. For war in Iraq, $\chi^2_{df}(159) = 823.500$, CFI = .949, SRMR = .055, and RMSEA = .055. For losing weight, $\chi^2_{df}(163) = 628.838$, CFI = .962, SRMR = .042, and RMSEA = .046. For eliminating affirmative action, $\chi^2_{df}(163) = 776.337$, CFI = .956, SRMR = .046, and RMSEA = .052. Thus, for all three models the second-order structure is a reasonable representation for CAPS. Next, I proceed to interpreting the parameter estimates in the second-order models to test the hypotheses I proposed earlier.

To conceptualize the new construct of communicant activeness in problem solving, I proposed six hypotheses (see Figure 5 in the conceptualization). They are:

- H1: The higher the communicant activeness in problem solving, the higher the information forefending.
- H2: The higher the communicant activeness in problem solving, the higher the information permitting.
- H3: The higher the communicant activeness in problem solving, the higher the information forwarding.
- H4: The higher the communicant activeness in problem solving, the higher the information sharing.
- H5: The higher the communicant activeness in problem solving, the higher the information seeking.
- H6: The higher the communicant activeness in problem solving, the higher the information processing.

Figures 15-17 summarize the three second-order models and the standardized structural path estimates and standardized loadings in three problems.

Figure 15: CAPS (War in Iraq).

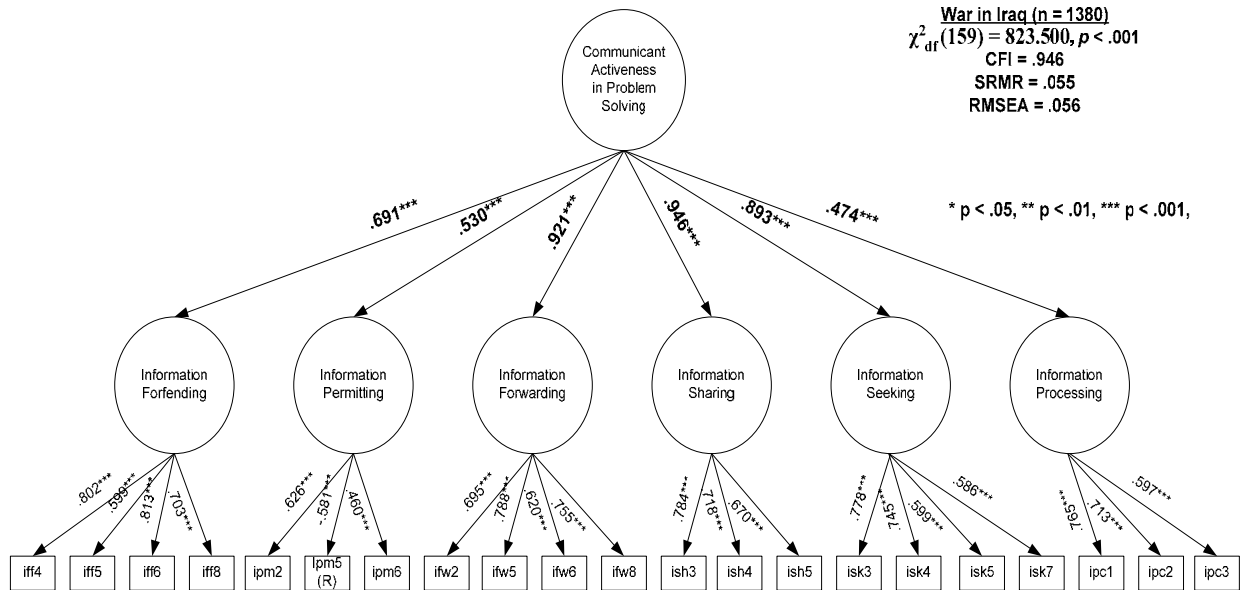


Figure 16: CAPS (Losing Weight).

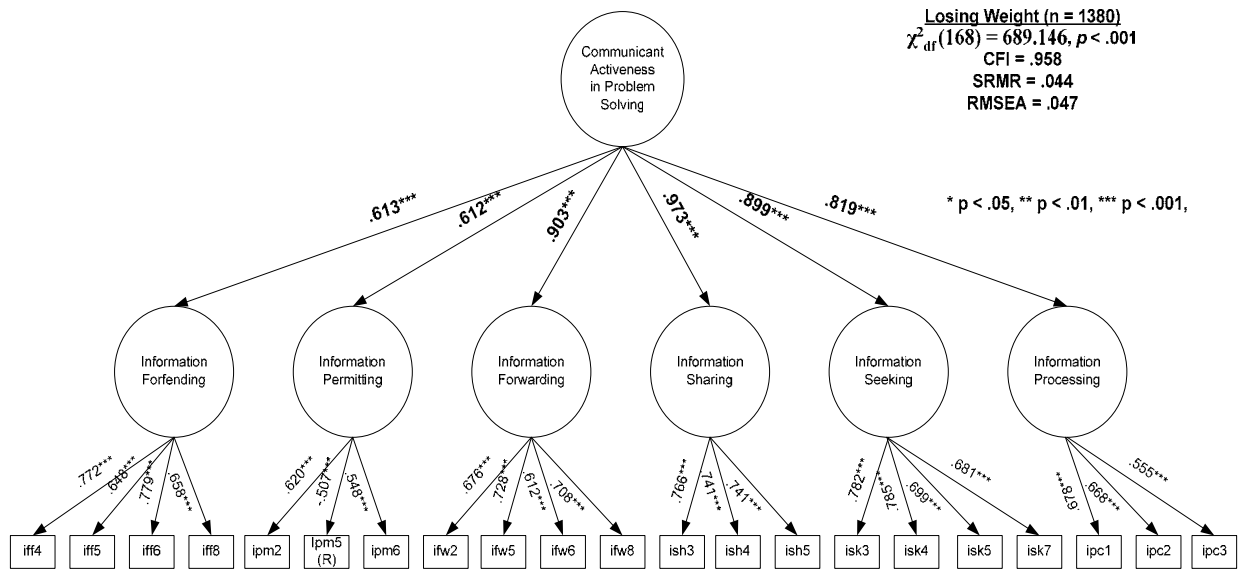
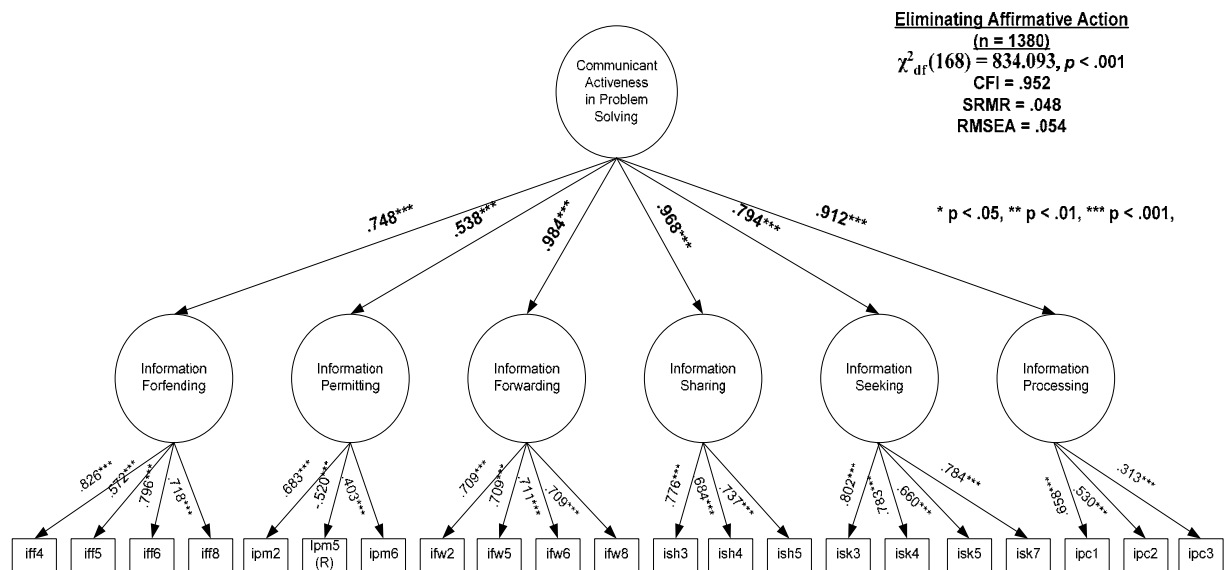


Figure 17: CAPS (Eliminating Affirmative Action).



For those items in the CFA models, I examined the extracted variance to assess construct validity and the coefficient H for construct reliability. The coefficient H is a better alternative indicator of construct reliability than other previous measures based on the composite score with the equal weight assumption (Hancock & Mueller, 2001). Specifically, H is not affected by the loading sign, additional indicators can never detract, and it is never smaller than the reliability of the best indicator, which is logical in that “a factor inferred from multiple indicator variables should never be worse (i.e., less reliable) than the best single indicator alone” (Hancock & Mueller, 2001, p. 195). For the extracted variance, 50% or above is considered good, whereas the coefficient H is considered good with .70 to .80 or above. Most subdimensions were higher or close to 50% of variance explained and close to or above .70 in the coefficient H. More importantly, communicant activeness in problem solving, which is the focal construct, exceeded 50% of the extracted variance and was above .95 on coefficient H. Table 21 summarizes the variance explained and the coefficient H of CAPS and its subdimensions.

Table 21

Variance Explained and Coefficient H in CAPS

	<i>War in Iraq</i>		<i>Losing Weight</i>		<i>Eliminating Affirmative Action</i>	
	Variance	H	Variance	H	Variance	H
	Explained		Explained		Explained	
Information Forefending	53.93	.841	51.39	.818	53.97	.820
Information Permitting	31.37	.588	31.39	.583	29.98	.590
Information Forwarding	51.46	.819	46.57	.781	50.34	.803
Information Sharing	52.64	.776	56.16	.794	53.77	.782
Information Seeking	46.56	.794	54.50	.893	57.66	.852
Information Processing	48.33	.750	40.46	.678	27.06	.558
Communicant Activeness in	58.73	.951	66.52	.967	70.27	.981
Problem Solving						

As shown in the figures, in all three problems ($n = 1380$), the structural paths from the second-order construct (i.e., communicant activeness) to first-order constructs were all significant at the $p < .001$ level. The loadings in the observed variables were all significant at the $p < .001$ level. Most of the parameter estimates in the measurement items varied between .313 and .826.

The core premise in the CAPS model is that as a communicant becomes active in problem solving, he or she will become more selective, transmissive, and acquisitive regarding information about the problem. The analysis of CAPS in three individual and social problems provides supportive evidence for the main postulate and the six *a priori* hypotheses.

As a communicant becomes active in problem solving, one's information selectivity tends to increase (i.e., H1 and H2). In general, one's information forwarding tendency increased more than his or her information permitting tendency as communicant activeness heightens. Interestingly, in all three problems, information transmission (i.e., H3 and H4) was the most salient dimension in the communicant activeness in problem solving. This indicates that a problem solver with heightened motivation in problem solving will evolve to be more active in sharing and forwarding information with others about the problem. The next salient dimension is information acquisition (i.e., H5 and H6). These two variables are the default dependent variables highlighting a public's active and passive communication behaviors in the situational theory of publics (J. Grunig, 1997). Consistent with what past studies of the STP found, I found that information seeking and processing increases as one becomes more active in problem solving. In summary, from the data analysis and hypothesis testing, I found six

conceptual subdimensions of CAPS as proposed. Each subdimension has a positive relationship with its higher dimension of communicant activeness. In the following section, I will report another new construct I developed in this study.

Cognitive Entrepreneurship in Problem Solving

Confirmatory Factor Analysis of CEPS

The second new construct is cognitive entrepreneurship in problem solving (CEPS). CEPS captures our varying cognitive approaches across different problem situations. It possesses four conceptual dimensions: cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. In the present study, I applied a multiple-item approach for cognitive retrogression and cognitive suspension. In contrast, I used two formulas that are conceptually derived for cognitive multilateralism and cognitive commitment. Specifically, I measured the latter two subdimensions by using participants' agreement with factual and evaluative statements of conflicting position about the problems. Thus, these two dimensions were measured by single items. I avoided nested model testing between one-factor, multiple-factor oblique, and second-order factor models because of modeling and programming difficulties, although it would have been possible to conduct these tests. Instead, I constructed and tested second-order factor structure directly whether it achieves a reasonable model fit across issues. Hence, if the model tests showed the second-order factor models to be viable, I considered these tests to be supporting evidence for the proposed second-order factor structure for CEPS.

As done in the confirmatory factor analysis of CAPS, I used randomly drawn subsamples: the developmental sample ($n = 467$, 33% of total $n = 1,380$) and the validating sample ($n = 917$, 66% of total $n = 1,380$). Table 20 and 21 report the CFA

results in two subsamples for two issues: i.e., war in Iraq and eliminating affirmative action.

First, in the developmental sample ($n = 467$), the second-order factor models were statistically viable models, according to Hu and Bentler's (1999) joint-criterion. For war in Iraq, the second-order model resulted in $\chi^2_{df}(29) = 58.935$, CFI = .977, SRMR = .055, and RMSEA = .047. For eliminating affirmative action, the second-order model resulted in $\chi^2_{df}(28) = 70.080$, CFI = .969, SRMR = .059, and RMSEA = .057. I found, thus, that a second-order factor structure is a viable representation of the observed data. In the validation sample ($n = 917$), I found similarly good model fit indices. For war in Iraq, the second-order model resulted in $\chi^2_{df}(29) = 154.220$, CFI = .955, SRMR = .067, and RMSEA = .069. For eliminating affirmative action, the second-order model resulted in $\chi^2_{df}(28) = 7123.734$, CFI = .964, SRMR = .056, and RMSEA = .061. With the CFA results, I consider the second-order factor representation a viable model structure for cognitive entrepreneurship in problem solving. Hence, I proceeded to interpret the parameter estimates in the second-order model in the following.

Hypothesis Testing

For the hypothesis testing, I used the total sample ($n = 1,380$) to conduct the second-order CFAs. I reported the model fits in the Table 19 and 20. For war in Iraq $\chi^2_{df}(29) = 187.542$, CFI = .961, SRMR = .061, and RMSEA = .063. For eliminating affirmative action, I found $\chi^2_{df}(28) = 175.969$, CFI = .963, SRMR = .056, and RMSEA = .062. Thus, these results allowed me to interpret the specific parameter estimates within the models.

For those items in the CFA models, again I computed the Coefficient H for construct reliability and the extracted variance to assess construct validity. Table 24 summarizes the variance explained and the coefficient H of CAPS and its subdimensions. In CEPS, only cognitive retrogression and cognitive suspension were measured by multiple items. Most subdimensions were lower than 50% of variance explained. Thus, current measurement items seemed to tap the construct rather poorly. But, coefficient H is close to .70 or higher for both issues. Cognitive entrepreneurship in problem solving, again, had low variance explained. The coefficient Hs were .612 and .627, which were lower than .70. I concluded that the CEPS construct has marginal validity and reliability in the present study. Hence, I interpret the findings more carefully related with the CEPS construct.

Table 22

CEPS Model Comparisons: Chi-square Differences and Goodness-of-Fit indices (War in Iraq)

	Model	χ^2	<i>df</i>	χ^2/df	RMSEA	SRMR	CFI	NNFI	AIC
Developmental Sample (n = 467)	Independence	1373.101	45	30.513					1283.101
	Second-Order	58.935	29	2.032	.047 (.030, .064)	.055	.977	.965	.935
Validation Sample (n = 917)	Independence	2812.394	45	62.498					2722.394
	Second-Order	154.200	29	5.317	.069 (.058, .079)	.067	.955	.930	96.200
Total (n = 1380)	Independence	4101.446	45	91.143					4011.446
	Second-Order	187.542	29	6.467	.063 (.054, .072)	.061	.961	.939	129.542

Table 23

CEPS Model Comparisons: Chi-square Differences and Goodness-of-Fit indices (Eliminating Affirmative Action)

	Model	χ^2	df	χ^2/df	RMSEA	SRMR	CFI	NNFI	AIC
Developmental Sample (n = 467)	Independence	1421.766	45	31.595					1331.766
	Second-Order	70.080	28	2.503	.057 (.040, .073)	.059	.969	.951	14.080
Validation Sample (n = 917)	Independence	2704.746	45	60.105					2614.746
	Second-Order	123.734	28	4.419	.061 (.059, .072)	.056	.964	.942	67.734
Total (n = 1380)	Independence	4070.582	45	90.457					3980.582
	Second-Order	175.969	28	6.285	.062 (.053, .071)	.056	.963	.941	119.969

Table 24

Variance Explained and Coefficient H in CEPS

	<i>War in Iraq</i>		<i>Eliminating Affirmative Action</i>	
	Variance Explained	H	Variance Explained	H
Cognitive Retrogression	30.93	.667	39.38	.699
Cognitive Suspension	34.88	.853	36.27	.785
Cognitive Entrepreneurship in Problem Solving	19.66	.612	19.96	.627

Figures 18-19 summarize the two second order models and the standardized structural path estimates and standardized loadings in two problems. I proposed four hypotheses for cognitive entrepreneurship in problem solving. They are:

H7: The higher the cognitive entrepreneurship in problem solving, the lower the cognitive retrogression

H8: The higher the cognitive entrepreneurship in problem solving, the higher the cognitive multilateralism.

H9: The higher the cognitive entrepreneurship in problem solving, the higher the cognitive commitment.

H10: The higher the cognitive entrepreneurship in problem solving, the higher the cognitive suspension.

Figure 18: CEPS (War in Iraq).

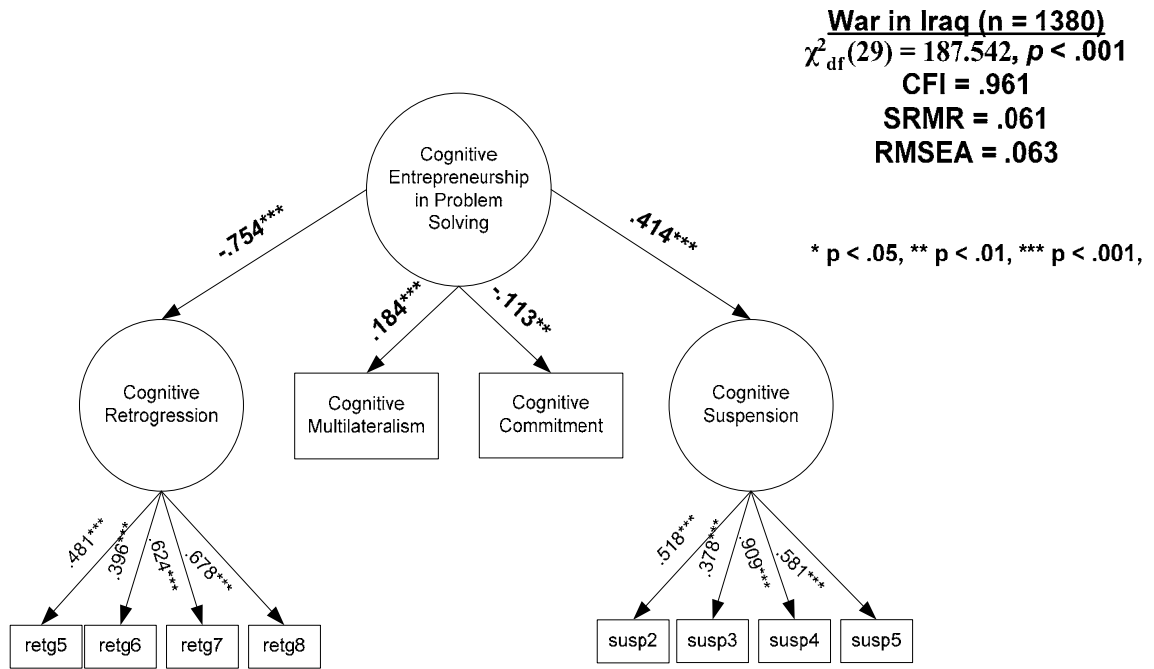
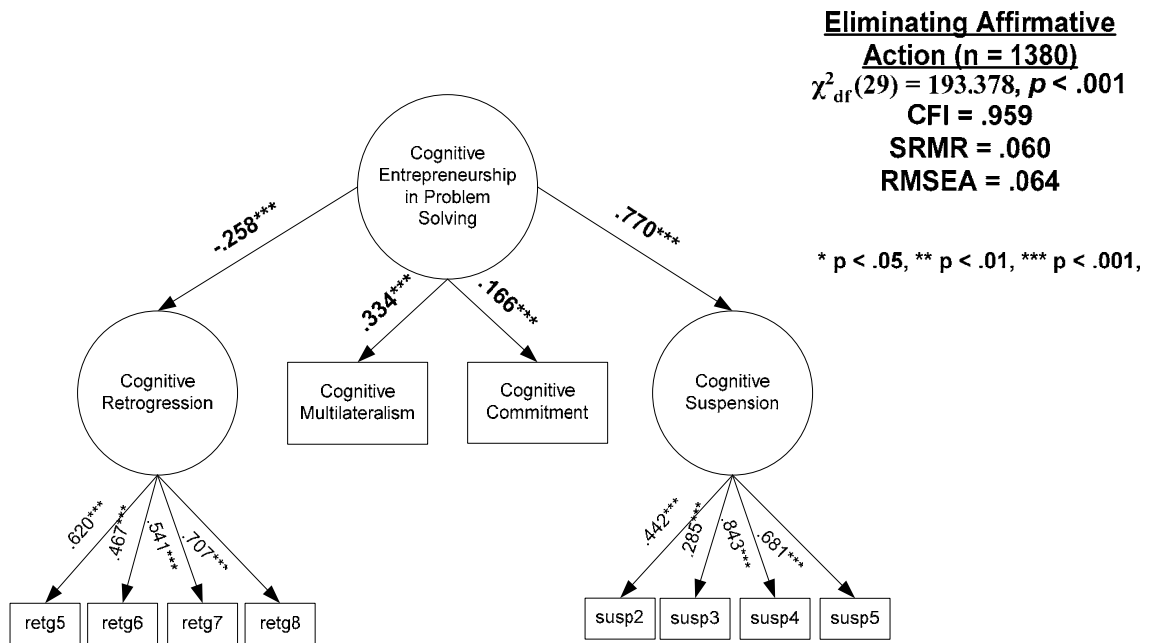


Figure 19: CEPS (Eliminating Affirmative Action).



As shown in the figures, in both problems ($n = 1,380$), the structural paths from the second-order latent variable (i.e., cognitive entrepreneurship) to the first-order latent variables (e.g., cognitive retrogression) were significant at the $p < .001$ level, except the path to cognitive commitment for the war in Iraq issue (i.e., $p < .01$). In addition, the loadings in the observed variables were all significant at the $p < .001$ level. Most of the parameter estimates in the measurement items varied between .400 and .700 (the lowest .285, the highest .909).

The core premise in the CEPS model is that as one becomes active in problem solving, one will become less backward reasoning (cognitive retrogression), be more possessing of cognitive multilateralism, and show more commitment and more suspending in finalizing a solution. The analysis of CEPS in two social problems provides supportive evidence for the main postulate and the four *a priori* hypotheses.

In H7, I conceptually predicted that the one's cognitive retrogression in problem solving will increase as the cognitive entrepreneurship in problem solving heightens. Cognitive retrogression can be highlighted by one's *backward reasoning*—i.e., “a conclusion directs certain evidence.” This is an optimization process for *a priori* conclusion. For H7, I found supporting evidence in both issues. Notably, the magnitude of the path coefficient was higher for the war in Iraq issue (i.e., $-.754, p < .001$) than the eliminating affirmative action issue (i.e., $-.258, p < .001$). This would suggest that there is a stronger backward reasoning tendency (i.e., cognitive omega approach) for the war in Iraq issue. However, in both issues, the directions of the path were consistently negative, as expected.

In H8 and H9, I adopted a single-indicator approach in measurement. I applied the derived formulas for cognitive multilateralism and cognitive commitment. In H8, I predicted that as cognitive entrepreneurship increases, one will more possess *cognitive breadth*—a greater number of decision alternatives and a greater extent of tolerance in dealing with competing information during the problem-solving process. I found support for this prediction in both issues: .184 in war in Iraq, and .334 in eliminating affirmative action. In H9, I expected that as cognitive entrepreneurship heightens one will make a greater cognitive commitment—a greater degree of enthusiasm and extent of patronizing of the proposed solutions for a given problem solving. I found support for the H9 in the eliminating affirmative action issue (.166, $p < .001$), but not in the war in Iraq issue (i.e., -.113, $p < .01$). Interestingly, the signs were opposite in the war in Iraq issue, which suggests, for the war in Iraq issue, that as one becomes more entrepreneurial in problem solving, one would be less enthusiastic and patronizing to the proposed solutions. Thus, I found partial support for the cognitive commitment.

In H10, I proposed that as one's cognitive entrepreneurship increases, one's cognitive suspension increases as well. Cognitive suspension refers to a problem solver's heightened willingness to invest cognitive resources in evaluating and reevaluating a selected solution before finalizing it. In the two issues, I found supporting evidence for H10: .414 ($p < .001$) in the war in Iraq issue and .770 ($p < .001$) in the eliminating affirmative action issue.

Overall results in the CEPS CFA model tests indicated that as the problem solver's entrepreneurial mindset in problem solving heightens, one tends to adopt more backward reasoning, have cognitive breadth, and show tolerance for competing ideas and

opinions and to suspend judgment before finalizing a solution. Yet, cognitive commitment—the degree of enthusiasm and the extent of patronizing the proposed solutions—seems to differ across issues. Considering the single-item approach with formulas in the cognitive multilateralism and cognitive commitment, such a finding requires further analysis. A new study using a multiple-indicators approach, as in the cognitive retrogression and suspension, will allow a clearer understanding for the two dimensions measured with a single item.

In summary, I proposed two new variables of CAPS and CEPS to develop a more general version of the situational theory of publics (J. Grunig, 1997, 2003). Although the previous confirmatory factor analyses provided some confidence in the new constructs, it is hardly conclusive in terms of their construct validity. However, construct validity is hard to test or establish by the newly developed concept alone. One alternative way to demonstrate validity of a construct is to examine its conceptual relationships with other established constructs—a “nomological network” (Cronbach & Meehl, 1955). Specifically, researchers can evaluate the validity of a new construct when they test “distinct antecedent causes” and find “consequential effects and/or modifying conditions, as well as quantitative differences in the degree to which a construct is related to antecedents or consequences” (Netemeyer, Bearden, & Sharma, 2003, p. 82; Iacobucci, Ostrom, & Grayson, 1995; Nunnally & Bernstein, 1994). Thus, it is necessary to test how and to what extent the two new constructs are explained by the antecedent variables in the situational theory. In practice, structural equation modeling provides an ideal methodological framework to test nomological validity (Bollen, 1989, Hoyle, 1995).

Earlier in the conceptualization, I posited conceptual relationships between the new constructs and existing antecedent variables in the situational theory of publics. Using a structural equation modeling approach, I tested the presumed conceptual relationships between new and existing variables. Specifically, I examined how the newly introduced concepts are conceptually linked with the four antecedent variables from the situational theory of publics. In the following section, I will report a series of models of nomological networks between the two new constructs and the antecedent variables of situational theory.

Structural Analysis

Situational Theory of Communicant Activeness in Problem Solving (SITCAPS) Model

The primary interest of this study is to generalize the situational theory of publics (STP) by introducing CAPS. In the earlier exploratory and confirmatory factor analysis, I found that the new variable, CAPS, is internally consistent and reliable for the three individual and social problems. To further explore the validity and utility of the new concept, I constructed a causal path model with four antecedent variables in the STP problem recognition, constraint recognition, level of involvement, and referent criterion. In addition, I introduced a motivational variable, situational motivation in problem solving (see Figure 11 for the summary model, Chapter II: Conceptualization).

Table 25 reports the SITCAPS model testing results. According to Hu and Bentler's (1999) joint criterion, all three models reached an acceptable level of model fit. For war in Iraq, the model fit indices were $\chi^2_{df}(154) = 927.538$, CFI = .930, SRMR = .077, and RMSEA = .060. Despite a relatively low CFI value, the combination of SRMR and RMSEA meets the recommended joint criterion (i.e., either CFI \geq .96 and

SRMR \leq .10 or SRMR \leq .10 and RMSEA \leq .06). For losing weight, the model fit indices were $\chi^2_{df}(259) = 855.524$, CFI = .960, SRMR = .036, and RMSEA = .041. Finally, for eliminating affirmative action, the model fit indices were $\chi^2_{df}(154) = 752.310$, CFI = .954, SRMR = .072, and RMSEA = .053. Thus, I will proceed to interpreting the model parameter estimates to test hypotheses.

Hypothesis Testing

Earlier I posited five hypotheses between communicant activeness in problem solving and the four situational antecedent variables and one motivational variable. They are:

- H11: The higher the problem recognition, the higher the situational motivation in problem solving.
- H12: The higher the constraint recognition, the lower the situational motivation in problem solving.
- H13: The higher the involvement recognition, the higher the situational motivation in problem solving.
- H14: The higher the referent criterion, the higher the communicant activeness in problem solving.
- H15: The higher the situational motivation in problem solving, the higher the communicant activeness in problem solving.

Figures 20-22 summarize the SITCAPS models and their parameter estimates in three social and individual problems.

Table 25

SITCAPS Model with Situational Motivation in Problem Solving: Chi-square Differences and Goodness-of-Fit indices

	Model	χ^2	<i>df</i>	χ^2/df	RMSEA	SRMR	CFI	NNFI	AIC
War in Iraq	Independence	11278.805	231	48.826					10816.805
	SITCAPS	927.538	154	6.023	.060 (.057, .064)	.077	.930	.895	619.538
Losing Weight	Independence	13360.036	231	57.836					12898.036
	SITCAPS	855.524	259	3.303	.041 (.038 .044)	.036	.960	.950	337.524
Eliminating Affirmative Action	Independence	15274.422	325	46.998					14624.422
	SITCAPS	752.310	154	4.885	.053 (.049, .057)	.072	.954	.932	444.310

Figure 20: SITCAPS (War in Iraq).

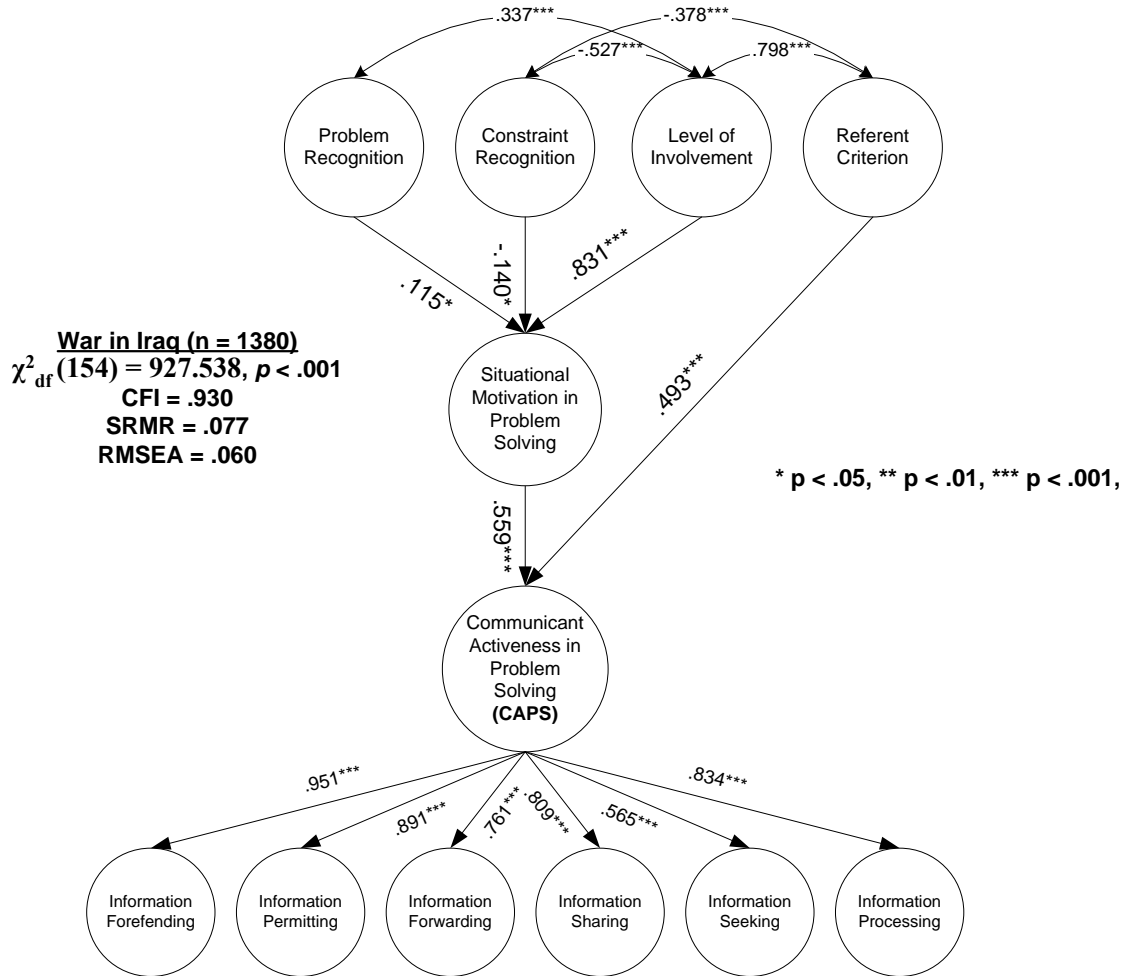


Figure 21: SITCAPS (Losing Weight).

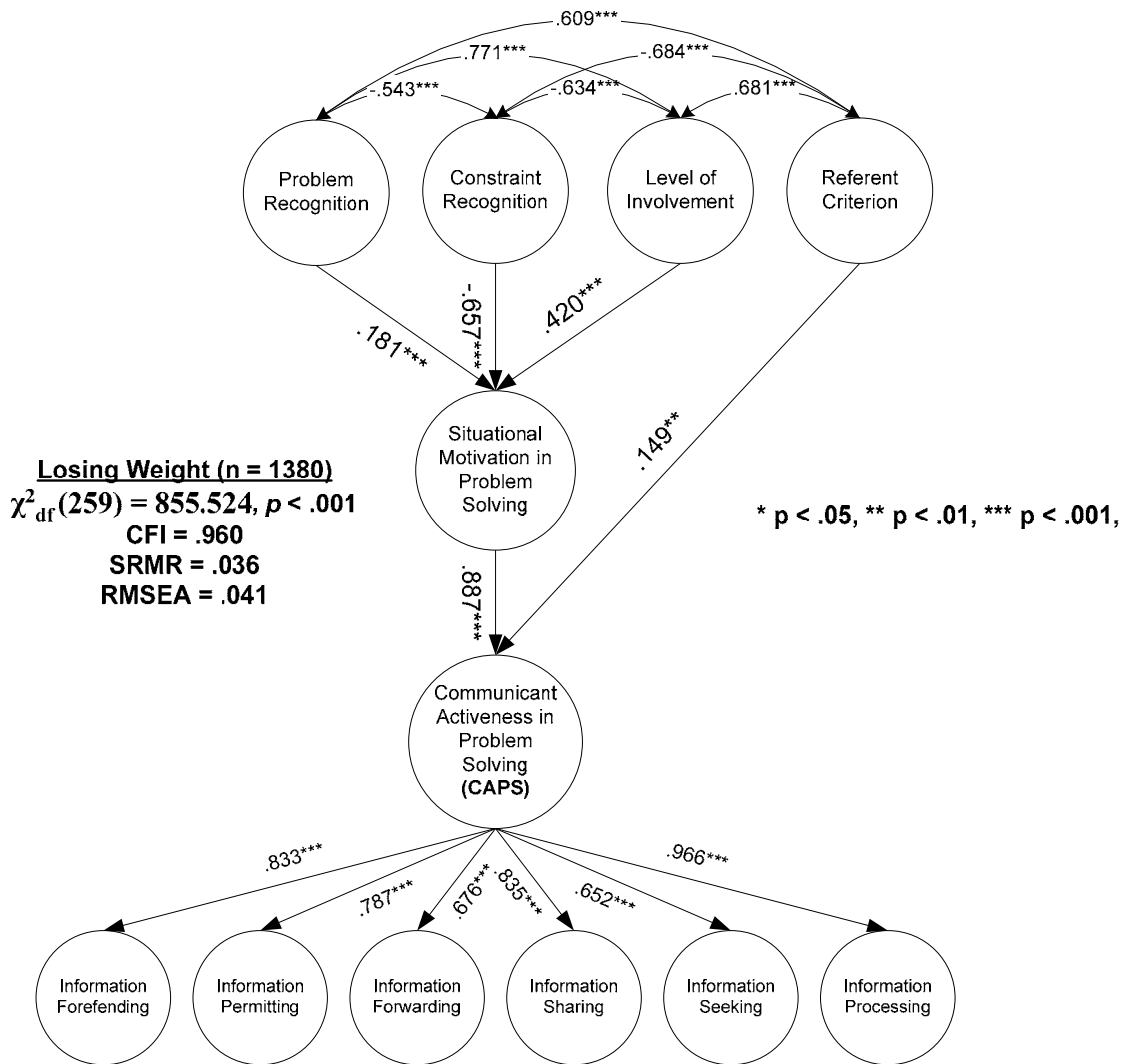
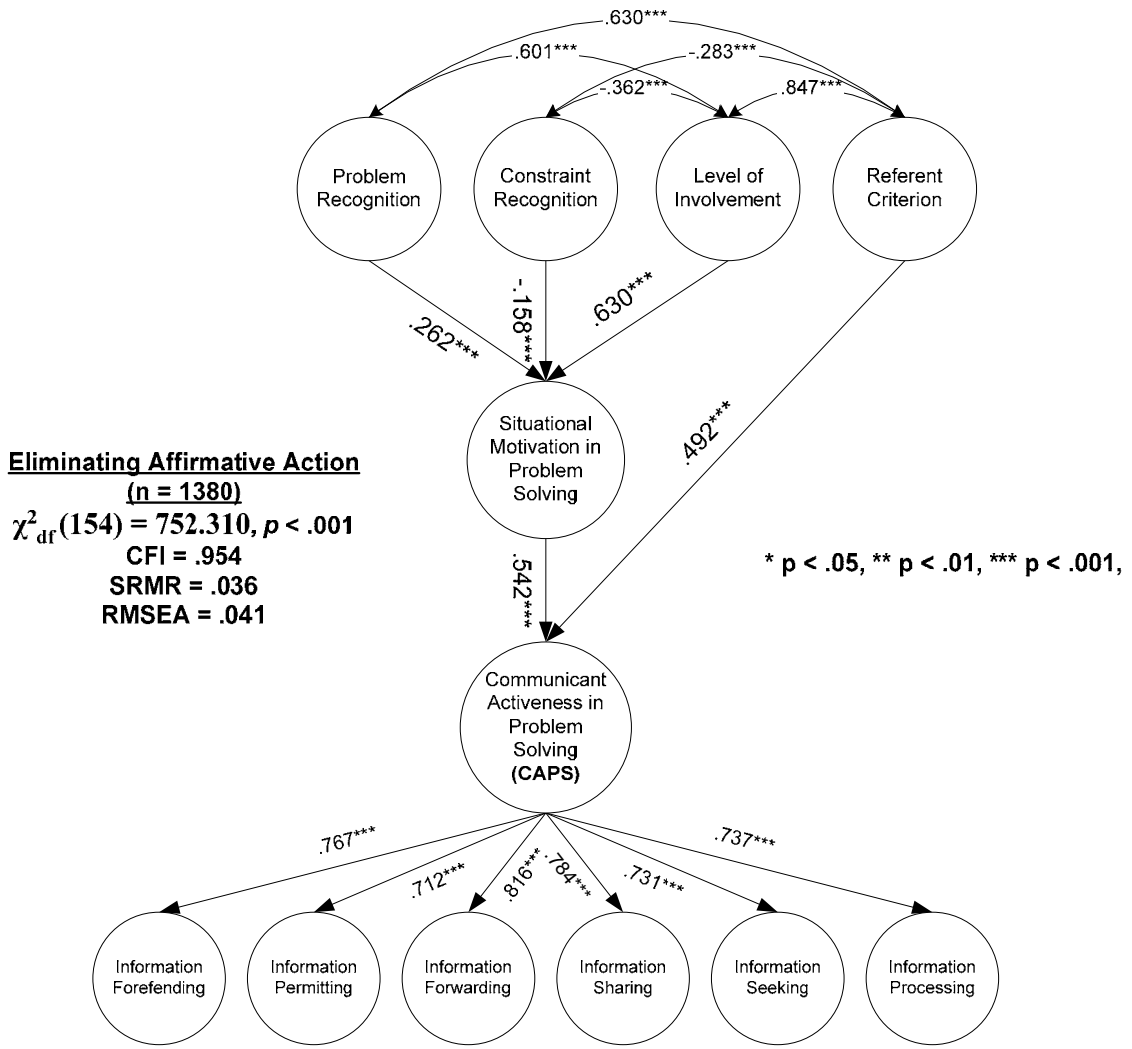


Figure 22: SITCAPS (Eliminating Affirmative Action).



In H11, I expected a positive relationship between problem recognition (i.e., “detect something is missing and should be done”) and situational motivation in problem solving (i.e., the likelihood of “stop to think about” the problem). I found positive path coefficients in all three problems: .115 ($p < .05$) for war in Iraq, .181 ($p < .001$) for losing weight, and .262 ($p < .001$) for eliminating affirmative action. Thus, as the problem recognition increases, the more one becomes motivated in problem solving. In H12, I expected a negative relationship between constraint recognition (i.e., “perceive that there are some obstacles in a situation that limit one’s ability to do anything about the

situation”) and situational motivation in problem solving. I found all negative path coefficients across all three problems: $-.140$ ($p < .05$) for war in Iraq, $-.657$ ($p < .001$) for losing weight, and $-.158$ ($p < .001$) for eliminating affirmative action. Thus, I conclude that as one’s constraint recognition increases, one’s situational motivation in problem solving decreases.

In H13, I expected a positive relationship between level of involvement (i.e., perceive some “connection” between a situation and oneself) and situational motivation. I found strong positive relationships: $.831$ ($p < .001$) for war in Iraq, $.420$ ($p < .001$) for losing weight, and $.630$ ($p < .001$) for eliminating affirmative action. I thus conclude that as one’s perceived involvement increases, his or her situational motivation toward the problem will increase.

H15 asks how one’s problem solving would differ in the presence of a referent criterion. Referent criterion was redefined in this study as any knowledge or subjective judgmental system that exerts specific influence on the way one approaches problem solving. This can be any decisional guideline or decision rules perceived as relevant to a given problem: i.e., either an *objective* referent, such as one carried from prior problem solving, or a *subjective* referent, such as wishful thinking or willful thinking about the problem outcomes. For example, a terminally ill patient would have a strong willful thinking on his problem (“I will be fine”—i.e., subjective referent) and subsequently he thinks and look for information that reinforce his strong “subjective” belief. Or, one may carry a solution—i.e., objective referent—for a PC virus infection from a past experience. The availability and applicability of such cognitive knowledge (internal referent) will increase communicant activeness regardless whether it is subjective or objective.

The CAPS model includes variables in information selection (e.g., information forefending) and information transmission (e.g., information forwarding) as new key dimensions. Thus, I conceptually predicted that a problem solver's selectivity and transmission of one's knowledge on the problem will increase as one possesses a stronger referent criterion about the problematic situation. From the analysis, I found support on this prediction: .493 ($p < .001$) for war in Iraq, .149 ($p < .01$) for losing weight, and .492 ($p < .001$) for eliminating affirmative action.

Finally, I expected that the situational motivation in problem solving will increase communicant activeness in problem solving (H15). In all three problems, I found support for this prediction: .559 ($p < .001$) for war in Iraq, .887 ($p < .01$) for losing weight, and .542 ($p < .001$) for eliminating affirmative action. Thus, I conclude that as situational problematic perception increases, one will experience a heightened situational motivation toward problem solving; and it subsequently increases one's active communication in information selection, transmission, and acquisition. The presence of a strong referent criterion, regardless of its subjectivity (e.g., a willful thinking toward the outcome), is likely to increase subsequent communicant activeness about the problem.

It is notable that the coefficients were rather fluctuating across different issues. I reason the fluctuation as originated from the issue sensitivity in this particular sample (i.e., students). For this homogeneous student group, respondents were similarly sensitive in some issues than others (e.g., war in Iraq). In addition, it is notable that the current data were drawn from a non-random sample, not a possible population. With a more heterogeneous samples (e.g., random samples drawn from a national population), the path coefficients could have been more similar across three problems. Finally, I took out some

correlations between exogenous variables (e.g., a correlation between problem recognition and constraint recognition in Figure 20) because specifying those correlations made a model convergence impossible.

Situational Theory of Cognitive Entrepreneurship in Problem Solving (SITCEPS) Model

Another new construct I developed is cognitive entrepreneurship in problem solving (CEPS). CEPS alone is an independent concept that features different cognitive approaches across different types of problems. However, CEPS can also be explained by situational antecedent variables. I posited the conceptual relationships with the antecedent variables (see Figure 12 for the summary model, Chapter II: Conceptualization). The combined model becomes one of the situational theories of problem solving.

Table 26 reports the results of the SITCEPS model tests. For war in Iraq, the model fit indices were $\chi^2_{df}(67) = 319.315$, CFI = .963, SRMR = .041, and RMSEA = .052. For eliminating affirmative action, the model fit indices were $\chi^2_{df}(94) = 397.388$, CFI = .964, SRMR = .041, and RMSEA = .048. Model fit indices suggest that both models are good enough to interpret. Thus, I proceed to interpreting the model parameter estimates to test hypotheses.

Hypothesis Testing

I posited five hypotheses between cognitive entrepreneurship in problem solving and the four situational antecedent variables and the situational motivation variable.

These hypotheses are:

H16: The higher the problem recognition, the higher the situational motivation in problem solving.

H17: The higher the constraint recognition, the lower the situational motivation in problem solving.

H18: The higher the involvement recognition, the higher the situational motivation in problem solving.

H19: The higher the referent criterion, the lower the cognitive entrepreneurship in problem solving.

H20: The higher the situational motivation in problem solving, the higher the cognitive entrepreneurship in problem solving.

Figures 23-24 summarize the structural parameter estimates.

Table 26

SITCEPS Model with Situational Motivation in Problem Solving: Chi-square Differences and Goodness-of-Fit indices

	Model	χ^2	<i>df</i>	χ^2/df	RMSEA	SRMR	CFI	NNFI	AIC
War in Iraq	Independence	6985.447	120	58.212					6745.447
	SITCEPS	319.315	67	4.766	.052 (.047, .058)	.041	.963	.934	185.315
Eliminating Affirmative Action	Independence	8668.108	136	67.736					8396.108
	SITCEPS	397.388	94	4.228	.048 (.043, .053)	.041	.964	.949	209.388

Figure 23: SITCEPS (War in Iraq).

War in Iraq
 (n = 1380)
 $\chi^2_{df(67)} = 319.315, p < .001$
 CFI = .963
 SRMR = .041
 RMSEA = .052

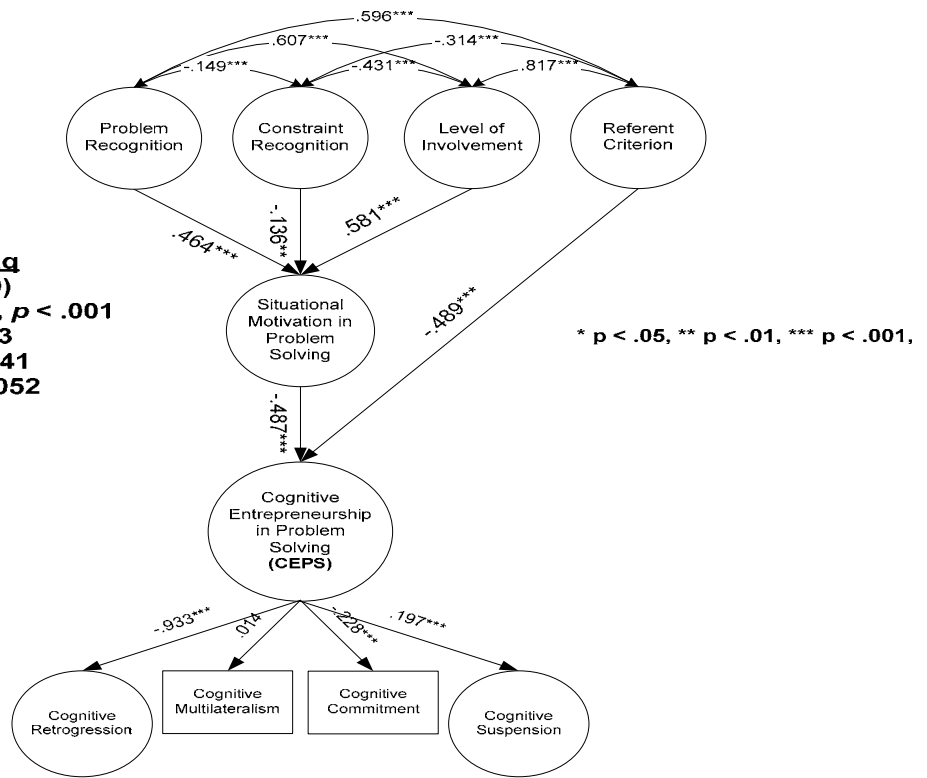
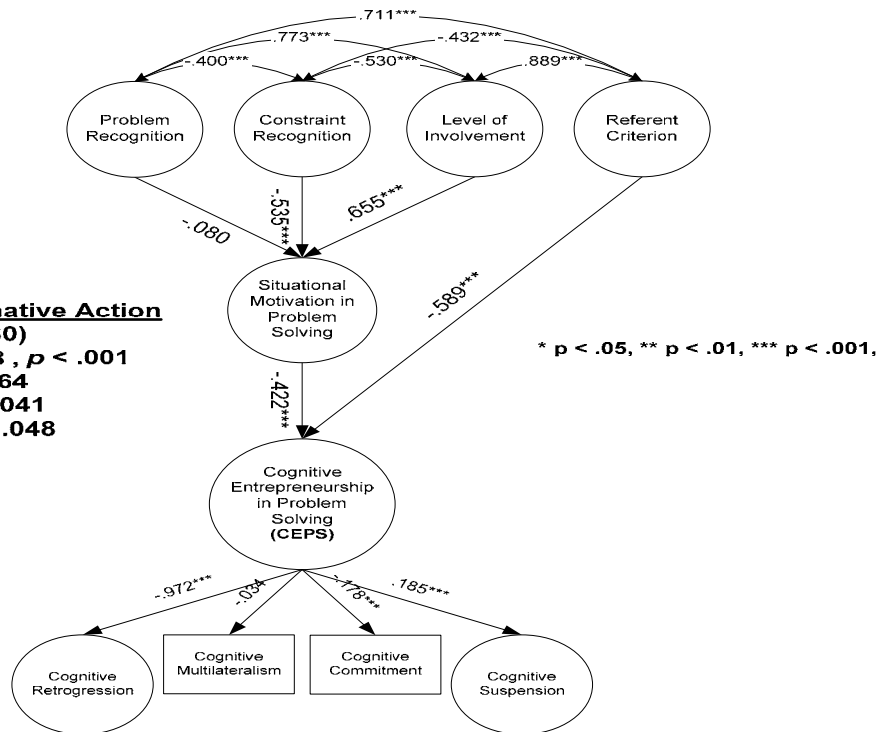


Figure 24: SITCEPS (Eliminating Affirmative Action).

Eliminating Affirmative Action
 (n = 1380)
 $\chi^2_{df(94)} = 397.388, p < .001$
 CFI = .964
 SRMR = .041
 RMSEA = .048



The hypotheses from H16 to H18 are conceptually identical predictions to those in H11-H13. In general, I found similar support as found in the SITCAPS analysis. In H16, I expected a positive relationship between problem recognition and situational motivation in problem solving. I found partial support: .464 ($p < .001$) for war in Iraq and -.080 (n. s.) for eliminating affirmative action. In H17, I expected a negative relationship between constraint recognition and situational motivation in problem solving. I found all negative path coefficients across all three problems: -.136 ($p < .01$) for war in Iraq and -.535 ($p < .001$) for eliminating affirmative action. In H18, I expected a positive relationship between level of involvement and situational motivation. I found positive relationships: .581 ($p < .001$) for war in Iraq and .655 ($p < .001$) for eliminating affirmative action. H19 inquires about the presence of a referent criterion during a problematic situation. From the analysis, I found support for this prediction: -.489 ($p < .001$) for war in Iraq and -.589 ($p < .001$) for eliminating affirmative action. This suggests that the presence of referent criteria tend to decrease one's entrepreneurial mindset—i.e., with applicable referents one becomes less entrepreneurial in problem solving. With the deployable referent for a given problem, one will be more likely to jump into a conclusion (i.e., a solution carried from prior situations) and to turn to information that optimizes the chosen solution—i.e., backward reasoning.

Finally, in H20, I expected that the situational motivation in problem solving will increase cognitive entrepreneurship in problem solving. However, from the analysis, I found no support for this prediction: -.487 ($p < .001$) for war in Iraq and -.422 ($p < .001$) for eliminating affirmative action. Notably, the signs of the paths were both opposite (i.e., negative) from situational motivation to cognitive entrepreneurship. This suggests that

the more one is situationally motivated for problem solving, the less one becomes entrepreneurial in problem solving.

Careful examination of the subdimensions in CEPS shows that the more one is situationally motivated, the more he or she engages in backward reasoning (i.e., cognitive retrogression). Cognitive retrogression was the strongest dimension among four subdimensions of CEPS. I conducted Sobel's test to examine the significance of the effect between situational motivation and cognitive retrogression. The Sobel test allows testing of whether the indirect effect of an independent variable on a dependent variable via the mediator is significantly different from zero (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Sobel, 1982). In both issues, the mediation effects between situational motivation and cognitive retrogression were significant: .454 ($p < .001$) for war in Iraq and .410 ($p < .001$) for eliminating affirmative action. For cognitive multilateralism, the indirect paths were not significant for both issues: -.007 (n. s.) for war in Iraq and .014 (n. s.) for eliminating affirmative action. For cognitive commitment, I found a significant mediation effect: as the situational motivation heightens, cognitive commitment increases: .111 ($p < .001$) for war in Iraq and .075 ($p < .01$) for eliminating affirmative action. Finally, for cognitive suspension, I found that as situational motivation increases, cognitive suspension decreases: -.096 ($p < .01$) for war in Iraq and -.078 ($p < .01$) for eliminating affirmative action.

The tests show that the CEPS construct in the SITCEPS model is primarily characterized by the cognitive retrogression dimension (i.e., the more entrepreneurial, the less retrogression). The standardized path coefficients were -.933 for war in Iraq and -.972 for eliminating affirmative action. Cognitive retrogression refers to a cognitive

tendency for backward reasoning (i.e., “a conclusion dictates evidence that secures and warrants the chosen conclusion.”). In other words, as situational motivation in problem solving grows, one tends to move backward in thinking about the problem. Thus, the result indicates that situational motivation does not create cognitive entrepreneurship in problem solving. On the contrary, the more one is motivated toward problem solving, the more one is likely to become non-entrepreneurial. From the finding, I conclude that situational motivation tends to pressure problem solvers to hastily turn to a conclusion and optimize the hastily drawn conclusion.

In summary, I found similar support for H16-H18 for situational perceptual variables as in the SITCAPS analysis. In addition, for H19, I found the more one possesses a referent criterion, the less one becomes entrepreneurial in problem solving. For H20, I failed to find support. The finding suggests the opposite relationship between situational motivation and cognitive entrepreneurship in problem solving: i.e., as one becomes motivated in problem solving, one tends to become non-entrepreneurial. It suggests that from the heightened motivation, problem solvers tend to mobilize available cognitive resources backwardly—to optimize the selected solution to be more conclusive and convincing.

Relationship between CAPS and CEPS

The previous two structural models were designed to test the nomological validity of the two new constructs. In addition, they tested the more generalized version of the situational theory of problem solving. Each model was derived from the situational theory of problem solving and stands by itself as a conceptual model with a unique theoretical purpose. SITCAPS is designed to understand and explain different

communicant behavior during problematic situations. SITCEPS is intended to describe and understand differential cognitive approaches in problem solving.

Because of model identification issues, I constructed two nonrecursive models that examine the simultaneous causal influences between CEPS and CAPS (see Figure 13 and 14 for the summary model, Chapter II: Conceptualization). As discussed, nonrecursive models are often difficult to solve mathematically. I tried both of the model specifications but found that only the Figure 16 model (i.e., referent criterion → CEPS) converged successfully in both issues of war in Iraq and eliminating affirmative action. The Figure 17 model (i.e., referent criterion → CAPS) failed to converge in both issues. Table 25 reports the result of the converged nonrecursive model tests.

For war in Iraq, the model fit indices were $\chi^2_{df}(217) = 794.508$, CFI = .961, SRMR = .045, and RMSEA = .044. For eliminating affirmative action, the model fit indices were $\chi^2_{df}(153) = 932.838$, CFI = .931, SRMR = .066, and RMSEA = .061.

According to Hu and Bentler's joint criterion, these fit indices suggest that both models are good enough to interpret. Thus, I interpret the model parameter estimates to test hypotheses.

Hypothesis Testing

I posited two hypotheses between cognitive entrepreneurship in problem solving and communicant activeness in problem solving. These hypotheses are:

H21: The higher the cognitive entrepreneurship, the higher the communicant activeness in problem solving.

H22: The higher the communicant activeness, the lower the cognitive entrepreneurship in problem solving.

Table 27

Nonrecursive Model: Chi-square Differences and Goodness-of-Fit indices

	Model	χ^2	<i>df</i>	χ^2/df	RMSEA	SRMR	CFI	NNFI	AIC
War in Iraq	Independence	14918.052	276	54.051					14366.052
	Nonrecursive	794.508	217	3.661	.044 (.041, .047)	.045	.961	.950	360.508
Eliminating Affirmative Action	Independence	11563.657	190	60.861					11183.657
	Nonrecursive	932.838	153	6.097	.061 (.057, .065)	.066	.931	.915	626.838

CAPS, featuring communicative behavior, and CEPS, featuring the cognitive approach in problem solving, seem to explain each other to some degree. However, it is hard to define one as the antecedent condition to the other. Indeed, it is most plausible to conclude that CAPS and CEPS affect each other simultaneously (i.e., bidirectional causality).

Figures 25-26 summarize the parameter estimates for the converged models. For H21, I expected a positive causal influence from cognitive entrepreneurship in problem solving to communicant activeness in problem solving. However, I found no support for this prediction in both issues: $-.959$ (n. s.) for war in Iraq and $-.892$ (n. s.) for eliminating affirmative action. Notably, the signs were opposite, unlike what I expected before model testing; and the standard errors of the parameter estimates were relatively large (i.e., 1.150 of unstandardized parameter estimate with 2.401 of *S. E.* in war in Iraq and $.459$ of unstandardized parameter estimate with $.633$ of *S. E.*).

For H22, I expected a negative causal influence from communicant activeness in problem solving to cognitive entrepreneurship in problem solving. I found support for this expectation in both issues: $-.919$ ($p < .001$) for war in Iraq and $-.622$ ($p < .001$) for eliminating affirmative action. This suggests that the more active communicative behaviors in information forefending, forwarding, and seeking, the less one will become entrepreneurial in problem solving. The accumulated knowledge and experience from problem-solving efforts in dealing with information seems to reduce entrepreneurial mindset regarding the problem.

Figure 25: Nonrecursive model between CEPS and CAPS (War in Iraq).

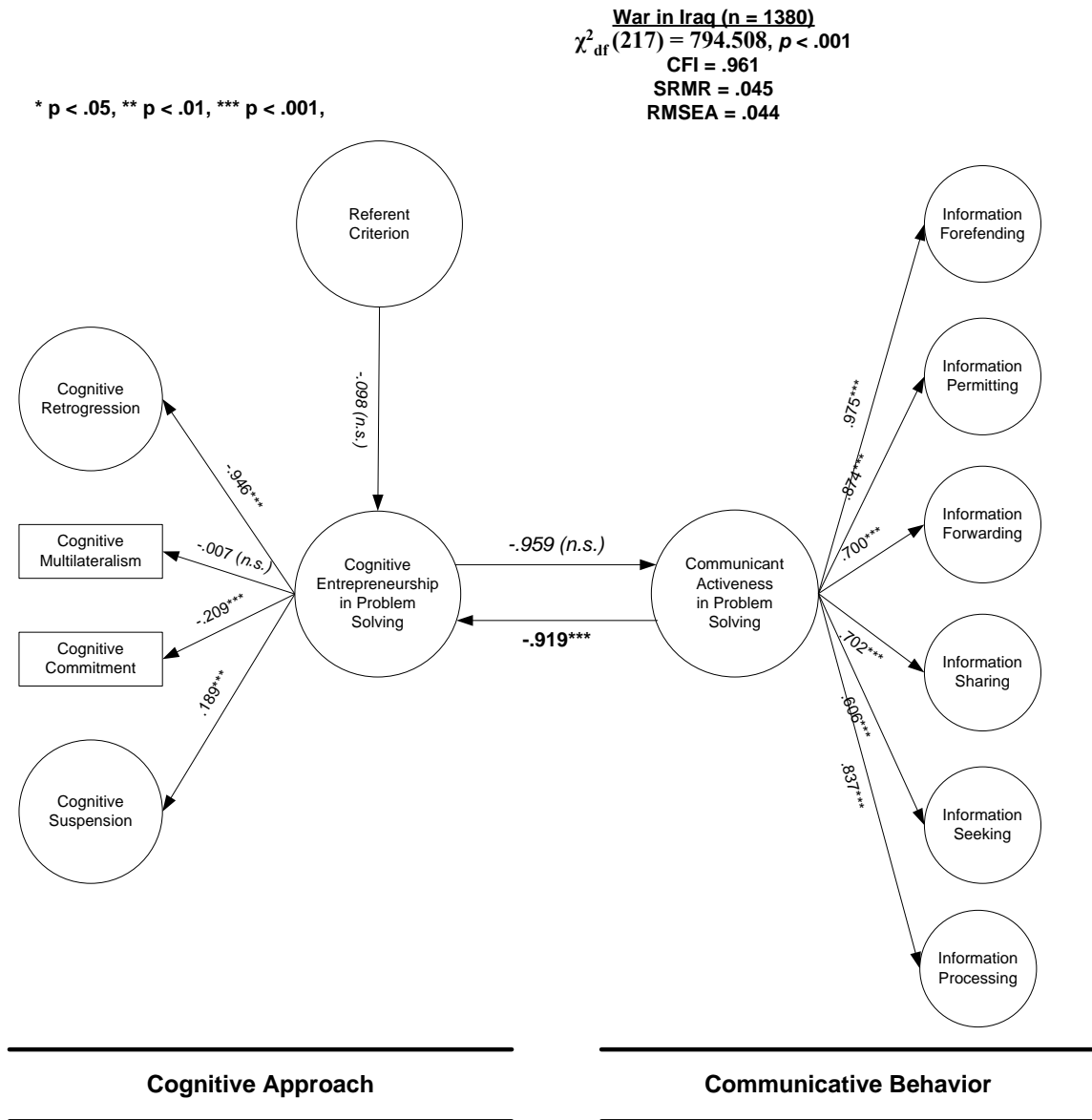
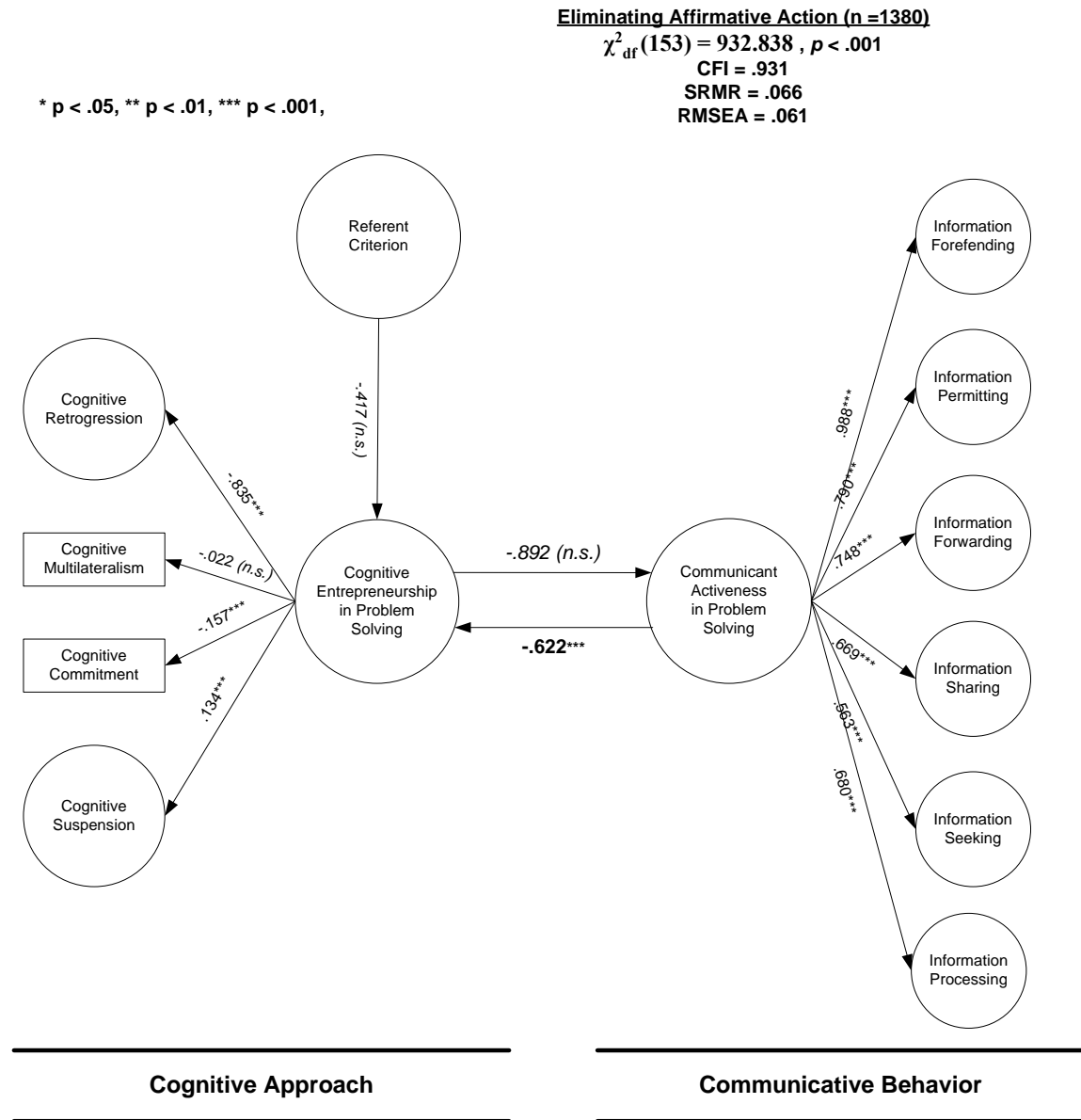


Figure 26: Nonrecursive model between CEPS and CAPS (Eliminating Affirmative Action).



I pay special attention to the H21. I expected that the higher cognitive entrepreneurship in problem solving would lead to higher communicant activeness. However, in retrospect, I failed to consider that the low cognitive entrepreneurial problem solver could also be very active in communication behavior. In conceptualizing cognitive entrepreneurship in problem solving, I explicitly said that a non-entrepreneurial mindset

would also be very active in problem solving but in a different way from the entrepreneurial. In other words, high cognitive non-entrepreneurship does not mean passiveness in communication behavior. As we found routinely, many non-entrepreneurial problem solvers tend to vigorously seek and forward information that is consistent with a hastily drawn conclusion. Thus, it was not conceptually and empirically valid to specify a positive causal relationship between high cognitive entrepreneurship and communicant activeness in problem solving. The nonsignificant path from cognitive entrepreneurship to communicant activeness seems to reflect such a notion.

In contrast, the reverse causal flow seems to be logical conceptually. As a problem solver experienced heightened communicant activeness, she or he is likely to develop a good deal of knowledge and preference on how to solve the problem. Then, such preference (i.e., high information forefending) would increase cognitive retrogression (i.e., optimizing a preferred conclusion backwardly) and less tolerating of incompatible information, less committed to all the available candidate solution and ideas, and less suspending. As a result, the problem solver becomes more non-entrepreneurial. Therefore, the negative path from CAPS to CEPS seems to reflect such a negative conceptual relationship.

A careful examination of the two nonrecursive model reveals the domination of cognitive retrogression and the information forefending in both issues. Information forefending is the strongest dimension in CAPS and cognitive retrogression is strongest dimension in CEPS. The relationship between cognitive retrogression and information forefending is positive: .885 ($p < .001$) for war in Iraq and .734 ($p < .001$) for eliminating affirmative action.

In summary, from the H21 and H22 tests, I found that communicant activeness in problem solving tends to reduce the problem solver's cognitive entrepreneurship eventually, while the opposite cannot be assumed. However, this interpretation should be treated with caution.

Additional Analyses

In the test of a nonrecursive relationship between CAPS and CEPS, I found that information selectivity and cognitive retrogression dominated the other dimensions. In addition, I found a nonsignificant path from CEPS to CAPS. As I discussed, the H21 prediction was a conceptual mistake in that both high and low entrepreneurial problem solvers could be high in communicant activeness. In other words, there is no conceptual reason that less entrepreneurial problem solvers should be low in communicant activeness. To test this reasoning, I conducted additional analysis to inquire how different they are in terms of communicant activeness.

In conceptualizing CEPS, I proposed a model of cognitive alpha and omega groups (CAOS) in terms of their *reasoning direction*: i.e., “evidence→conclusion” for forward reasoning and “conclusion→evidence” for backward reasoning. I named those forward reasoning problem solvers as the *cognitive alpha* group, and those backward reasoning problem solvers as the *cognitive omega* group (see Figure 9, Chapter II: Conceptualization).

Thus, I computed the average scores of cognitive retrogression (i.e., backward reasoning) for all the respondents and regrouped them high, medium, and low scorers in cognitive retrogression. For analysis, I selected the high and low groups and named them

as cognitive omega (i.e., high in cognitive retrogression) and cognitive alpha (i.e., low in cognitive retrogression).

I expected that similar model structures of CAPS in both the cognitive alpha group and cognitive omega groups. However, I predicted that they will differ in terms of information selectivity. Specifically, I expected that the cognitive alpha group would have a low path coefficient in information forefending and a high one in information permitting. In contrast, I predicted that the cognitive omega group would show the opposite pattern—i.e., high path coefficient in information forefending and low path coefficient in information permitting. If supported, this pattern of structural paths in CAPS would provide some evidence for the explanation of nonsignificant path in H21 (i.e., the low entrepreneurial problem solvers can also be active in communication behavior, just as those high entrepreneurial problem solvers are active in communication behavior.). The higher or lower entrepreneurial problem solvers do not differ in their information transmission and acquisition but only in their information selectivity (i.e., non-entrepreneurial problem solvers tend to more forefend information.).

Table 28 reports the CAOS and CAPS comparison models. For war in Iraq, the CAPS model fit of cognitive alpha group were $\chi^2_{df}(139) = 314.960$, CFI = .946, SRMR = .061, and RMSEA = .053 and for the cognitive omega group were $\chi^2_{df}(145) = 265.130$, CFI = .969, SRMR = .047, and RMSEA = .043. For eliminating affirmative action, the CAPS model fit of cognitive alpha group were $\chi^2_{df}(97) = 230.285$, CFI = .936, SRMR = .054, and RMSEA = .055 and for the cognitive omega group were $\chi^2_{df}(96) = 175.514$, CFI = .961, SRMR = .039, and RMSEA = .043. Thus, I interpret the model parameter

estimates to examine whether the patterns were similar as I expected. Figures 27-28 summarize the structural paths of both groups in two issues.

Figure 27: CAPS comparisons between cognitive alpha and omega groups (War in Iraq).

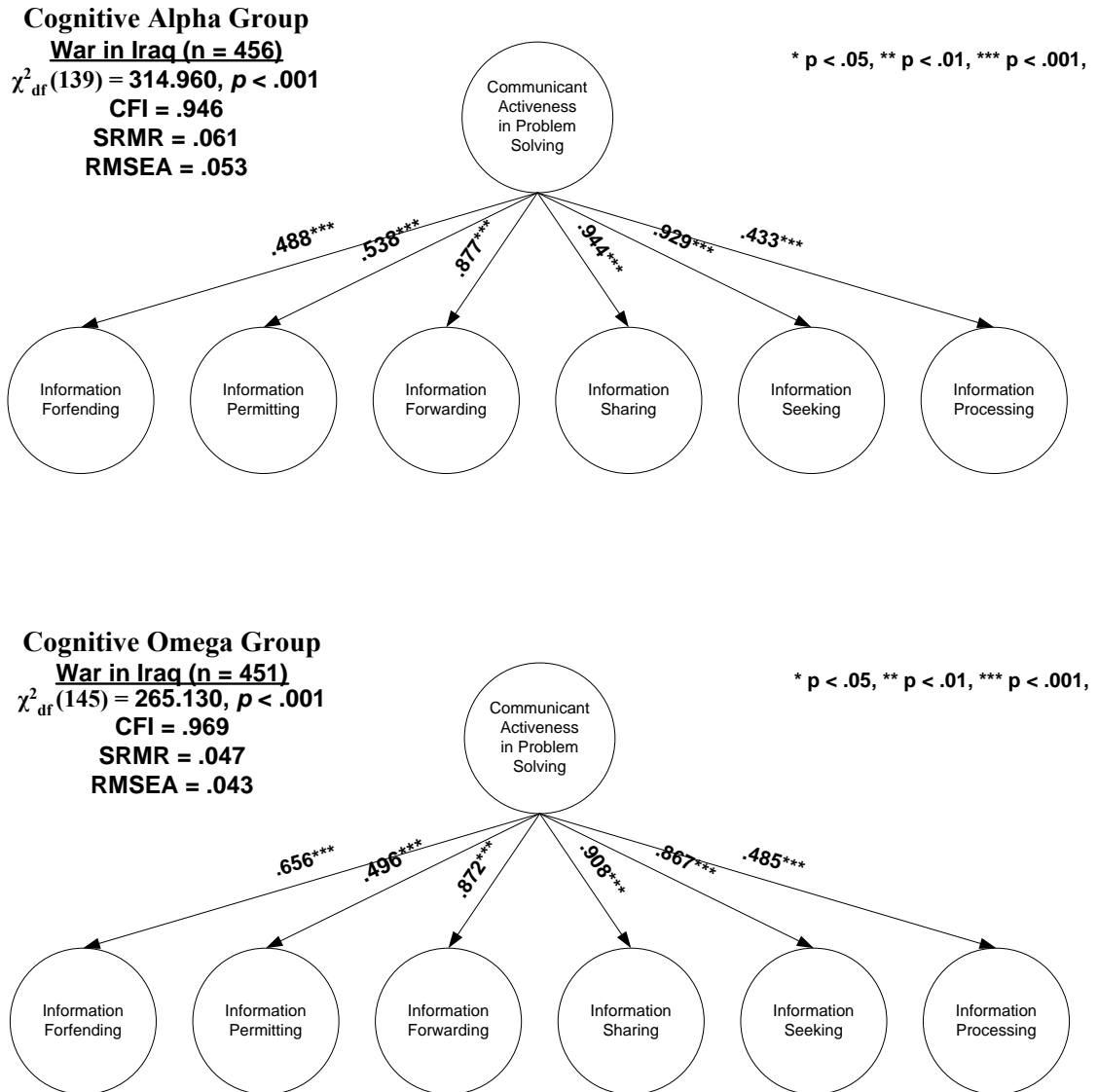


Figure 28: CAPS comparisons between cognitive alpha and omega groups (Eliminating Affirmative Action).

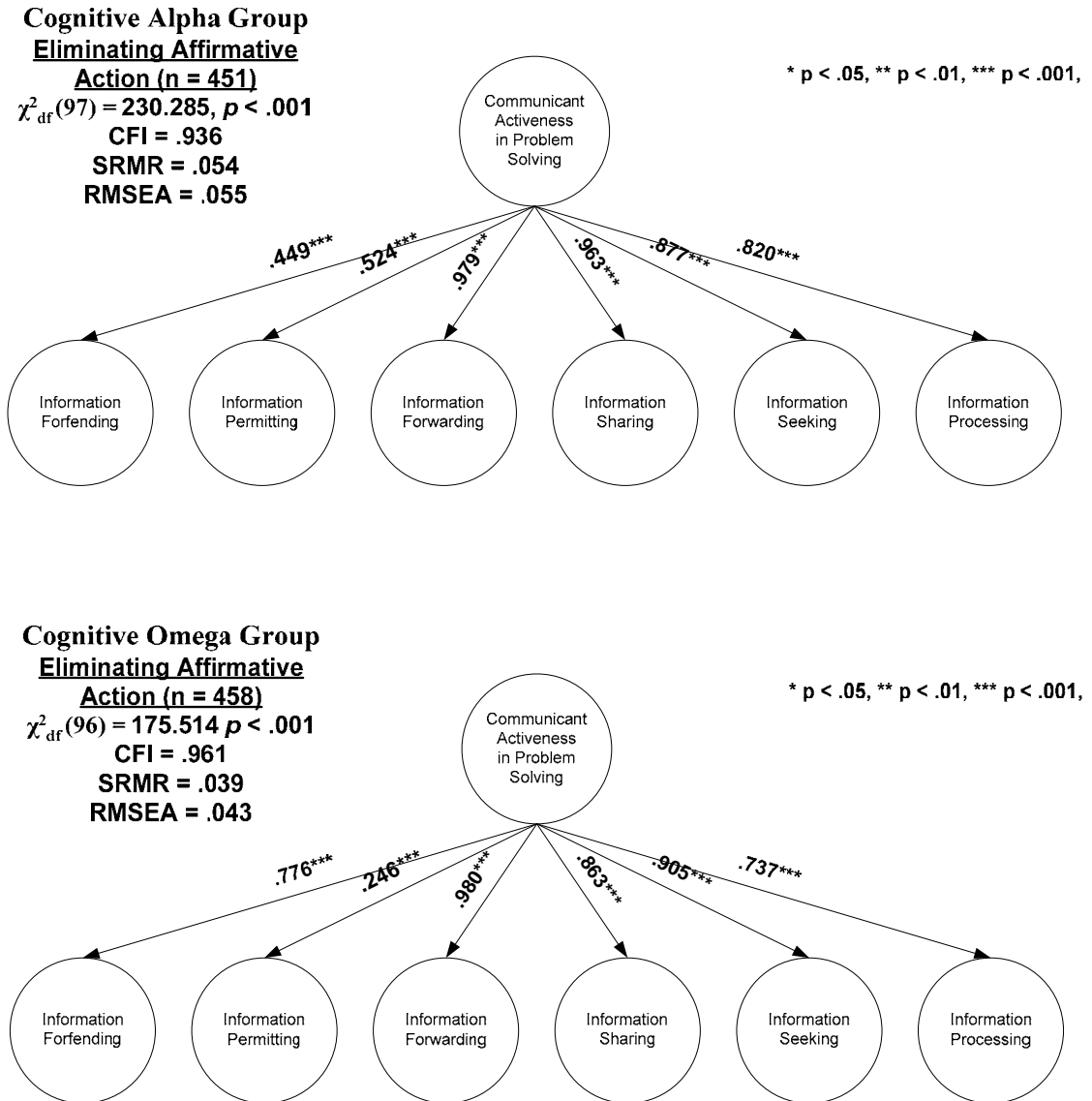


Table 28

Additional Analysis of CAPS (Cognitive Alpha versus Cognitive Omega Groups): Chi-square Differences and Goodness-of-Fit

Indices

		<i>Model</i>	χ^2	df	χ^2/df	<i>RMSEA</i>	<i>SRMR</i>	<i>CFI</i>	<i>NNFI</i>	<i>AIC</i>
War in Iraq	Cognitive Alpha Group (n = 456)	Independence	3471.731	190	18.272					3091.731
		CAPS	314.960	139	2.266	.053 (.045, .060)	.061	.946	.927	36.960
	Cognitive Omega Group (n = 451)	Independence	4104.376	190	21.602					3724.376
		CAPS	265.130	145	1.828	.043 (.035, .051)	.047	.969	.960	-24.130
Eliminating Affirmative Action	Cognitive Alpha Group (n = 451)	Independence	2232.467	136	16.415					1960.467
		CAPS	230.285	97	2.374	.055 (.057, .065)	.054	.936	.911	36.285
	Cognitive Omega Group (n = 458)	Independence	2155.632	136	15.850					1883.632
		CAPS	175.514	96	1.828	.043 (.032, .052)	.039	.961	.944	-16.486

A careful examination indicates that information selectivity was different between the cognitive alpha group and cognitive omega group in both issues. Specifically, the cognitive alpha groups in the two issues were lower in information forefending (i.e., .488 for war in Iraq and .449 for eliminating affirmative action) and relatively higher in information permitting (i.e., .538 in war in Iraq and .524 in eliminating affirmative action). The pattern reversed in the cognitive omega group. Cognitive omega groups were higher in information forefending (i.e., .656 for war in Iraq and .776 for eliminating affirmative action) and relatively lower in information permitting (i.e., .496 for war in Iraq and .246 for eliminating affirmative action). I tabulated these findings in the Tables 29-32. Notably, the information selectivity shows contrasting reflections between the cognitive alpha and omega groups. For the information transmission and acquisition dimensions, I expected a similar pattern between two groups. I visualized these dimensions in Tables 29-32. Even with eyeball examination, two groups possess similar structural path coefficients in information transmission and information acquisition.

Thus, I conclude that the additional analysis of CAOS and CAPS seems to support why H21 failed to get support. In other words, the low entrepreneurial problem solvers can also be active in communication behavior, just as those high entrepreneurial problem solvers are active in communication behavior. Specifically, the low and high entrepreneurial problem solvers seem to differ in information selectivity. However, those higher or lower entrepreneurial problem solvers do not differ in their information transmission and acquisition (i.e., those non-entrepreneurial problem solvers tend to more forefend information, while they are similarly seeking and forwarding information as those entrepreneurial problem solvers do.).

Figure 29: Standardized structural path coefficients between cognitive alpha and cognitive omega group (War in Iraq).

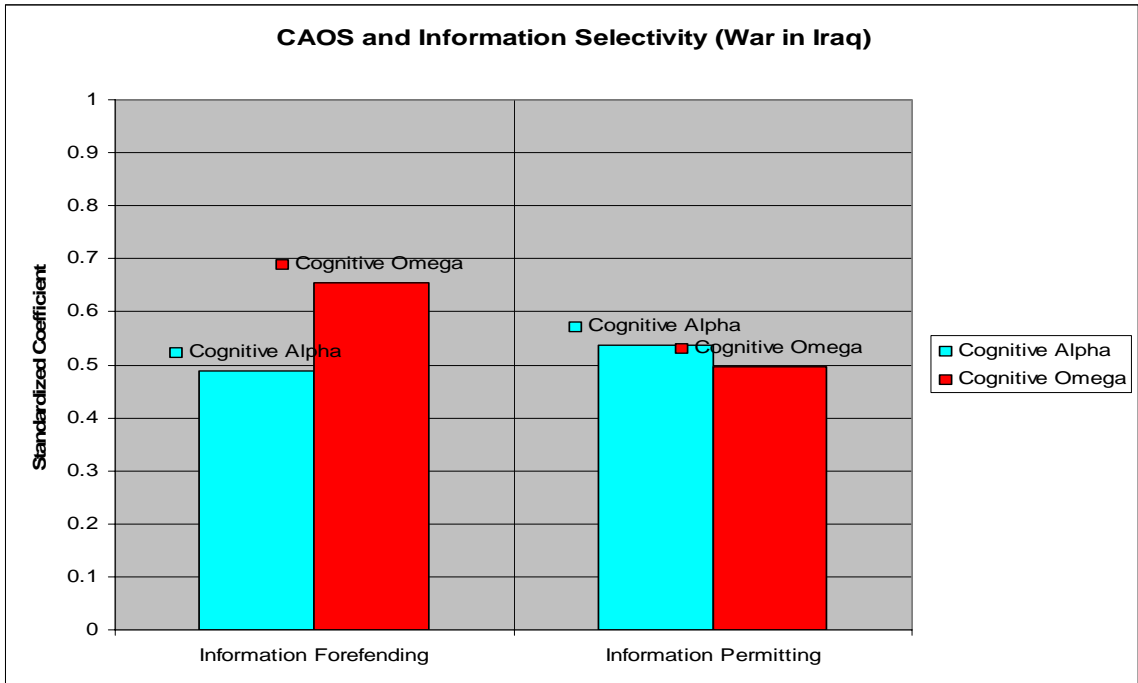


Figure 30: Standardized structural path coefficients between cognitive alpha and cognitive omega group (Eliminating Affirmative Action).

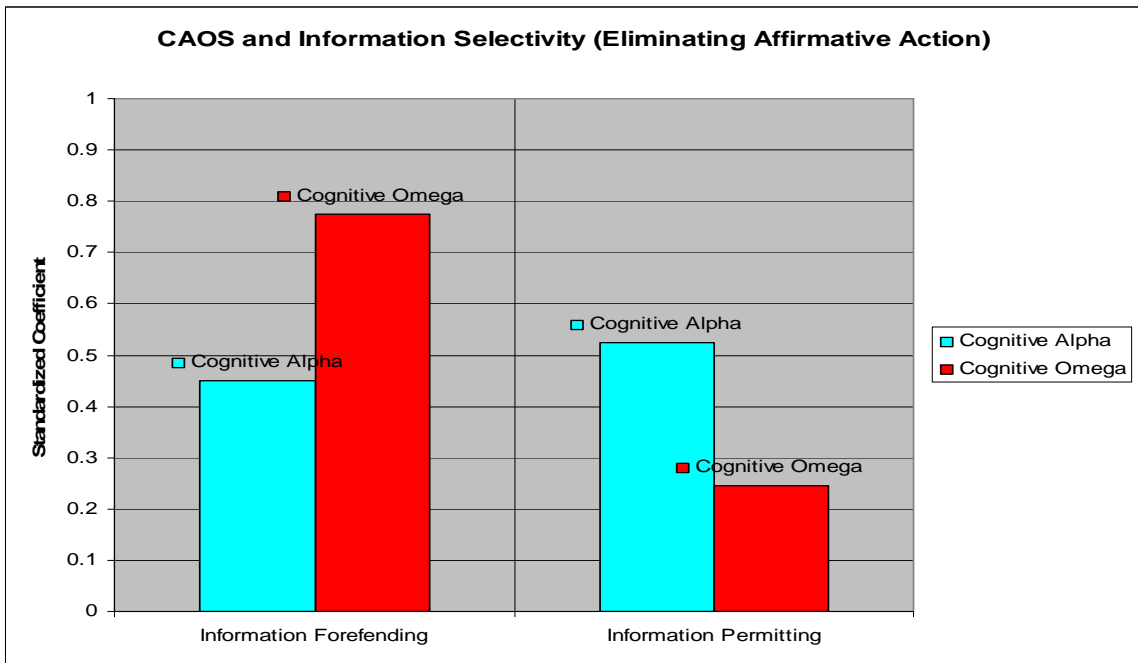


Figure 31: Standardized structural path coefficients between cognitive alpha and cognitive omega group (War in Iraq).

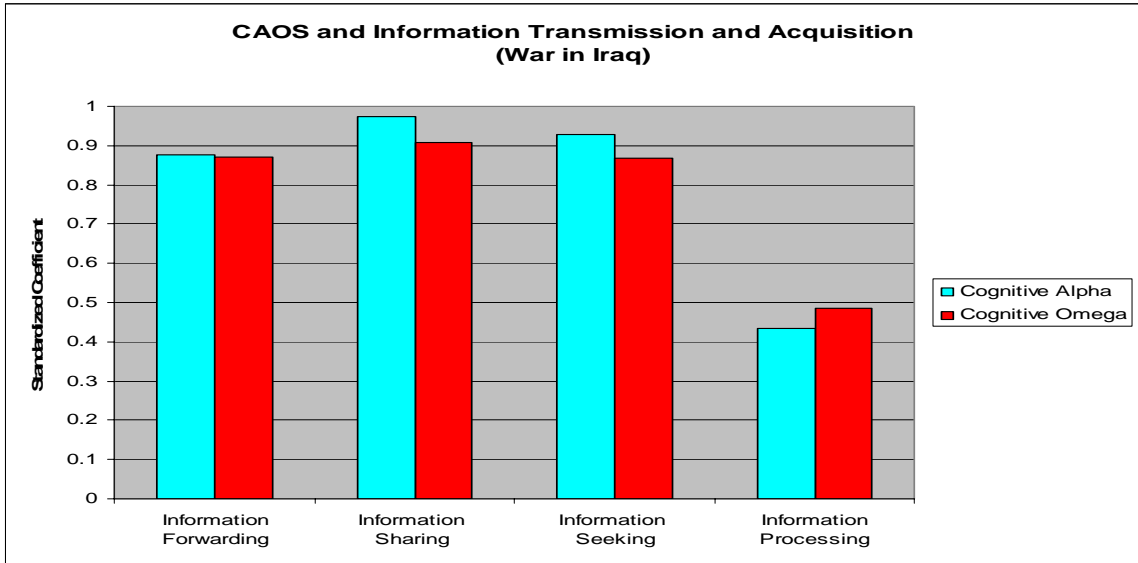
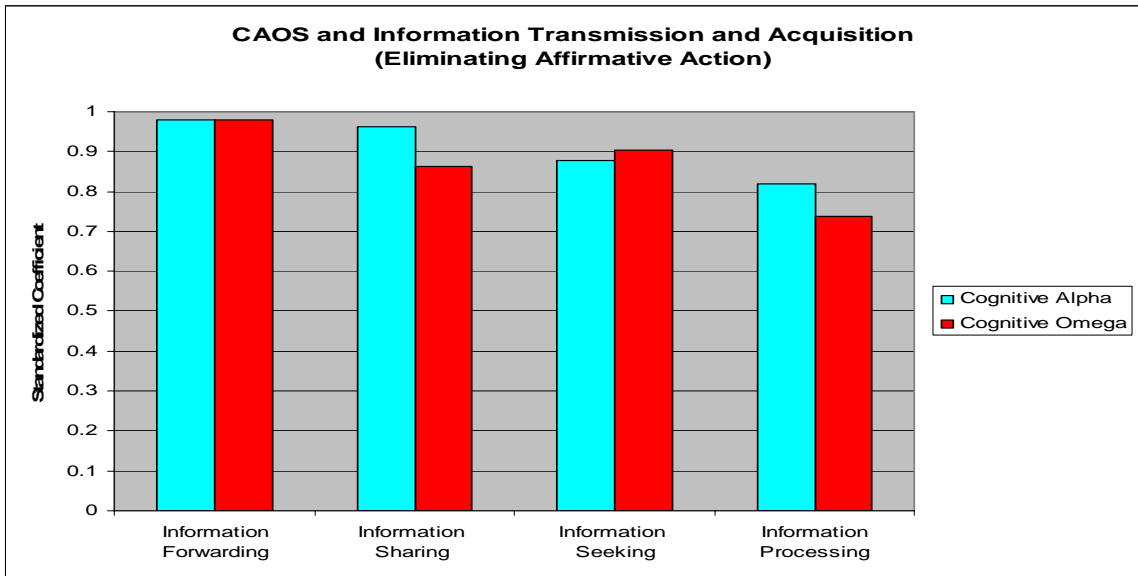


Figure 32: Standardized structural path coefficients between cognitive alpha and cognitive omega group (Eliminating Affirmative Action).



In the next chapter, I will discuss the findings and their implications to theory and practice. Following that, I will discuss the limitations of current study and the suggestions for future research.

CHAPTER V: CONCLUSIONS AND IMPLICATIONS

All life is problem solving.

Karl Popper

The primary purpose of this study was to develop two new concepts, communicant activeness in problem solving (CAPS) and cognitive entrepreneurship in problem solving (CEPS). I then added CAPS and CEPS as the dependent variables to the situational theory of publics (J. Grunig, 1968, 1989, 1997). By this way, I elaborated and refined the existing situational theory of publics (STP) further. As a result, STP became a more general theory of human problem solving, and I called the resulting theory the situational theory of problem solving (STOPS).

In CAPS, I started with the guiding premise: The more one commits to problem resolution, the more one *becomes selective* in dealing with information, the more one *becomes transmissive*, and the more one *becomes acquisitive* about information pertaining to the problem. In CEPS, I postulated: A problem solver with heightened cognitive entrepreneurship tends to 1) generate a large number of mental syllogistic models before he or she finally selects one for problem solution; 2) commit more to proposed solution proposals, as if they are a solution, during evaluation; 3) be more heedful in finalizing a conclusion; and 4) be more likely to invest cognitive labor *prior to* finalizing a conclusion (i.e., an *evaluation purpose*) rather than to spend cognitive efforts *after* finalizing a conclusion (i.e., *justification purpose*).

Parallel to the conceptual explication, I developed measurement systems for the new concepts and tested their validity and utility with the situational antecedent variables such as problem recognition, constraint recognition, level of involvement, referent

criterion, and situational motivation in problem solving. In doing so, I refined the concepts of problem recognition and referent criterion to address some issues raised against the situational theory of publics.

After the introduction of the key variables in the new situational theory of problem solving, I constructed a series of confirmatory factor analytic models and full causal structural equation models.

Overall, I posited 22 hypotheses among the key variables and their subdimensions. I collected data using the survey method and analyzed them using structural equation modeling with the EQS 6.1 program.

In general, I found a good amount of support for most hypotheses. Those few not supported revealed conceptual mistakes I made in deriving predictions (e.g., situational motivation → CEPS in the SITCEPS model). Also, some serendipitous findings provide a valuable chance for conceptual refinement.

This final chapter consists of the detailed summary of what I found from the model and hypothesis testing, discussions regarding supported and non-supported hypotheses, the implications of CAPS, CEPS, and STOPS to theory and practice, and finally a summary of limitations and ideas for future research. In the following section, I will first recapitulate the results of this study with discussions of major findings.

Summary and Discussion

Reliability and Validity of the Measurement Instruments

Of two new concepts, CAPS and CEPS, it is necessary to have reliable and valid measurement systems to be useful. I conducted a series of exploratory tests such as Cronbach's alpha and Principal Component Analysis. In general, analysis of three

problems (war in Iraq, losing weight, and eliminating affirmative action) showed that CAPS and CEPS measurement systems are reliable and internally consistent.

For nomological validity test purposes, I introduced five situational antecedent variables: problem recognition, constraint recognition, level of involvement, referent criterion, and situational motivation in problem solving. I examined the internal consistency and reliability of the situational antecedent variables and found, overall, the measurement items for the situational antecedent variables performed an acceptable job in reliability and validity.

Tests of the New Constructs and Hypotheses

After the reliability and validity tests, I proceeded to confirmatory factor analysis and causal model analysis to examine construct validity of the two new constructs. I summarize the findings of the SEM analysis in following.

CAPS

Using the sub-sampling strategy, I divided total sample of $n = 1,380$ into developmental ($n = 467$) and validation samples ($n = 458$, $n = 460$). In all the nested model tests, the six factor oblique models were always better than one-factor model structure for CAPS. This suggests that CAPS has multidimensionality, as it was conceptualized. Of six out of nine nested model tests in three issues, the second-order factor structure turned out to be a better model than the six factor oblique model. In general, CAPS seems to be better represented as a second-order construct. Hence, I conducted three second-order confirmatory factor analyses using the total sample ($n = 1,380$) to test hypotheses regarding CAPS.

The evaluation of the model fit to data showed that in all three models the second-order structure is a reasonable conceptual representation for the CAPS data. Thus, I examined the parameter estimates in the second-order models to test H1-H6. All hypotheses found support as expected at ($p < .001$). The loadings in the observed variables were all significant at the $p < .001$ level. Most parameter estimates in the measurement items vary between .313 and .826.

The core premise in the CAPS model was that as a communicant becomes active in problem solving, one will become more selective, transmissive, and acquisitive regarding information about the problem. Specifically, as a communicant becomes active in problem solving, one's information selectivity tends to increase (i.e., H1 and H2). Notably, the subject's information forefending tendency increased more than the information permitting tendency as communicant activeness heightens: for information forefending .691, .613, .748 vs. for information permitting .530, .612, .538 in three problems. Thus, as problem solvers become more active, they tend to lose information permissiveness, which is often a desirable characteristic in problem solving (e.g., in the issues of social conflicts).

In all three problems, information transmission (i.e., H3 and H4) was the most salient dimension in communicant activeness in problem solving: .921, .903, .984 for information forwarding; .946, .973, .968 for information sharing. This indicates that as problem solvers become more active, their dominant characteristic is to give information about a problem to others. As discussed earlier, the previous situational theory of publics and other communication models often focused exclusively on information acquisition in conceptualizing communicator activeness. Such findings tell us how the omission of

information giving in previous research was a loss in understanding communicator's activeness in dealing with his or her life problems. To name just a few, with the inclusion of information selectivity and information transmission variables, now we can explain better how certain ideas are dispersed among people (diffusion of innovations), how and why certain social problems are enduring and become chronic (conflict resolution), and how activist and active publics can be conceptually distinguished (public relations).

The last dimension of information acquisition consists of information seeking and information processing (i.e., H5 and H6). These two variables are the default dependent variables highlighting publics' active and passive communication behaviors in the situational theory of publics (J. Grunig, 1997). Consistent with what past studies of the STP found, information seeking and processing were increased as one becomes more active in problem solving: .893, .899, .794 for information seeking; .474, .819, .912 for information processing. Problem solvers with heightened motivation in problem solving tend to make efforts in gaining information about the problem.

In summary, I found support for the hypotheses regarding six conceptual subdimensions of CAPS. Each subdimension has a positive relationship with its higher dimension of communicant activeness in problem solving.

CEPS

I divided the total sample of $n = 1,380$ into developmental ($n = 467$) and validation samples ($n = 917$). For CEPS, I proceeded directly to the second-order confirmatory factor analysis in the development and validation samples. I considered the second-order confirmatory factor analyses as a good model structure if the model tests resulted in the acceptable fit indices according to Hu and Bentler's (1999) joint criterion.

Results showed that the second-order structure was a good conceptual representation of the data.

I tested the two second-order models and the standardized structural path estimates and standardized loadings in two problems. In both problems ($n = 1,380$), the structural paths from the second-order latent variable (i.e., cognitive entrepreneurship) to first-order latent variables (e.g., cognitive retrogression) were significant at the $p < .001$ level, except the path to cognitive commitment in the war in Iraq issue (i.e., $p < .01$). In addition, the loadings in the observed variables were all significant at the $p < .001$ level. Most parameter estimates in the measurement items varied between .400 and .700 (the lowest .285, the highest .909).

In the CEPS model, I postulated that as one becomes active in problem solving, one will use less backward reasoning (cognitive retrogression), will possess more cognitive multilateralism, will exhibit more commitment, and will exhibit more suspending in finalizing a solution. The analysis of CEPS in two social problems provides supportive evidence for the main postulate and the four hypotheses.

In H7, I conceptually predicted that one's cognitive retrogression in problem solving will decrease as cognitive entrepreneurship in problem solving increases: i.e., a negative relationship. The most salient feature in cognitive retrogression is one's *backward reasoning*—i.e., “a conclusion directs certain evidence.” This is an optimization process for an *a priori* conclusion one drew earlier. For H7, I found supporting evidence in both issues. Notably, the magnitude of the path coefficient was higher for the war in Iraq issue (i.e., $-.754, p < .001$) than the eliminating affirmative action issue (i.e., $-.258, p < .001$). This would suggest that there is a stronger backward

reasoning tendency (i.e., cognitive omega approach) for the war in Iraq issue than for the eliminating affirmative issue.

In H8 and H9, I adopted a single indicator approach in measurement. In H8, I predicted that as cognitive entrepreneurship increases one will possess more *cognitive breadth and tolerance*—the number of decision alternatives and the extent of tolerance in dealing with competing rival information during the problem-solving process. I found support for this prediction in both issues: .184 in war in Iraq and .334 in eliminating affirmative action. H9 predicted that as cognitive entrepreneurship heightens, one will make more cognitive commitment—the degree of enthusiasm and the extent of patronizing the proposed solutions for a given problem solving. I found partial support for H9 in the eliminating affirmative action issue (i.e., .166, $p < .001$), but not in the war in Iraq issue (i.e., $-.113$, $p < .01$). The signs were opposite in the war in Iraq issue, which suggests that for the war in Iraq issue, as one becomes more entrepreneurial in problem solving, one would be less enthusiastic and patronizing to the proposed solutions.

About the reversal of sign in cognitive commitment, I speculate that for the war in Iraq issue, survey respondents seemed to feel tired of the issue, because it had been prolonged about two years at the time the data were collected (spring 2005). Thus, even respondents who were high in entrepreneurship in problem solving would stick exclusively to a certain perspective. Hence, the cognitive commitment was less because survey respondents became entrenched in certain positions even if their cognitive entrepreneurship increased. Considering the computation formula, if one adheres exclusively to a single position, it will result in a low score in cognitive commitment. In contrast, the eliminating affirmative action issue was relatively a less “entrenched”

problem, so the participants with high entrepreneurship in problem solving seemed to think and value different perspectives more than in the war in Iraq issue. In other words, people result in more “hedging” (i.e., commit to different ideas at the same time), and the resulting commitment scores become higher as one’s cognitive entrepreneurship heightens.

H10 predicted as one’s cognitive entrepreneurship increases, one’s cognitive suspension increases as well. Cognitive suspension refers to a problem solver’s heightened willingness to invest cognitive resources in evaluating and reevaluating a selected solution before finalizing it. In both issues, H10 was supported: .414 ($p < .001$) for the war in Iraq issue and .770 ($p < .001$) for the eliminating affirmative action issue.

Overall results in the CEPS CFA model tests indicated that as the problem solver’s entrepreneurial mindset in problem solving heightens, one tends to adopt more of a backward reasoning strategy, have cognitive breadth, exhibit more tolerance of competing ideas and opinions, and suspend judgment before finalizing a solution. Yet, cognitive commitment—the degree of enthusiasm and the extent of patronizing the proposed solutions—seems to differ across issues. This requires further study with different types of issues. Considering the single-item approach with formulas for cognitive multilateralism and cognitive commitment, such a finding begs further analysis. A new study using a multiple-indicator approach as in the cognitive retrogression and suspension will allow a clearer understanding for the two dimensions measured with a single item.

In sum, I proposed two new variables, CAPS and CEPS, to make a more general version of the situational theory of publics (J. Grunig, 1997, 2003). To examine construct

validity (i.e., “nomological network,” Cronbach & Meehl, 1955), I created several causal nets using situational antecedent variables. Earlier in the conceptualization, I posited conceptual relationships between the new constructs and existing antecedent variables in the situational theory of publics. Using structural equation modeling, I tested the presumed conceptual relationships between new and existing variables. In the following section, I summarize a series of models of nomological networks between the two new constructs and the antecedent variables of situational theory.

SITCAPS

From the SITCAPS model testing, I found that the three SITCAPS showed acceptable fit to the data. I thus, examined the model parameter estimates to test hypotheses.

In H11, I expected a positive relationship between problem recognition (i.e., “detect something is missing and should be done”) and situational motivation in problem solving (i.e., the likelihood of “stop to think about” the problem). I found positive path coefficients in all three problems: .115 ($p < .05$) for war in Iraq, .181 ($p < .001$) for losing weight, and .262 ($p < .001$) for eliminating affirmative action. As problem recognition increases, one becomes more motivated in problem solving.

In H12, I expected a negative relationship between constraint recognition (i.e., “perceive that there are some obstacles in a situation that limit one’s ability to do anything about the situation”) and situational motivation in problem solving. I found all negative path coefficients across all three problems: -.140 ($p < .05$) for war in Iraq, -.657 ($p < .001$) for losing weight, and -.158 ($p < .001$) for eliminating affirmative action.

Therefore, as one's constraint recognition increases, one's situational motivation in problem solving decreases.

In H13, I predicted a positive relationship between level of involvement (i.e., perceive some "connection" between a situation and oneself) and situation motivation. I found strong positive relationships: .831 ($p < .001$) for war in Iraq, .420 ($p < .001$) for losing weight, and .630 ($p < .001$) for eliminating affirmative action. I thus conclude that as one's perceived involvement increases, his or her situational motivation toward the problem will increase.

H14 investigated the role of a referent criterion in a problematic situation. I redefined referent criterion as "any knowledge or subjective judgmental system that exerts specific influence on the way one approaches problem solving." This can be *any* decisional guideline or decision rules *perceived as relevant to a given problem*: i.e., either an *objective* referent, such as one carried from prior problem solving, or a *subjective* referent, such as wishful thinking or willful thinking about the problem outcomes. The availability and applicability of such cognitive knowledge (internal referent) will increase communicant activeness regardless of whether it is subjective or objective. The CAPS model includes variables in information selection (e.g., information forefending) and information transmission (e.g., information forwarding) as new key dimensions. Thus, I conceptually predicted that the problem solver's selectivity and transmission of one's knowledge on the problem will increase as one possesses a stronger referent criterion about the problematic situation. From the analysis, I found good support for this prediction: .493 ($p < .001$) for war in Iraq, .149 ($p < .01$) for losing weight, and .492 ($p < .001$) for eliminating affirmative action.

Finally, by H15, I predicted that the situational motivation in problem solving will increase communicant activeness in problem solving. In all three problems, I found support for this prediction: .559 ($p < .001$) for war in Iraq, .887 ($p < .01$) for losing weight, and .542 ($p < .001$) for eliminating affirmative action. As situational problematic perception increases one will experience a heightened situational motivation toward problem solving, which subsequently increases one's active communication in information selection, transmission, and acquisition. The presence of strong referent criteria regardless of their subjectivity (e.g., a willful thinking toward the outcome) is likely to increase subsequent communicant activeness about the problem. In the previous situational theory, the referent criterion had explained little variance in communication behaviors—i.e., information seeking and information processing (J. Grunig, 1997). Thus, the referent criterion had eventually been dropped from the independent variables. J. Grunig (1997) discussed the referent criterion as an effect or outcome of communication behavior such as information seeking.

I support his reasoning as logical and strategic in theory building. Nonetheless, the referent criterion still could be useful as an antecedent variable in a way I redefined. For many problem-solving contexts, we observe that our preconception, subjective beliefs, or carried-over knowledge from past situations affects our subsequent communication behaviors. Specifically, our subsequent information seeking is directionally tuned by what a referent criterion prescribes and proscribes. We tend to see what the referent criterion implies. Hence, our information seeking and forwarding or sharing are selective. If so, a new situational theory should reintroduce the variable, referent criterion. In other words, I theorize that a referent criterion is not only an effect

and outcome of communication behaviors, but also an antecedent condition contextualizing subsequent communication behaviors. At times, a referent criterion remains intact (i.e., reinforced); at other times it is revised.

In addition, communication behavior has become more general. Information seeking would be reduced in the presence of a referent criterion. However, a referent criterion seems to trigger and drive one to be more selective and to be willing to share and forward information to others. I found supportive evidence for this reasoning. The higher the referent criterion, the higher the communicant activeness in problem solving.

Finally, I revised problem recognition to be more of “detect” something missing rather than “stopping to think.” I followed Kim, Downie, and De Stefano’s (2005) conceptual explication to distinguish situational motivation (i.e., “stop to think about” tendency) from the joint function of “detect,” “perceived connection,” and “perceived obstacle” in doing something about the problem. Hence, I used a new measurement item for problem recognition. The previous problem recognition measures, such as “how often do you stop to think about the issue?” were considered as measures for situational motivation in problem solving. Analyses with these refined measures were consistent with the previous situational theory’s prediction (e.g., the more one exhibits problem recognition, the more one will do information seeking.). Besides, the reported multicollinearity issue (e.g., standardized beta coefficients greater than 1.00) between the independent variables was not found.

In summary, the causal networks I posited between newly refined situational antecedent variables and CAPS have gained a good amount of support. The finding gives

us some confidence in the construct validity for the new construct of CAPS and the situational theory of problem solving.

SITCEPS

From the SITCEPS model tests, I found acceptable model fits to the data, thus I proceeded to interpreting the parameter estimates to test hypotheses. For hypotheses from H16 to H18, which are conceptually identical predictions in H11-H13, I found similar support as found in the SITCAPS analysis.

In H16, I expected a positive relationship between problem recognition and situational motivation in problem solving. But, I found partial support: .464 ($p < .001$) for war in Iraq and -.080 (n. s.) for eliminating affirmative action.

In H17, I expected a negative relationship between constraint recognition and situational motivation in problem solving. I found significant negative path coefficients in both problems: -.136 ($p < .01$) for war in Iraq and -.535 ($p < .001$) for eliminating affirmative action.

In H18, I expected a positive relationship between level of involvement and situation motivation. Again, I found significant positive relationships in both problems: .581 ($p < .001$) for war in Iraq and .655 ($p < .001$) for eliminating affirmative action.

H19 inquired about the presence of a referent criterion in a problematic situation. From the analysis, I found support for this prediction: -.489 ($p < .001$) for war in Iraq and -.589 ($p < .001$) for eliminating affirmative action. This suggests that the presence of a referent criterion tends to decrease one's entrepreneurial mindset. With applicable decisional referents, one becomes more non-entrepreneurial in problem solving. I

predicted so because, given a deployable referent for a problem, one will be more likely to jump into a conclusion (i.e., a solution carried from prior situations) and turn to information that optimizes the chosen solution—i.e., backward reasoning.

Lastly, H20 predicted that situational motivation in problem solving will increase cognitive entrepreneurship in problem solving. However, I found no support for this prediction: $-.487$ ($p < .001$) for war in Iraq and $-.422$ ($p < .001$) for eliminating affirmative action. Notably, the signs of the paths were both opposite (i.e., negative) from situational motivation to cognitive entrepreneurship. This suggests that the more one is situationally motivated for problem solving, the more one becomes non-entrepreneurial in problem solving.

To understand better this surprising finding, I conducted Sobel's test to see the effect between situational motivation and cognitive retrogression via CEPS. In both issues, the indirect effects between situational motivation and cognitive retrogression via CEPS were significant: $.454$ ($p < .001$) for war in Iraq and $.410$ ($p < .001$) for eliminating affirmative action. For cognitive multilateralism, in both issues the indirect paths via CEPS were not significant: $-.007$ (n. s.) for war in Iraq and $.014$ (n. s.) for eliminating affirmative action. For cognitive commitment, I found a significant effect. As the situational motivation heightens, cognitive commitment increases: $.111$ ($p < .001$) for war in Iraq and $.075$ ($p < .01$) for eliminating affirmative action. Finally, for cognitive suspension, I found that as situational motivation increases, cognitive suspension decreases: $-.096$ ($p < .01$) for war in Iraq and $-.078$ ($p < .01$) for eliminating affirmative action.

Notably, in the SITCEPS model, I found that cognitive retrogression is the most salient conceptual subdimension to conceptualize cognitive entrepreneurship in problem solving (i.e., -.933 for war in Iraq and -.972 for eliminating affirmative action). Cognitive retrogression refers to a cognitive tendency of doing backward reasoning (i.e., “a conclusion dictates evidence that secures and warrants the chosen conclusion.”). In other words, as situational motivation in problem solving grows, one tends to move backward in thinking about the problem. From the finding, I conclude that situational motivation tends to pressure problem solvers to hastily turn to a conclusion and optimize the hastily drawn conclusion. This suggests that the heightened situational problem perceptions (e.g., feel more problematic and more connected) tend to trigger a non-entrepreneurial mindset. It explains why our problem-solving efforts are very often ineffective even if we are very eager and pressured (i.e., “motivated”) to work on problem resolution. In other words, a problem solver’s motivation cannot be exclusively equated with his or her adoption of the entrepreneurial cognitive strategy.

In summary, I found similar support for H16-H18 for situational perceptual variables as in the SITCAPS analysis. In addition, in H19, as expected, I found that the more one possesses a referent criterion, the less one becomes entrepreneurial in problem solving. However, I failed to find support for H20. The finding suggests the opposite relationship between situational motivation and cognitive entrepreneurship in problem solving. It thus suggests that from the heightened motivation, problem solvers tend to mobilize available cognitive resources backwardly—to optimize the selected solution to be more conclusive and convincing.

Relationships between CAPS and CEPS

I constructed two nonrecursive models that investigate the simultaneous causal influences between CEPS and CAPS. Nonrecursive models are often difficult to solve mathematically. I tried both of the model specifications and found that only the Figure 16 model (i.e., referent criterion → CEPS) converged successfully in both issues. Thus, I used the Figure 16 model to test the hypotheses regarding bidirectional causality between CEPS and CAPS.

For H21, I expected a positive causal influence from cognitive entrepreneurship in problem solving to communicant activeness in problem solving. However, I found no support for this prediction in both issues: $-.959$ (n. s.) in war in Iraq and $-.892$ (n. s.) in eliminating affirmative action. For H22, I predicted a negative causal influence from communicant activeness in problem solving to cognitive entrepreneurship in problem solving. I found support for this expectation in both issues: $-.919$ ($p < .001$) for war in Iraq and $-.622$ ($p < .001$) for eliminating affirmative action. This indicates that the more active are one's communicative behaviors (i.e., high in information forefending, forwarding, and seeking), the less one will become entrepreneurial in problem solving (i.e., doing more cognitive retrogression in problem solving). The accumulated knowledge and experience from problem-solving efforts in dealing with information seems to decrease an entrepreneurial mindset because of more expertise and/or confidence on the given problem.

For H21, I expected that higher cognitive entrepreneurship in problem solving will lead to higher communicant activeness. However, in retrospect, I failed to consider that the low cognitive entrepreneurial problem solver could also be active in communication behavior. In other words, high cognitive non-entrepreneurship does not

mean passiveness in communication behavior. As we found routinely, many non-entrepreneurial problem solvers tend to vigorously seek and forward information that is consistent with their preferred conclusion. Thus, it was not conceptually and empirically valid to specify a positive causal relationship between high cognitive entrepreneurship and communicant activeness in problem solving. The nonsignificant path from cognitive entrepreneurship to communicant activeness seems to reflect such a notion.

In contrast, the reverse causal flow seems to be logical conceptually. As a problem solver experiences heightened communicant activeness, she or he is likely to develop a good deal of knowledge and preference on how to solve the problem. Then, such a preference (i.e., high information forefending) would lead to more cognitive retrogression (i.e., optimizing a preferred conclusion backwardly) and less tolerance, less commitment to all the available candidate solution and ideas, and less suspension of finalizing a solution. As a result, the problem solver becomes less entrepreneurial. Therefore, the negative path from CAPS to CEPS seems to reflect such a negative conceptual relationship. In summary, from the H21 and H22 tests, I found that communicant activeness in problem solving tends to reduce the problem solver's cognitive entrepreneurship eventually, while the reverse cannot be assumed.

Additional Analysis

As I discussed, the H21 prediction was a conceptual mistake in that both high and low entrepreneurial problem solvers could be high in communicant activeness. There is no conceptual reason that the less entrepreneurial problem solvers should be low in communicant activeness. To test the validity of this reasoning, I conducted an additional

analysis of how the high and low entrepreneurial problem solvers would differ in communicant activeness.

Earlier, I developed a model of cognitive alpha and omega strategies (CAOS) reflecting a problem solver's *reasoning direction*: i.e., "evidence→conclusion" for forward reasoning and "conclusion→evidence" for backward reasoning. I named those forward reasoning problem solvers as the *cognitive alpha* group, and those in the backward reasoning group as *cognitive omega*. Using the CAOS model, I sorted survey participants into three groups: high, medium, and low in cognitive retrogression. I then selected the high and low groups and named them cognitive omega (i.e., high in cognitive retrogression) and cognitive alpha (i.e., low in cognitive retrogression).

I expected similar model structures of CAPS in both the cognitive alpha group and cognitive omega groups, but I predicted that the two groups will differ in information selectivity. Specifically, I expected the cognitive alpha group would have a low path coefficient in information forefending and a high one in information permitting. In contrast, I predicted that the cognitive omega group would show the opposite pattern—a high path coefficient in information forefending and a low path coefficient in information permitting. If the patterns developed as I expected, this should become evidence for the explanation of a nonsignificant path in H21: high or low entrepreneurial problem solvers do not differ in their information transmission and acquisition but only in their information selectivity (i.e., non-entrepreneurial problem solvers tend to more forefend information.).

As I expected, information selectivity was different between the cognitive alpha group and the cognitive omega group in both issues. Specifically, the cognitive alpha

groups in two issues were lower in information forefending (i.e., .488 for war in Iraq and .449 for eliminating affirmative action) and relatively higher in information permitting (i.e., .538 for war in Iraq and .524 for eliminating affirmative action). I found a reversed pattern in the cognitive omega group. Cognitive omega groups were higher in information forefending (i.e., .656 for war in Iraq and .776 for eliminating affirmative action) and relatively lower in information permitting (i.e., .496 for war in Iraq and .246 for eliminating affirmative action). The two groups possess similar structural path coefficients in information transmission and information acquisition, whereas in information selectivity between cognitive alpha and omega groups shows an interaction-like pattern.

Thus, I concluded that the additional analysis of CAOS and CAPS reinforced my explanation of why H21 failed to get support. The low entrepreneurial problem solvers *can also be active* in communication behavior, just as those high entrepreneurial problem solvers are active. Thus, this at least in part explains why my conceptual prediction in H21 failed.

Overall Discussion

To recap, the present study finds support for communicant activeness in problem solving. Tests showed that CAPS is a multidimensional construct. In all six dimensions, I found the expected positive structural path coefficients: as one's communicant activeness in problem solving increases, those subdimensions such as information forefending, information permitting, information forwarding, information sharing, information seeking, and information processing increase as well.

I introduced a new concept, cognitive entrepreneurship in problem solving, which consists of cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. Except for cognitive retrogression, all subdimensions were posited to have positive relationships with their higher order construct, cognitive entrepreneurship. Cognitive retrogression captures how one would deploy a backward reasoning strategy in problem solving. In general, I found support for these predictions. However, I found only partial support for cognitive commitment. In two tests, I found a positive path (in eliminating affirmative action) and a negative path (in war in Iraq). So, from the current data, we cannot say definitively whether cognitive commitment generally increases as cognitive entrepreneurship increases. This may be a matter of issue sensitivity. A future study with multi-items and comparisons across more diverse types of problems should bring clearer understanding.

This study's findings suggest that high problem recognition and level of involvement with low constraint recognition increases one's situational motivation in problem solving. As the situational motivation in problem solving grows, communicant activeness in problem solving increases. In addition, as one has a stronger referent criterion, this tends to increase communicant activeness in problem solving.

However, if one has a heightened situational motivation, she or he tends to have low cognitive entrepreneurship in problem solving. The presence of a stronger referent criterion tends to lower the cognitive entrepreneurial approach in problem solving.

From the bidirectional analysis, I found that problem solvers with high communicant activeness in problem solving are not necessarily entrepreneurial in their problem solving. Low and high entrepreneurial problem solvers both can be active in

communication behavior. Nonetheless, as communicant activeness in problem solving increases, the lower the cognitive entrepreneurship in problem solving one tends to develop. Finally, the cognitive alpha group (i.e., the entrepreneurial problem solvers) tends to be less forefending and more permitting in information acquisition and transmission. In contrast, the cognitive omega group (i.e., the non-entrepreneurial problem solvers) tend to be more forefending and less permitting in dealing with information during problem solving.

To conclude, in the present study, I found a good amount of evidence for communicant activeness in problem solving, cognitive entrepreneurship in problem solving, and the situational theory of problem solving. These constructs describe unique cognitive and communicative features during problematic situations. In addition, they explain how and why those unique features arise in some situations and not in others. Yet, I found a few unexpected findings (e.g., the higher the situational motivation in problem solving, the lower the cognitive entrepreneurship) that provoke further theoretical development. In future study, such serendipity will provide a chance for theory elaboration.

Implications

This study has introduced two new concepts of communicant activeness in problem solving and cognitive entrepreneurship in problem solving. With the new concepts, the situational theory of publics becomes a more general theory by replacing information seeking and processing (i.e., “particular”) with six subdimensions in communicant activeness in problem solving and four subdimensions in cognitive entrepreneurship in problem solving (“the general”). The resulting theory and models

have implications for communication theory in general as well as for subfields such as public relations, health and risk communication, political communication, and conflict resolution. In the following section, I will discuss the implications of communicant activeness in problem solving (CAPS), cognitive entrepreneurship in problem solving (CEPS), and the situational theory of problem solving (STOPS).

Implication of CAPS

The CAPS model I have developed aims to capture the notion of *intercommunication*. A dominant view is that communication is an *individual act* of *information inflow* or *outflow*, not an *individual's act* of *information interflow* simultaneously. Prior conceptions of communicant activeness hinged on information learning potential. However, to explain information interflow, we need both *conceptual nuts* and *bolts*.

With the concepts of information sharing, information forwarding, information processing, and information seeking, we can look at how communicants interlock with each other. Active communicants who are dealing with a life problem are not only seeking information about it but forwarding information about the problem and solutions to others. They are not only active in information taking but also active in information giving. Some communicants are active but may not seek information because of their successful problem solving in past (P. K. Hamilton, 1992). With their subjective confidence that they developed in dealing with a problem, they do not actively collect information about the problem but actively forward and forefend information to other communicants. It has been conceptually inconvenient to explain active communicants who are active in information giving but not active in information taking. Previous

theories could not capture such type of active communicants because they did not explicitly conceptualize information giving.

In addition, I have introduced another conceptual dimension, information selection, to capture how a communicant deals with information as having heightened activeness in problem solving. We routinely encounter active communicants in our daily life who *selectively* share, forward, process, or seek information about some problem. Communicants not only are interconnected with each other, but they have certain ways of selecting information. Our society, thus, is like a box of nuts and bolts of different sizes and shapes. Matching such a mixed pile of nuts and bolts is not a simple task to accomplish. Indeed, many information forwarders find it difficult to meet information processors (who are possessed by other life problems) who are likely to take information as the forwarders wish. Finding the right fits is more difficult than most message senders believe because of the information selectivity that problem solvers tend to develop over the problem-solving periods.

CAPS, Communicant Network, and Model of Meso-Level Intercommunication

With CAPS, we can break down the process of trafficking information among individuals within a communication network. To explain, I introduce two terms: *focal communicants* and *peripheral communicants*. Focal communicant refers to a central person who plays a role of information station regarding a problem. The focal communicant actively “inhales and exhales” information in an effort to solve a problem. He or she is actively seeking, forefending, and forwarding information about the problem. Within the boundary of the communication network in which he or she is situated, a focal communicant becomes a driving force to locate and relocate information about a problem

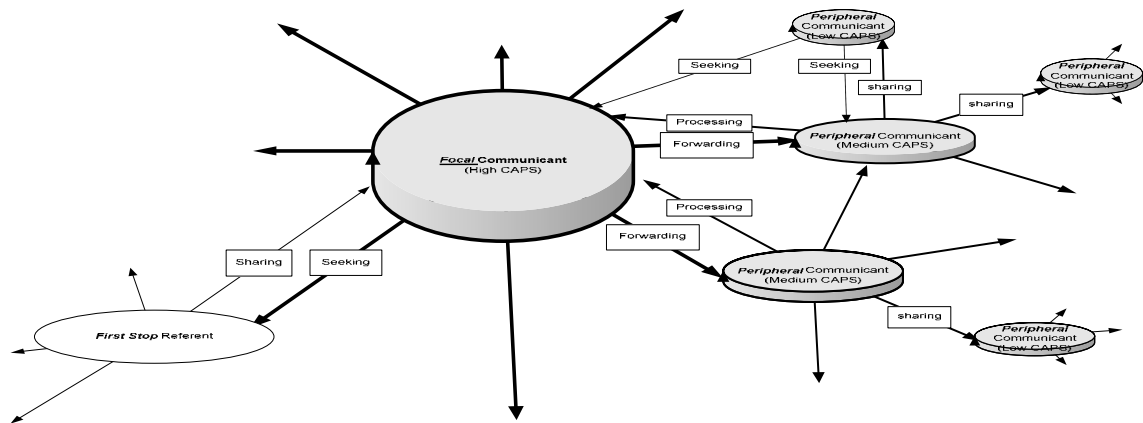
across one's interconnected communicant networks. In contrast, peripheral communicants refer to those communicants who are neighbors to focal communicants within a communicative network but who are less active on the problem. Peripheral communicants tend to passively process, permit, and share information they encounter from the communicative interactions. They may or may not cultivate a similar situational perception and communicative behavior as focal communicants have and do.

Focal and peripheral communicants are not necessarily bounded by geographic proximity. Focal communicants can be various types of people and social figures. They could be, for example, our geographically close friends and neighbors who are upset about some issue, media reporters who investigate and report publicly some new threats to readers, government officials working for a citizen safety issue, or a corporate marketing staff that is desperate to increase sales. Such focal communicants attempt to transfer information to other communicants in an effort to solve a problem they feel important. Notably, as shown in past research, interpersonal communication networks, rather than mass-mediated channels, such as word-of-mouth spread among people who are acquainted with each other (e.g., "weak ties," Granovetter, 1983) are by far the most effective method of communication (Rosen, 2000). Thus, building a model that conceptually illustrates the process of information trafficking among individual communicants would be theoretically useful.

Although prior studies distinguish the communication process by the medium utilized, this often misleads our study of communication effectiveness. For example, scholars of mass media effects distinguish mass-mediated communication from interpersonal communication in building a communication model. However, such a

distinction is futile in studying communication effectiveness from information giver to information takers in that the mass-media cannot exclude other communicant media in its effects (Chaffee, 1982). Too often, mass-mediated communication and interpersonal communication are closely intertwined, almost inseparable from other communication networks such as mass-mediated communication flows (Chaffee, 1982). The approach in studying communication effectiveness by distinguishing the medium would only be a phenotypic account that prohibits better understanding. A better alternative puts the emphasis on “communicants,” not the “medium” of communication, to describe information trafficking across people. In the below model, a focal communicant can be a person (e.g., a roommate) or a mass medium (e.g., a local newspaper). In either case a person or a mass medium, plays a role of information provide, acquirer, and selector as a communicant to other communicants. Thus, without distinguishing between medium and person, we can conceptually describe information interflow with a single frame. The following figure describes information trafficking among the interconnected communicants.

Figure 33: Meso-level intercommunication process among communicants.



This model illustrates the active communicant's role in transmitting information about some problem he or she is actively working on. In the model of communicant activeness in problem solving, active communicants—*focal communicants*—are seeking information from other referents. Focal communicants, as a way of problem solving (e.g., effectuating), forward information (e.g., about problems and/or solutions) to other communicants who are most likely within their routine relationship network. Such active forwarding would, to some extent, have effects on information processors'—*peripheral communicants*—perception regarding the problem. If peripheral communicants find some personal connection to the forwarded problem, then they would become active communicants. However, it is possible that peripheral communicants would not perceive enough of a connection to elevate one's problem perception and communicant activeness. They might toss information, reactively, to other communicants only when they have an opportunity (e.g., “FYI”). Importantly, this meso-level model takes information trafficking as a *joint function* of information transmission efforts as well as information acquisition efforts among interconnected communicants, not attributing it to the sole function of one party. Thus, it models the *intercommunication process*, not communication itself.

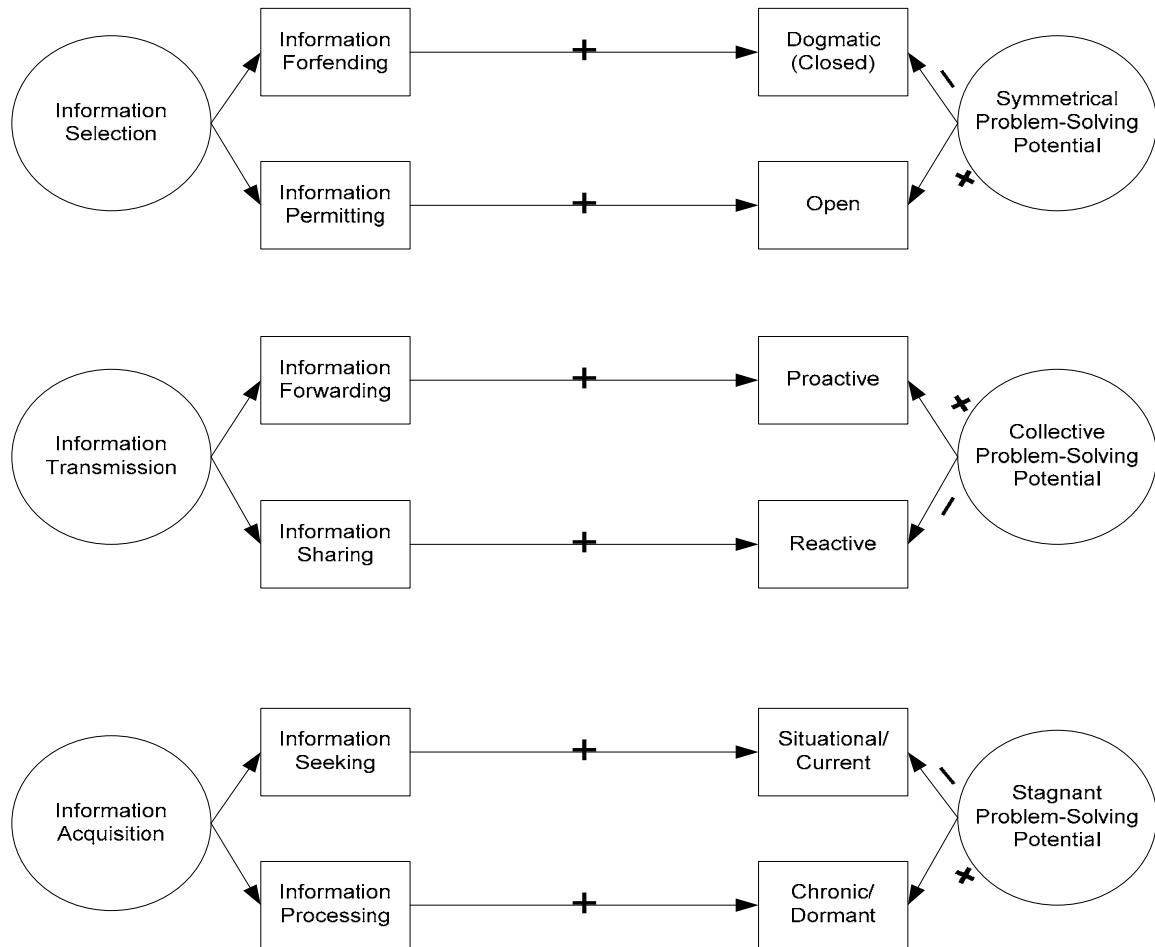
CAPS provides conceptual nuts and bolts to describe how some problems and solutions are exchanged across the social pipelines. It will reserve a fresh look for communication phenomena, such as opinion leadership, agenda setting, and diffusion of innovation.

CAPS and Problem-Solving Potential

CAPS and its subconstructs provide a way to explain how active publics behave

in some social conflicts and to estimate the extent to which a conflict would bear resolution potential. In the conceptual diagram in Figure 34, I summarize how the six subdimensions in CAPS model can predict the three key problem solving potentials.

Figure 34: Communication behaviors and problem-solving potential in controversial social issues.



Predicting symmetrical resolution potential: Open versus closed problem solver. Not all personal problems evolve into social problems. Yet, many individual problems have some potential to evolve into social problems if many people are affected by a same problem source. For example, a construction plan by a company in a quiet neighborhood would become an issue resulting in a collective problem-solving effort if neighbors

organize to challenge the company. Problems that attract multiple stakeholders often result in conflict. Often, one party's proposal for problem resolution is less attractive to another. Because problem solvers apply their own evaluative lens—i.e., becoming selective—evolved from their independent inquiring phases, another party's solution is often distasteful. Problem solvers in a conflict situation are tempted to refute the other party's proposal.

Because problem solvers abide by their own decisional rules, knowing how much individual problem holders have a tendency for information selection (forefending) can be a good predictor for symmetrical problem-solving potential. In other words, a problem solver's openness to reviewing information from competing perspectives, even if distasteful, can be a litmus test for diagnosing the potential for a symmetrical resolution of a social problem. Thus, here I refer to an *open problem solver* as a person who is willing to use *any* information to increase problem-solving potential. I refer to a *closed problem solver* as a person who discriminates against distasteful information incompatible with his or her frame of reference. They want to increase problem-solving potential by subscribing to *a certain* type of information.

Collective action potential: Individual versus collective problem solver. As mentioned, information transmission is a critical part of problem solving (i.e., effectuating a solution). By giving information about a problem, those isolated individual problem solvers evolve into a social collectivity (i.e., collective effectuating). Sharing a similar perception about a problem, its cause, and some negative consequences helps individual problem solvers increase their problem-solving potential (e.g., easier to mobilize resources to the problem). In the inquiring stage, a communicant cannot get any

potentially useful information without communicating about his or her problematic state: i.e., problem forwarding. A communicant should talk about his or her problem. Also, by provoking other communicants to recognize a problematic state, individual problem solvers can enhance the pool of potentially useful information, can divide the costs for problem solving, and can increase their bargaining power in demanding resources from a relevant party. Information forwarding and permitting is at the heart of the locating and networking with other individual problem solvers.

Giving information about a problematic situation is thus a necessary condition for a problem to produce a group of collective problem solvers (e.g., an activist group). Thus, knowing who is likely to emit information about a problem and a solution to other communicants explains what kind of problem would have potential for collective action. I refer to an *individual problem solver* as a person who is working on a problem in an independent and isolated way without knowing other problem solvers. A *collective problem solver* is a person who tries to solve the problem through coordinated efforts with others. The key difference between individual and collective problem solvers is whether one has a cross-awareness between problem solvers. In other words, individual problem solvers recognize a problem but may not recognize the presence of other problem solvers. In contrast, collective problem solvers not only recognize a problem but also recognize comrade problem solvers. The only way that individuals communize a similar sense of problem perception is through forwarding and sharing information about the problem with one's neighboring communicants.

Stagnancy potential: Situational versus dormant/chronic problem solver. Some problems are more enduring than others for various reasons. Problem solvers may suffer

from absence of a solution (e.g., curing cancer). Or solutions may be obvious, yet problem solvers suffer from a lack of resources to enact a solution; or they have difficulties mobilizing the attention of those who have necessary resources (e.g., obtaining budget for a community educational facility from government). If a problematic situation continues, problem solvers become *chronic* problem solvers unless they leave the situation psychologically (i.e., fight-or-flight syndrome). To highlight such a distinction in terms of problem duration, I distinguish a *situational problem solver* from a *chronic problem solver* and a *dormant problem solver*.

A *situational problem solver* refers to a problem solver whose problem is solvable within a short amount of time. For example, a person with the flu would try to find a cure effortfully. Yet, the resolution of the problematic state would end simply as time passes. In contrast, a *chronic problem solver* refers to a problem solver who has procrastinated because of the absence of a concluding solution or for inability to mobilize resources. For instance, many diabetes patients are chronically active trying to learn and manage their disease throughout their lifetime. In contrast, a *dormant problem solver* is a person who has found a problem in the past and now pauses his or her problem-solving effort. From their past problem-solving efforts, dormant problem solvers would possess some knowledge. However, they are busy in solving other more important problems; hence, they *temporarily* leave the problematic state until a new problematic state arises from it.

Taking information as current as possible to solve a problem would decrease a “stagnant” state in problem solving. If competing parties are dormant or chronic in a social conflict, the members tend to be less active in information acquisition. Thus, with the knowledge of problem solver’s information acquisition tendency, we can predict how

likely a given social conflict would be stagnant in conflict resolution.

CAPS and Typology of Publics

The situational theory of publics classifies publics into categories such as *nonpublic*, *latent*, *aware*, and *active* publics predicted by the interaction of three independent variables, problem recognition, constraint recognition, and level of involvement—i.e., $2 \times 2 \times 2 = 8$ (J. Grunig & Hunt, 1984). However, the STP conceptualizes communication behavior only by the information taking dimension (i.e., information seeking and processing). Active and passive communication behaviors explain only when people, as information consumers, are more or less likely to take information. Hence, the active, aware, latent, and nonpublic categories are useful in understanding how a public is likely to consume information, but not useful in explaining how a public is likely to interpret, produce, and transmit information to other publics and how selective they would be.

The CAPS model offers a more comprehensive framework that develops a new typology of publics using its general conception of communicant behavior. Using and combining six subdimensions under information selection, transmission, and acquisition generates eight different publics. I distinguish eight different types of publics derived from three key characteristics in problem solving behavior. These are *open-dormant passive public*, *closed-dormant passive public*, *open-situational active public*, *closed-situational active public*, *open-situational activist public*, *closed-situational activist public*, *open-chronic activist public*, and *closed-chronic activist public* (see Table 29).

Table 29

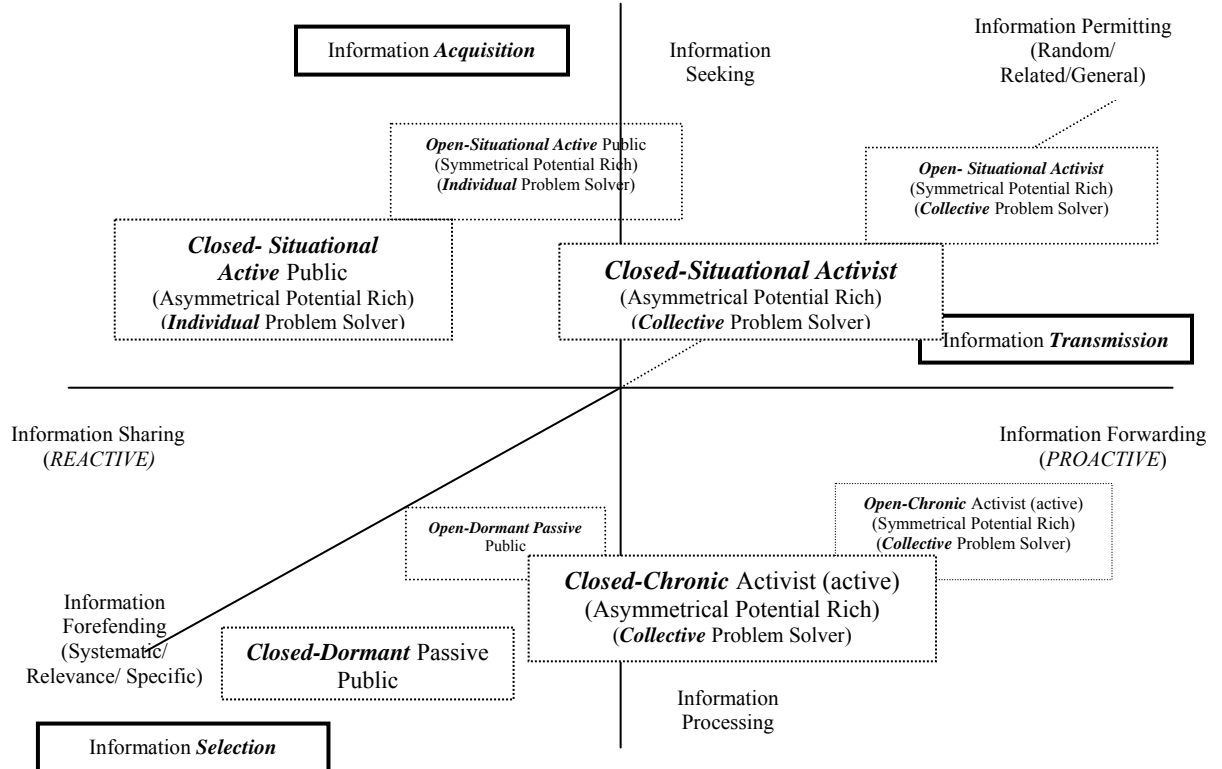
Dimensions of Communicant Activeness and Types of Publics

		Information Transmission			
		Forwarding		Sharing	
		Information Acquisition		Information Acquisition	
		Seeking	Processing	Seeking	Processing
Information Selection	Forefending	<i>Closed-Situational Activist Public</i> <i>(Collective Problem Solver)</i> <i>(Asymmetrical Potential Rich)</i>	<i>Closed-Chronic Activist Public</i> <i>(Collective Problem Solver)</i> <i>(Asymmetrical Potential Rich)</i>	<i>Closed-Situational Active Public</i> <i>(Individual Problem Solver)</i> <i>(Asymmetrical Potential Rich)</i>	<i>Closed-Dormant Passive Public</i> <i>(Individual Problem Solver)</i> <i>(Asymmetrical Potential Rich)</i>
	Permitting	<i>Open-Situational Activist Public</i> <i>(Collective Problem Solver)</i> <i>(Symmetrical Potential Rich)</i>	<i>Open-Chronic Activist Public</i> <i>(Collective Problem Solver)</i> <i>(Symmetrical Potential Rich)</i>	<i>Open-Situational Active Public</i> <i>(Individual Problem Solver)</i> <i>(Symmetrical Potential Rich)</i>	<i>Open-Dormant Passive Public</i> <i>(Individual Problem Solver)</i> <i>(Symmetrical Potential Rich)</i>

Dewey (1927) provided a classic definition of a public that avoids the common confusion in lay use of the term *public* (e.g., a general public). In Dewey's theory, a *public* is a group of people who 1) *face a similar problem*, 2) *recognize that the problem exists*, and 3) *organize to do something about the problem*. Following Dewey, J. Grunig and Hunt (1984) distinguished four types of publics. They labeled a group of people who face a similar problem but do not detect the problem a *latent public*. When group members subsequently recognize the problem, they become an *aware public*. If the public organizes to discuss and do something about the problem, they become an *active public*. Finally, as a logical extension, those groups of people do not meet any condition of Dewey's notion of publics are called *nonpublics*. J. Grunig and Hunt (1984) differentiated these four types of publics by "the extent to which they participate in active behavior to do something about" a problem (p. 145). Thus, their typology of publics is consistent and compatible with the present model of communicant activeness in a problematic situation. Specifically, nonpublic, latent, aware, and active publics differ in their extent of problem solving efforts—i.e., communicant activeness. As a problem solver becomes more serious in tackling a recognized problem, he or she will be more active in information acquisition, transmission, and selection.

In Figure 35, I offer a three dimensional model to illustrate such conceptual correspondence between types of publics and three communicant activeness dimensions.

Figure 35: Three dimensions of communicant activeness and eight types of publics.



From the CAPS conception, a public is a problem solver who uses communication behavior as a coping mechanism to inquire and effectuate a chosen solution. A public may be individually or collectively working toward problem resolution. A public as a problem solver may have an enduring or a transient problem, may approach problem resolution individually or collectively, and may take an open or closed approach in using information during problem solving process. I emphasize, following J. Grunig (1968, 1989, 1997, 2003, 2005), the importance of viewing a public as having situational properties in terms of communicative activeness to end a problematic situation.

As is easily observable, different problems produce different types of publics. Across problems, publics' compositions differ as well. Hence, if public relations practitioners can anticipate which types of publics (e.g., closed-situational activist) emerge with what types of behavioral characteristics (e.g., collective problem solver),

they will make a more strategic choice in dealing with publics (e.g., negotiation or information campaign).

CAPS and Criticisms of the Situational Theory of Publics

Criticism about failure to explain the communicative nature of publics. Vasquez and Taylor (2001) said that the STP is limited because it heavily hinges on a “socio-/psycho-centric view of a public,” a “tautological conceptualization of individual and public,” and a “view of communication that is outdated or out of touch with actual observations” (p. 150). Above all, they said that the STP failed to explain “the contemporary communicative nature of a public” (p. 150). They asserted:

The situational perspective identifies communication as central to the emergence of a public but uses social-psychological variables to investigate a public. *Only after the characteristics and composition of a public have been identified does communication become important as an outcome effect. Yet, the underlying “logic” of the situational perspective is grounded in the assumption of communication—public discussion, debate, and argument. The difference in conceptualization and operationalization is a source of tension for the situational perspective* that has the effect of orienting the researcher to a socio-/psycho-centric view of a public. [italics added] (Vasquez & Taylor, 2001, p. 150)

CAPS grants STP a conceptual coherence that resolves this “source of tension” by its extended and general conception of communication behavior. Specifically, CAPS defends STP against the criticisms that it uses “social-psychological variables” and treats “communication...as an outcome effect” (Vasquez & Taylor, 2001, p. 150). Opposite to the criticism, STP’s use of “social-psychological” variables and viewing communication as a dependent variable to study publics is not a problem, but a strength of the theory. The conception of *communication as an outcome* of problem perception is indeed the core virtue that the STP uniquely has brought into the field of communication. Prior to STP and another audience-centered model such as uses and gratifications theory (Blumer

& Katz, 1974), communicants were only described as pathologically helpless targets of message sender's persuasive intent. They were fed or merely declined messages given by senders. As an assumption, communication was almost always an unquestioned causal variable that a sender does to receivers, not an outcome variable that reflects a message taker's needs and purposes across their life situations.

In this vein, STP considers communication to be as “outcome effect” corresponding to a communicant's own problem perception in a given situation. A public's problem perception is imperative for understanding when publics do or do not engage in problem-solving actions (e.g., debate against people with a competing perspective about a social issue). Knowing the degree of problem perception is, in turn, essential to understand *when* publics arise and evolve to do something about the problem. We can *never* understand how and why people become communicatively active without using “social-psychological” variables such as the degree of problem recognition and the perceived degree of involvement. For problem solvers (i.e., publics), information is not simply given but actively sought, forwarded, and selected purposefully. Few prior communication theories, if any, could dare to theorize in that way. Thus, attacking the STP's conception as problematic because it treats communication as an outcome is missing the point (*ignoratio elenchi*).²⁴

CAPS provides a framework for researchers to discuss the “nature, role, and influence of communication” by understanding how “problematic situations are created, raised, and sustained through the symbolic convergence (configuring and reconfiguring) of messages” (Vasquez & Taylor, 2001, p. 150). The information transmission variables

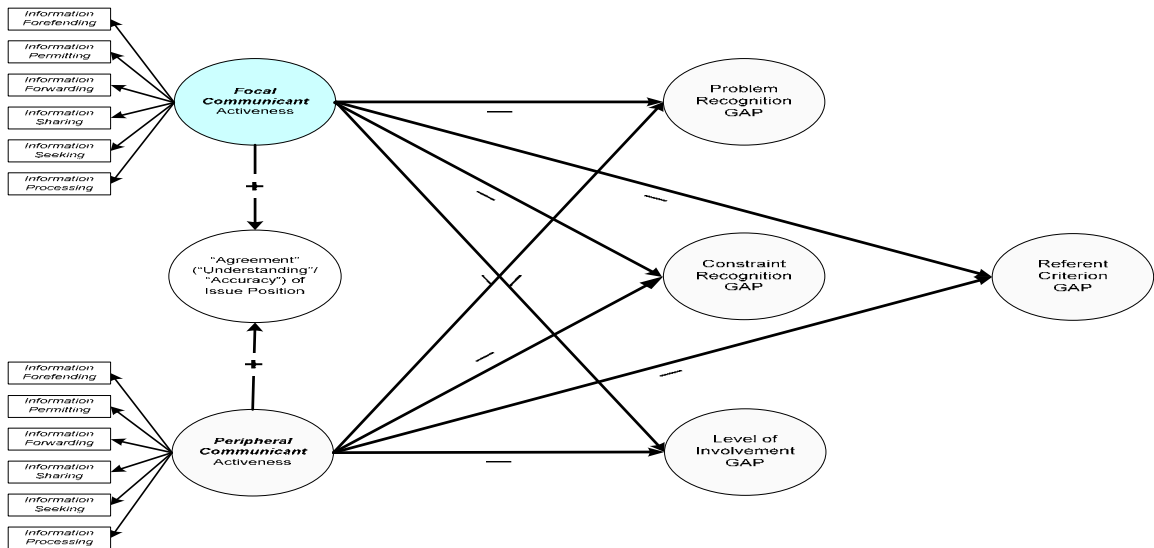
²⁴ This term refers to *a missing the point* “the arguer is ignorant of the logical implications of his or her own premises and, as a result, draws a conclusion that misses the point entirely” (Hurley, 1997, p. 131).

in CAPS provide conceptual links that enhance the STP's contribution to balancing a sender-biased conception and upsetting the traditional communication assumption. Through the concepts of information forwarding and information sharing, CAPS allows researchers to set communication behavior as independent variables as well. That is, active communicants who are publics tend to forward information about a problematic state as well as their own solution proposals to other communicants. Forwarding or sharing information about their problem is a means to effectuate their preferred solution. Thus, by setting up communication as an independent variable, we can understand how active publics increase problem perception among others by providing them with information. Then, we can illustrate a process through which a communicant, a member of public, begins to perceive a problem and a social collectivity arises in the social mesh of communicants to deal with their common problems. Hallahan (2001) lamented that "issue process" and "issue dynamics" received "too little attention" in public relations research (p. 49). He (2001) thus posited a question, "what role does communication play in creating problem recognition, involvement, and constraint recognition?," and requested a conceptual effort to put communication as "independent variable" (p. 49).

I believe the new model of CAPS answers Hallahan's call for new research. Although in the present study I did not test it, the following model can be tested to see the reversal effect from communication behavior as a cause to the other communicants' perceptions in a problematic situation. In the following model, I predict the effect of communication as an independent variable will reduce perceptual gaps among interacting communicants. Thus, as focal and peripheral communicant activeness increases, the perceptual gaps between two interacting communicants will decrease about the problem

and the “accuracy,” “understanding,” and “agreement” (two concepts in the Coorientation model, McLeod & Chaffee, 1972) about the problem will increase.

Figure 36: Effects of communicant activeness to perceptual and communicative behavioral coorientation among problem solvers.



Importantly, CAPS advocates the conception of “collective consciousness” in STP as a viable explanation of how an isolated individual member of a public transforms into a cohesive collective public in some problems. The communicant interaction captured in CAPS explains how individual problem holders begin to realize commonality among themselves. Then, it explains how the individual problem solvers are transformed into collective problem solvers.

Information forwarding by activist communicants, which is parallel to information seeking by active communicants, increases the chance of meta-perception or *cross meta-perception about problem perception* among individual problem solvers (e.g., individual problem solvers are aware that other individual problem holders are aware that I am making an effort to solve this problem.). This is the process and the point at which isolated publics turn into a social collectivity or a system to coordinate their behavior

toward problem resolution. Thus, CAPS rebuts the criticism of “the tautological conceptualization of individual and public” by explaining how a collective consciousness arises. By CAPS, we can conceptually differentiate publics as *individual problem solvers* (e.g., open/chronic active publics) and *collective problem solvers* (e.g., open/chronic activist publics). Further, the conceptual dimensions of CAPS, such as information selection, transmission, and acquisition, explain not only the detailed evolving process from individual to collective problem solving, but also the extent to which a problem has the potential for a collective problem solving.

Vasquez and Taylor (2001) attacked the situational theory of publics as “outdated and lacking in correspondence validity...whether or not concepts and relations specified can be seen in the observations of everyday life” (p. 150). They said that STP “marginalized the role of communication process and dynamics” because of its “socio/psycho-centric conceptualization of a public” (Vasquez & Taylor, 2001, pp. 149-150). Although most attacks against the situational perspective have come as *straw man* arguments (e.g., the “tautology” claim of public concept against the STP), their calling for emphasizing “communication process and dynamics” seems to be a constructive criticism for advancing our understanding of publics.

By extending the conceptual scope of communicant behavior beyond information acquisition, as CAPS does, I believe the situational theory of publics better explains the “communication process and dynamics” inherent in the emergence of publics and social issues. Just as they claim for their favored position, the homo narrans perspective, the situational theory of publics with CAPS is better capable to explain the process that, “Symbolic reality and individual knowledge of a problematic situation are created, raised,

and sustained through the symbolic convergence (configuring and reconfiguring) of messages” (Vasquez & Taylor, 2001, p. 150). Vasquez and Taylor (2001) requested a refinement such that: “One could question whether or not the STP information-processing and information-seeking behaviors are appropriate variables of concern for explicating the communicative nature of a public. A single coherent approach is needed” (p. 150). CAPS would be a single coherent approach to respond to their request for further refinement of the situational theory and even for their “rhetocentric” homo narrans perspective (Vasquez & Taylor, 2001).

CAPS and Active Publics without Information Seeking

The situational theory of publics predicts active publics will seek information about a problem. However, P. K. Hamilton (1992) posed one intriguing question regarding the predictive power of the situational theory of publics. He found that some active publics who are high in problem recognition and involvement perception with low constraint recognition are not actively seeking information about the problem. P. K. P. K. Hamilton (1992) explained:

... individuals who have made up their mind regarding the election, and can sufficiently avoid negative communications, will indeed reduce their level of information seeking. Indeed this specific case will find a respondent who continues to be highly involved and low in constraint but has in essence decided how to solve the problem he or she recognized. The question is *would situational theory continue to count this individual as being high in communication activity?* If so, then the reduced level of information seeking, because there is no longer any uncertainty, will be contrary to situational theory’s prediction. [italics added] (p. 144)

CAPS provides a conceptually coherent answer to P. K. Hamilton’s question. With its general conception of communicant activeness other than information acquisition (e.g., information seeking), CAPS predicts a special active public that would be low in

information seeking or processing, will be *high in information transmission* (i.e., information forwarding) and *high in information selectivity* (i.e., information forefending). Conceptually, such an active public is, CAPS predicts, in the effectuating phase who is “active” in translating their favored solution (e.g., actively promote their preferred candidate to other voters), while having little need for more information. In other words, the “anomaly” public is active in information transmission and selectiveness after it passed the inquiring phase. Thus, P. K. Hamilton’s paradox of active publics is not a paradox from the CAPS point of view.

CAPS and Campaigns

Often we observe that apparently well thought-out mass-mediated campaigns are not successful. The model of communicant activeness, CAPS, illustrates this in two ways. *Active communicants* are likely to be selective in their informational activities. Thus, campaigners who are selective in their information forwarding would be frustrated by the active information seeker’s information forefending. In contrast, those *less active communicants* are less selective (i.e., permissive) and thus would be less resistant to the attempts of an information forwarder’s selectivity. However, their permissiveness makes it difficult to catch and hold their attention. They are processing information, not seeking. Further, even if they pay attention, they are not likely to withhold information as information forwarders intend. They neither refute the informational contents nor withhold it. They are nonchalant and transient.

At the same time, the new model of communicant activeness can enhance campaign effectiveness. Some communication theories encourage campaigners to segment their audience. Taking an example, the situational theory of publics predicts who

are likely to seek information with its three independent variables, problem recognition, constraint recognition, and level of involvement (J. Grunig, 1989, 1997). This theory suggests that public communicators should not attempt to communicate with those passive publics (who are engaged in information processing) and whose communication behaviors are almost *random*. Instead, the situational theory recommends segmenting the active communicants who are likely to seek, keep, and use the information. Thus, campaigners can increase the communication effectiveness and decrease the communication costs.

In addition to information seeking and processing, the four additional variables in CAPS (i.e., information forefending, information permitting, information forwarding, and information sharing) allow information campaigners to predict, first, *when* a communicant would refute or receive information from the campaigner and, second, *when* a communicant would voluntarily disperse information that he or she learns to other communicants (c.f. word-of-mouth campaign). With CAPS, public communicators can predict better when their information campaign would be more successful and less costly by allowing a more comprehensive audience segmentation.

CAPS and Opinion Leadership

Opinion leadership has been defined as the act of being sought out for information and advice on a topic (Troidahl & Van Dam, 1965). CAPS explains the opinion leader concept in a fresh way. Despite its conceptual appeal, opinion leadership concept hinges more on a *reactive* notion of leadership. In literature, the opinion leaders are individuals who are “being sought out” for their knowledge by others. The CAPS framework considers such “reactive leadership” as passive communicant behavior by the variable

information sharing. I suggest expanding the opinion leadership concept to “proactive leadership.” Opinion leaders (active communicants) at times offer information even without a request. They may voluntarily disperse opinions, issues, and solutions to neighboring communicants. CAPS extends reactive opinion leadership to a proactive role with its generalized notion of communicant activeness. It explains how opinion leadership might differ across problems. For example, proactive opinion leaders are likely to seek information, forefend information, and forward information. Reactive opinion leaders are more likely to permit, process, and share information. We can conceptually distinguish varying degrees of opinion leadership using the information selection, transmission, and acquisition dimensions in a more comprehensive way than information acquisition alone.

In addition, CAPS extends opinion leadership beyond a non-varying personal trait. The opinion leadership literature treats opinion leadership as an enduring personal characteristic. Yet, we encounter many situations in which an unlikely individual plays the role of opinion leader (e.g., uneducated, less prone to think). Because CAPS adopts a notion of “situational” activeness, any individual can be an active opinion leader in some problem he or she is seriously trying to solve. Indeed, almost everyone is an active problem solver at some times for some issues. It is not surprising, therefore, that some unlikely people transmit or are sought for information by other communicants even when they deviate from a typical opinion leader profile (e.g., old, experienced, and/or highly educated). CAPS lifts the conceptual bar for lay people to become opinion leaders at some situation by relieving rigid assumption of enduring personal traits in opinion leadership. Any problem solver can be an opinion leader when he or she develops enough

confidence and competence through solving a problem. Extraordinary problem situations make even laypeople situational opinion leaders who forward/share their solutions with other communicants. CAPS conceptually welcomes and resolves such an anomaly in previous opinion leadership studies.

CAPS and Diffusion of Innovation

The theory of the diffusion of innovations uses two simple variables, *time* and *number of adopters*. In brief, the increased “number of adopters” of new ideas or things is a function of *time* (Rogers, 1995). Despite the theory’s parsimony, it is interesting to conceptually partial out the variance of the independent variable of “time.” From a theory building perspective, time is neither interesting nor useful because time engulfs many possible causes. Hence, conceptually partialing out the variance in “time” advances diffusion theory. CAPS can segment significant variance from the independent variable, “time.” Specifically, CAPS explains the key dependent variables in the diffusion theory such as the adoption rate, the number of adopters, or the shape of adoption curve of some innovation (e.g., Chaffee’s, 1977, three curves of diffusion). These can be determined by *the number of information seekers and processors and information forwarders and sharers* regarding a given innovation/things. Also, because CAPS postulates that active communicants not only *learn* something new but also *educate* others about it, the changing rate of communicants from information seeker to information forwarder of an innovation can explain a portion of the variance contained in time.

CAPS and Agenda Setting Theory

Agenda setting theory has become one of the most influential mass communication theories (McComb & Shaw, 1972). It cleverly solved the puzzle of

empirical failure to find a strong mass communication effect on attitudes and behavior. By shifting its focus from “what to think” (i.e., “attitude change”) to “what to think *about*” (i.e., audience’s “learning” public issues and their priorities), McComb and Shaw (1972) found a strong mass media effect on audience thinking (McQuail & Windahl, 1993). In essence, the agenda setting hypothesis postulates that the mass media influence public opinion by “paying attention to some issues and neglecting others” (McQuail & Windahl, 1993, p. 104).

Using the definition of communicant activeness in CAPS, active communicants are those who seek, forward, and forefend about some problem. When speculating on the role of media and actors in mass media institutions (i.e., reporters and editors), we can consider the mass communication actors (c.f., gatekeepers) to be “active communicants” or at least *quasi*-active communicants who seek, forward, and forefend information about social problems. If we extend the conception of individuality or personality to the organizational persona of a mass medium, we can connect the CAPS framework to the agenda-setting hypothesis. Active media communicants are selective in sampling social problems/issues and prioritizing them by applying their own decision rules. For example, active media communicants (a reporter or editor who subjectively defines social issues) whose “problem” is to fulfill a social watchdog responsibility select information routinely. Their communicant activeness may be triggered not by a personal problem but by a quasi-problem perception (e.g., “although I am not personally interested in it, the side effects of this new medical pill seem to be a serious problem to my readers”) (J. Grunig, 1983). They think some issues are more worthwhile to seek and forward to other communicants (audiences) while others are not: i.e., information forefending.

With the CAPS framework, those “institutional elites” (e.g., members of the dominant coalition or public relations managers) or activist groups who are the “information sources” for the media are also active or activist communicants. These institutional elites or organizational rebels actively promote their problem as a critical issue for society and demand public attention. Just as media reporters are active communicants in that they tend to forefind, seek, and forward information in dealing with information to readers, these organizational elites or rebels actively seek and forward information selectively to media and audiences. Although the routes or sources of problem recognition would be different, the resulting communicant actions of media reporters, active organizational communicators, activist publics, and active audiences are functionally identical. CAPS conceptualizes media reporters as active communicants who perceive a set of possible problems (agendas), who place problem priorities on that list (agenda setting), and who inquire and effectuate their problems for their problem (social watchdog) solving.

CAPS and Coorientation: From Competitors to Cooperators

Many social problems lead to social schisms because of a lack of “coorientation” among problem solvers (e.g., different “orientation” between pro-choice activists and pro-life activists). Achieving a cooriented state between problem solvers with different definitions of the problem and its solutions is therefore a necessary condition for problem resolution. Then, how can communication moderate a coorienting effort between competitors?

In a conflict, the potential for resolution depends on the extent of cognitive overlap between the competing parties. The extents to which conflicting parties subscribe

to similar sets of information and to the extent to which they have similar interpretations of information, that is, “coorientation,” will be keys to predicting a likelihood of collaboration and conflict resolution. By seeking, consuming, and generating a certain subset of information that fits with their desired end state (information forefending), people construct their own situational reality regarding the problem they face. In terms of the coorientation model (McLeod & Chaffee, 1973), rampant social schisms on many issues result from a lack of coorientation. CAPS explains the lack of coorientation (e.g., lacking understanding and/or agreement) as originating from an unabated information forefending tendency among active communicants around problems.

For example, the U. S. military and government prohibited publicity about dead U. S. soldiers from the war in Iraq (since March 2003). Active communicants become selective in information giving. The U. S. authorities in charge of the war were active communicants themselves who wanted to define, interpret, and construct the problem and solution in a way consistent with their interest and beliefs. They were forefending, seeking, and forwarding information to illustrate and define reality as their strong beliefs lead (referent criteria). They referred to the things, events, and segments of reality in a way consistent with their constructed solution (referent criterion). They concluded that the war was worthy to liberate suppressed Iraq civilians. On the opposite side, some anti-war activist groups selectively looked for how many U. S. soldiers and civilians died from the war (information seeking and forwarding with strong forefending). An activist group’s strong belief of ‘stop the war’ (referent criterion) leads them to selective information seeking and forwarding.

People reduce their conflict resolution potential because of the dissimilar sense of

reality, which is caused and reinforced by their subscription to filtered information. The degree of information forefending and permitting, therefore, becomes a critical indicator to diagnose resolution potential in many social problems held between competing parties. When problem holders are high in information forefending with different definitions of problems and solutions proposed, they tend to construct and become entrenched within a certain aspect of *reality*—constructing a sense of reality by sampling only *some portion* of information—over the other alternatives. Not surprisingly, the potential of reaching an integrative solution decreases.

Often, such an issue devolves to a chronic social problem. This, in turn, creates chronic rebellions against each other. Correspondingly, active or activist publics become habitual in their communicative efforts. They experience a chronic problematic situation and become chronically active publics. In many cases, such chronic problems breed closed mindsets in reviewing available information (e.g., a solution proposal from others). Having competing entities (e.g., activist groups) routinizes strong information forefending in their communicative actions. Then, a chain reaction, seeking and forwarding the forefended information to others, sets in motion. Each faction of collective problem solvers mirror what the other did previously thereafter.

Implication of CEPS

Cognitive entrepreneurship in problem solving consists of four underlying subfactors: cognitive retrogression, multilateralism, commitment, and suspension. Among four dimensions, I paid special attention to cognitive retrogression with its novelty and potential utility to other research. Cognitive retrogression is the primary concept that I used to distinguish two groups in problem solving. I introduced a model of

cognitive alpha and omega strategies (CAOS) in terms of their *reasoning direction*: i.e., “evidence→conclusion” for forward reasoning and “conclusion→evidence” for backward reasoning. I referred to those forward reasoning problem solvers as the *cognitive alpha* group, and the backward reasoning group as the *cognitive omega* group. The CAOS model helps us explain some important phenomena and theories. In the following section, I will review the implications of CEPS and CAOS.

CAOS and Dissonance Theory

CAOS explains typical cases of what dissonance theory explains. When a person faces dissonance (“perceived discrepancy” in terms of the situational theory of problem solving) with the joint conditions of other situational antecedent variables (e.g., high in problem recognition, level of involvement, constraint recognition, and referent criterion), the person would use a “backward cognitive strategy” (i.e., cognitive omega approach) about the dissonance state. She or he may effortfully justify his or her choice by selectively seeking or avoiding some information that can fortify his or her readymade decision. The cognitive omega approach is a fair reflection of the dissonance phenomenon.

However, CAOS does not exclusively associate with activeness and backward reasoning. It is possible that problem solvers would dare to seek “dissonant” information. At times, we observe that problem solvers do not fear or shy away from dissonance arousing information or situations (Chaffee, Saphir, Graf, Sandvig, & Hahn, 2001; Carter, Pyszka, & Guerrero, 1969). Such an instance is a cognitive alpha strategy whereby the problem solver pursues problem solving with a more entrepreneurial mindset. In this vein,

CEPS offers a more general conceptual frame beyond the point at which dissonance theory loses its explanatory power.

CAOS and Information Selectivity

Cognitive alpha and omega strategies explain why selectivity arises—one's inclusion and exclusion of information to devise a set of solution alternatives. In the cognitive alpha strategy, one's communicative efforts are more likely to be used to *revise* and *reform* the prior maladaptive solution, rather than to reinforce an old solution. Thus, people with high cognitive entrepreneurship in problem solving are more likely to *be selective* in the sense that she or he adopts an "except this" approach—i.e., excluding an old ill-suited solution. Besides, as one's information acquisition becomes comprehensive, certain guiding principles emerge with subjective confidence in evaluative tasks. This makes communicants more selective. Such selectivity takes the form of "preference" rather than "avoidance" as in the cognitive omega approach.

In contrast, in the cognitive omega strategy, which is a default human cognitive strategy in problem solving, one's communicative efforts are more likely to be used to *reinforce* and *reconfirm* a preferred solution. But, it tends to make one more maladaptive to the problematic situation. Again, people with low cognitive entrepreneurship in problem solving are also likely to *be selective* in a different sense from the cognitive alpha approach. Now, problem solvers adopt an "only those" approach—i.e., including information that reconfirms a preferred outcome state and increase confidence in the preference. Such selectivity takes the form of "avoidance" as in the dissonance theory account.

In the present study, I found that the cognitive omega group had stronger selectivity (i.e., more information forefending and less information permitting), whereas the cognitive alpha group showed relatively low selectivity (i.e., less information forefending and more information permitting). Such a finding helps us understand how information selectivity arises and how it specifically differs in six subdimensions of CAPS. With this understanding, we can introduce a normative knowledge about a better problem-solving practice.

CAOS and Theories of Behavioral Intention

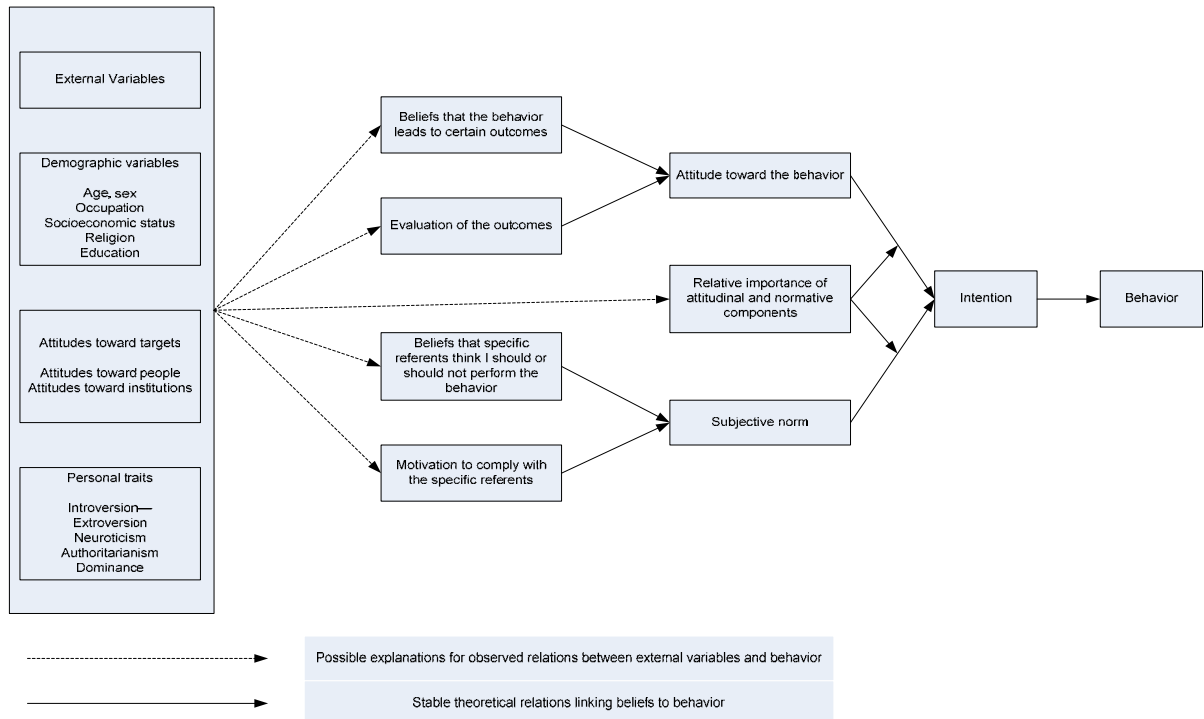
Social psychologists have proposed several theories to explain why and how one's attitude affects behavior. They have been puzzled by the so-called attitude-behavior inconsistency problem (e.g., the weak empirical evidence of attitude as a cause of a behavior). Such efforts resulted in the theory of reasoned action (the TRA) (Fishbein & Ajzen, 1975). In tackling the puzzle of strong attitudes but low behavioral interpretation, Fishbein (1967) devised a clever conceptual bridge, namely *behavioral intention*. Fishbein (1967) reasoned that the proximal cause of a behavior is one's intention. Intention is antecedent to an action. The intention is, in turn, determined by one's *attitude* toward the behavior and *subjective norms* (e.g., compliance to a specific norm of reference regarding the behavior). Attitudinal influence on a behavior is mediated by behavioral intention, which is a preliminary decision to act in a certain way. Eagley and Chaiken (1993) praised Fishbein's approach to the attitude-behavior inconsistency such that:

The scientific and philosophical issue of how the mental event of holding an attitude is transformed into observable action was thus resolved by interposing another psychological event, the formation of an intention, between the attitude and the behavior. Intention, a psychological construct distinct from attitude,

represents the person's motivation in the sense of his or her conscious plan to exert effort to carry out a behavior. (p. 168)

Figure 37 summarizes the conceptual process that Fishbein and Ajzen (1975) proposed to explain the linkages attitude to a behavior.

Figure 37: Conceptual model of the theory of reasoned action.

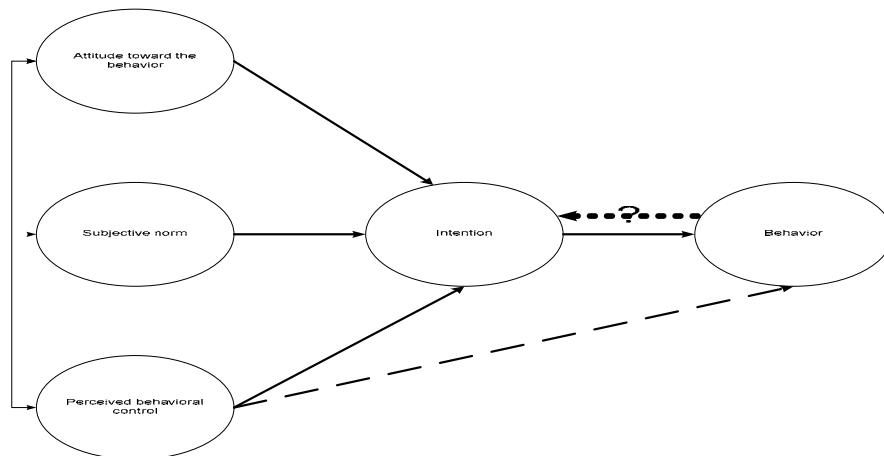


*This figure is adapted from Ajzen and Fishbein (1980, p. 84).

However, the TRA has a conceptual limitation that CAOS does not. In the CAOS conceptualization, our action or effectuating--the last step of problem solving--does not require our intention. For many problems, we take the cognitive omega strategy in which we skip much cognitive effort in order to solve the problem quickly. Thus, we may not need intention to behave. Indeed, Ajzen, Timko, and White (1982) found this deficiency to be a severe limitation of the theory of reasoned action. They criticized the theory because it was founded on the assumption that behavior is always volitional. And with

that assumption, the TRA only explains behaviors that are consciously thought out beforehand. To fix the problem, Ajzen proposed a theory of planned behavior (the TPB, Ajzen, 1985) to explain non-volitional behaviors in the TRA (see Figure 34 for a summary of the TPB).

Figure 38: Conceptual model of the theory of planned behavior.



*This figure is adapted from Ajzen (1991, p. 182).

Ajzen (1985) reformulated the theory of reasoned action to explain the cases in which behaviors can occur without a person's volitional control (i.e., intention). He introduced a new variable of “perceived behavioral control”—self-perception of how easy or difficult it is to perform the behavior. Perceived behavioral control is analogous to “self-efficacy,” which refers to the “conviction that one can successfully execute (a given) behavior” (Bandura, 1977, p. 193). Thus, when one has a sufficient level of perceived confidence, she or he would not necessarily go through “intention” to execute an action (the dotted path from perceived behavioral control to intention in Figure 38). The inclusion of perceived behavioral control released the burden of the intention assumption (i.e., volition → action) for the reasoned action model. Especially, when we

explain well-rehearsed or trivial acts (e.g., easily executable actions or habitual behaviors), the intermediate conception of intention is of no use to explain behavior.

However, Pavitt (2003) pointed out the weakness of theories that use behavioral intention in general:

Other forces might prevent a person from behaving consistently with an intention, and some behavior is performed without any relevant intentions at all. Nonetheless, the mental state has the power to direct behavior in an attempt to achieve a person's goals.... *This is a good time to dismiss the argument that intentional explanations by their very nature cannot be causal because goals [intention] occur after the behavior requiring explanation.* Intentional explanations rely on present conceptions of goals to explain future behaviors. [italics added] (Pavitt, 2003, p. 8)

As Pavitt pointed out, we can easily identify situations in which people go from behavior to intention. Our choice of a behavior can precede our perceived intention when we do something in response to a strong urge and then look for justification: e.g., one might shoot another person and then reconstruct and subsequently elaborate one's intention as self-defense. At times, we cognitively regress to reconstruct our intention to increase our confidence, satisfaction, or "consonance" with our preceding behavior. Under such circumstances of reconstruction of intention, we need nonrecursive paths between behavior and intention.

In Figure 34, I drew a nonrecursive path from behavior to intention to illustrate the point. Although Ajzen (1985) conceived of cases in which intention is absent for a certain behavior, it is questionable whether the theory of planned behavior can explain the reversal of temporal order between intention and behavior. As mentioned, the cognitive alpha and omega model suggests that people in some instances can rationally and successfully choose a backward cognitive approach in which they reach a conclusion

(e.g., behavior) before they find evidence (e.g., reason/intention) to back up that conclusion.

With a serious problem, people hastily decide (behave) what to do and reconstruct reasons (behavioral intention) backwardly. The motivation to select the backward cognitive approach could be to *explain an action* to others (e.g., answering a doctor's question about a risky personal behavior) or to justify and reinforce an *a priori* choice or behavior. The reverse temporal order between intention and behavior highlights the conceptual limitations of some theories, such as the theory of reasoned action, that rely on the concept of intention to explain a behavior. CAOS reveals such a limitation in a few popular social psychological models using the concept of behavioral intention.

Cognitive Multilateralism and Hedging and Wedging

The studies on environmental issues, Stamm and J. Grunig (1977) and J. Grunig and Stamm (1979) found that people have situationally different cognitive strategies—"hedging" and "wedging." They found that environmental publics often hold two incompatible beliefs and frequently change their beliefs across situations. Hedging refers to when people hold two conflicting beliefs; wedging refers to when people hold one belief and reject other (J. Grunig & Hunt, 1984). J. Grunig (1997) used the hedging and wedging concepts in combination with the concept of "attitude" to explain when and how publics' attitudes differ from situation to situation. Hedging and wedging concepts are a useful alternative to illustrate how communication effects happen without the "valence" prediction of attitudes.

I created a new concept, cognitive multilateralism, which is implied in hedging and wedging. Cognitive multilateralism in problem solving refers to *cognitive breadth*

during a given problem solving task—i.e., the *number of alternatives* one generates and one's *tolerance of rival information* during the problem-solving process. I speculated that a more entrepreneurial mindset in problem solving will have more cognitive breadth. To expand a viable candidate solution for a given problem requires “tolerance.” Expansion of the candidate solutions inherently has a problem solver sustaining incompatible ideas and opinions. Thus, one's situational need and willingness to withhold incompatible ideas and competing perspectives can be a good yardstick of the extent of an entrepreneurial problem solving approach.

Cognitive multilateralism has much potential in applied communications. For instance, knowing voters' extent of cognitive multilateralism may associate with the style of political information processing and electoral decision making. A researcher could study how voters with different level of cognitive multilateralism and cognitive entrepreneurship would vary in forefending (permitting), seeking (processing), and forwarding (sharing) election-related information. It also explains how effective a political candidate and supporters might be in managing conflicting social issues. In addition, assuming that cognitive multilateralism can better prepare one in health problem solving, a public health intervention program would aim at rather modest but realistic objectives, such as incrementally changing a risky group's cognitive strategy (to have more cognitive multilateralism and cognitive entrepreneurship) rather than changing their problematic behaviors immediately. Considering the difficulties in changing audience *behaviors* as a communication objective in health campaigns, enhancing cognitive entrepreneurship (e.g. reducing retrogression, increasing multilateralism) as an intervention objective must be a better alternative for health communicators.

CEPS and Characteristics of An Excellent Organization

The IABC funded study, excellence in public relations and effective organizations (L. Grunig, J. Grunig, & Dozier, 2002; J. Grunig, 1992), found that a set of factors (e.g., roles and models of public relations preferred by CEO) affect the “excellence” and “effectiveness” of public relation and its hosting organizations. Treating cognitive entrepreneurship in problem solving as an enduring personal trait (e.g., the extent of cognitive retrogression), it is interesting to study how the problem-solving characteristics held by the CEO and members of the dominant coalition would affect public relations excellence (e.g., the likelihood of giving public relations access to the decision-making process), types and quality of relationships with key stakeholders and publics (e.g., the likelihood of holding a symmetrical worldview), and the effectiveness of the organization. The IABC study found that the values of CEOs and dominant coalition members were a critical factor for excellence in public relations and organization effectiveness. In this vein, it is worth investigating what kind of influence the extent of cognitive entrepreneurship among organizational elites would have on the communication excellence and the organizational effectiveness.

Implications of Situational Theory of Problem Solving (STOPS)

Researchers have tried to expand the situational theory by introducing new dependent variables such as “cognitive response” (Slater, Chipman, Auld, Keefe, & Kendall, 1992) and “message retention,” pro- or anti- “cognition,” “attitude,” and “behavior, (Major, 1993; J. Grunig, 1982). J. Grunig (1997) posited a need for “extension of the theory to new outcomes of communication” (e.g., “breadth and depth” of cognitive structures) as a promising new research direction. In this vein, I proposed two new

concepts of CAPS and CEPS and introduced them as dependent variables. In a nutshell, the new concepts are more general in describing the unique communicative and cognitive process that a problem solver takes during a problematic situation. I tested how well the situational antecedent variables account for the two new communicative and cognitive variables. Findings suggest that the situational theory of problem solving explains when, why, and how we communicate and how and why we take a differential cognitive approach in problem solving.

In the next section, I will discuss implications of the new situational theory to the theory and practice in the field of communication.

STOPS and Public Relations

The situational theory of publics, STOPS' precursor, has become a crucial component of a general theory of public relations (L. Grunig, J. Grunig, & Dozier, 2002; J. Grunig, 1992). It provides a conceptual ground for strategic management of public relations (J. Grunig & Repper, 1992) and the two-way models of public relations (L. Grunig, J. Grunig, & Dozier, 2002; J. Grunig & L. Grunig, 1992). In this vein, the situational theory should be considered as an essential theoretical foundation for the field of public relations. For that reason, I consider the influences and implications of this situational theory of problem solving to be the same as those of the situational theory of publics.

First, an immediate implication of STOPS relates to segmenting publics. Because of CAPS and CEPS, practitioners can classify publics in more useful ways. For example, using the new typology of publics that I derived from the CAPS dimensions, practitioners can identify eight types of publics: *open-dormant passive public*, *closed-dormant passive*

public, open-situational active public, closed-situational active public, open-situational activist public, closed-situational activist public, open-chronic activist public, and closed-chronic activist public. Then, practitioners can predict when the information about the given problem or issue would be sought or just processed, forwarded and/or shared, and forefended or permitted. Furthermore, after practitioners identify the profiles of the publics in a problem, they can anticipate what kind of problem-solving potential there is for the issue—i.e., the symmetrical problem-solving potential, collective problem-solving potential among publics, and stagnant potential for a given problem.

Related to segmentation, J. Grunig (1982) studied the probabilities of a public's information seeking and processing and other useful outcomes such as cognition, attitude, and behavior. The probabilities of communication behavior, cognition, attitude, and behavior guide public relations practitioners to prioritize publics in relation to their monetary and time budget constraints. Such knowledge of probabilities help practitioners make a more strategic decision in implementing communication programs with the identified publics.

In a similar way, the situational theory of problem solving can generate a probability table for the subdimensions in CAPS and CEPS. Thus, in preparing communication programs, public relations practitioners can apply the probabilities of information forwarding, information sharing, information forefending, information permitting, cognitive retrogression, cognitive multilateralism, cognitive commitment, and cognitive suspension. These probability estimates can be used in the “expected-value analysis” (J. Grunig & Hunt, 1984) that is a critical guideline in budgeting and decision

making for public relations programs. STOPS can improve public relations practitioners' formative and evaluative research in practice.

Second, public relations researchers have proposed several typologies of publics. For example, Chay-Nemeth (2001) offered "circumscribed," "co-opted," "critical," and "circumventing" publics. Hallahan (2001) outlined "active (high knowledge and high involvement)," "aroused (high involvement and low knowledge)," "aware (high knowledge and low involvement)," and "inactive (low knowledge and low involvement)." Contrary to the common misconception of "general public," J. Grunig and Hunt (1984) classified publics as "active," "aware," "latent," and "nonpublic." Each type is connected with eight types of publics segmented by three independent variables of STP (e.g., high problem facing, low fatalistic behavior).

Following its mother theory, STP, STOPS generates a new typology of publics that hinges on the dimensions of communication behavior. It is not intended to compete with existing typologies, but to complement them by emphasizing different communicative features among publics. It brings much conceptual utility in segmenting, describing, and predicting publics' actions. Also, the new typology invites more research about publics. For example, researchers can investigate extent and kind of relationships that each type of public would form with organizations and what kind of behaviors each public would engage in (e.g., joining activist group, contacting organization/government official, changing one's behavior). Also, with a finer distinction between active and activist publics (e.g., closed-chronic activist public vs. open situational activist public), researchers who study social activism and conflict resolution can form new research questions.

Third, as discussed earlier, with the inclusion of CAPS, the situational theory now describes in more detail how a group of publics would arise and the role of communication in the emergence of publics. In short, the information forwarding and forefending of focal communicants increase cross-awareness among isolated individual problem solvers. The cross-awareness about problem solving turns isolated individual problem solvers into collective problem solvers.

Provoking other communicants to recognize a problematic state, individual problem solvers can enhance the pool of potentially useful information, divide the costs for problem solving, and increase their bargaining power in demanding resources from a relevant party. Information forwarding and permitting is at the heart of locating and networking with other individual problem solvers. Giving information about a problematic situation is thus a necessary condition for a problem to produce a group of collective problem solvers (e.g., an activist group). Thus, knowing who is likely to transmit information (i.e., problem and solution) to other communicants explains what kind of problem would have more potential for resulting in a collective action. CAPS describes such processes with new dimensions of communication behaviors. It highlights the “intercommunication” process (see Figure 33 in this chapter) among communicants (problem solvers)

Such understanding of the intercommunication process highlights the role of communication behaviors in the emergence of public and the “nature, role, and influence of communication” in the social contexts (Vasquez & Taylor, 2001, p. 150). Thus, STOPS better explains how “problematic situations are created, raised, and sustained through the symbolic convergence (configuring and reconfiguring) of messages”

(Vasquez & Taylor, 2001, p. 150). With CAPS, in which publics are defined as “communicants” who work on problem solving, the new situational theory explains intercommunication better. Publics are conceived not only as the information takers, but also information givers and selectors who create perceptions around a problem, raise issues, and sustain their problem-solving efforts via symbolic interactions. Now the situational theory responds directly to the request of “communication process and dynamics” (Vasquez & Taylor, 2001) and “a framework that shifts the locus of analysis to the public’s communicative practices in interactional settings” (Cozier & Witmer, 2001).

Fourth, the new situational theory addresses the issue of valence prediction with the earlier situational theory. Cameron and Yang (1990) and Slater et al. (1992) proposed that “valence of support” should be added to the situational theory. I second J. Grunig’s (1997) rejection of such request for “philosophical” and “pragmatic” reasons (pp. 38-39). Interestingly, a redefined referent criterion and new dimensions such as information forefending ensures advancement for this issue.

Although I opposed adding “valence” to the theory, it is possible and useful to know when and why a problem solver becomes more selective in dealing with information. I explained that problem solvers become selective because of the presence of a strong referent criterion. I defined referent criterion as “any knowledge or subjective judgmental system that exerts specific influence on the way one approaches problem solving”—this includes any “decisional guidelines or decision rules perceived as relevant to a given problem.” In other words, a referent criterion can be either “objective” or “subjective.” However, both types of decisional referents are functionally identical in

problem solving. Selectivity is divorced from the “valence” of one’s beliefs. In other words, predicting when a person becomes “selective” is different from predicting “valence” of support. Although I oppose the prediction of valence with the situational theory, I alternatively suggest predicting the communicant’s selectivity. STOPS now opens a way to explain and predict such recurrent selectivity among publics.

Finally, the new situational theory has resolved an issue of multicollinearity among independent variables (Kim, Downie, & De Stefano, 2005; J. Grunig, 1997). J. Grunig (1997) posed a question about multicollinearity among independent variables. In one study using the situational theory of publics, J. Grunig and Childers [a.k.a. Hon] (1988) found a few standardized path coefficients greater than 1.00. Such unusual standardized coefficients often result from the multicollinearity problem among independent variables (Jöreskog, 1999). Kim, Downie, and De Stefano (2005) studied the source of multicollinearity particularly from the conceptual overlapping between level of involvement and problem recognition. Kim et al. (2005) conceptually explicated the definition of problem recognition as more of “detect something is missing” in the situation and isolated the “stop to think” tendency as the situational motivation. Their empirical analysis reduced multicollinearity with the refined conceptual definition of problem recognition. In the present study, I redefined and used measures of problem recognition to be more about a perceived problem (i.e., detect something is missing in the situation). Analyses showed that situational theory now has little, if any, problem of multicollinearity. Thus, I conclude the refined conceptual definition can be recommended in future research and practice.

STOPS and Health and Risk Communication

Researchers have applied STP to enhance the effectiveness of health and risk communication (e.g., Aldoory, 2001; Chay-Nemeth, 2001). Similarly, STOPS with CAPS (i.e., SITCAPS) helps risk and health communicators better identify critical agents for health/risk information diffusion. Focal communicants who are active problem solvers tend to disperse problems and solutions proactively. They are sophisticated information takers and givers who regularly and selectively update information related to the problem. Because focal communicants tend to be in an effectuating stage, they are likely to forward information. Further, focal communicants, even reactively, act as a first stop referent (cf. opinion leader) when neighboring communicants are identifying a problem and entering into the inquiring stage. STOPS can prescribe and trigger better information trafficking regarding health problems among target segments of the population.

For health care experts frustrated with groups that continue to engage in risky behaviors, STOPS with CEPS (i.e., SITCEPS) explains how and why some chronic problem holders fail to use information adequately and fail to behave appropriately. For example, the theory predicts that most information dissemination efforts will be futile if a risky behavior group possesses a strong cognitive omega approach. As discussed earlier, a cognitive omega strategy in problem solving can worsen one's problematic situation when one refuses to revise previously drawn conclusions. Tests with the situational antecedent variables indicated that as one has higher problem recognition, lower constraint recognition, higher involvement, and higher referent criterion, one's cognitive entrepreneurship decreases. SITCEPS thus requests differential intervention in accordance with the level of entrepreneurial mindset in one's problem solving.

STOPS and Political Communication

Communication effects studies originated from the early studies about voters and election (Katz & Lazarsfeld, 1955; Lazarsfeld, Berelson, & Gaudet, 1944). The main interest was to understand how voters were influenced and influenced other voters. In essence, such studies inquired how political information was dispersed and used with what effectiveness.

First, STOPS with CEPS explain how voters and citizens make political decisions and actions in some situations. The variables cognitive retrogression and cognitive multilateralism are especially interesting in this context. For example, a voter with more cognitive multilateralism and less cognitive retrogression would make a decision more slowly, would consider more aspects before decision making, and would have more of a tendency to cross-vote than to vote a party line.

Next, STOPS with CAPS fits well with the “two-step flow model” of personal and mass media influence. As discussed in opinion leadership and meso-level intercommunication models, communication by opinion leaders in political issues and elections is a special case of focal communicants (high in CAPS). They sometimes reinforce and compete with other focal communicants such as mass media or rival candidate supporters. Thus, SITCAPS will provide a conceptual framework that illustrates how voters’ information behavior will be different and how focal and peripheral communicants shape the electoral outcomes in the political arena.

In summary, in most applied communications contexts (e.g., political and health campaigns), attitude formation and behavioral changes are the prime “communication objectives.” However, researchers have found that these objectives are rarely met. J.

Grunig and Hunt (1984) introduced alternative communication objectives such as “coorientation” and “symmetrical” communication approaches such as “accuracy,” “understanding,” and “agreement.” With the new situational theory of problem solving, I also introduced a new set of communication objectives: e.g., increasing “information permitting,” and “information forwarding,” making less “retrogression,” having more “cognitive multilateralism,” and more “cognitive suspension.”

STOPS and Communication of Science

Several disciplines contribute to a better understanding of the antecedents, processes, and consequences in and around “doing science.” For example, philosophy provides essential understanding of how scientific epistemics differ from non-scientific lay thinking: i.e., philosophy of science (Popper, 1963). History of science elucidates how, why, and what factors drive scientific advancements or “paradigm shifts” (Kuhn, 1962). Sociology explains how scientific knowledge and technology are dispersed, how scientists gather, connect, compete, and advance knowledge in terms of social connection (Kraut, Egido, & Galegher, 1990; Bijker, Hughes, & Pinch, 1987). Psychology investigates how scientific inference and method is different from and similar to the process of naïve lay inference and lay epistemics (Kruglanski, 1989). However, there is little research on the ways in which lay and scientific thinkers differ in terms of communication behavior.

CAPS, CEPS, and STOPS fill this gap. First, CAPS conceptualizes unique features of a problem solver’s information selectivity, transmission, and acquisition. Problems can be any *life problems* that lay people experience routinely (e.g., a health problem, buying a car, or job hunting), whereas they can be *scientific problems* that

researchers and scientists work to resolve professionally (e.g., curing cancer with stem cells, explaining the causes of the Great Depression, decoding particles consisting of dark matter in the universe). Regardless of the type of problems, life or scientific mysteries, human activities around *information* play the key role in bringing solutions. Thus, studies should ask, “How are lay and scientific epistemics different in terms of their communication behavior?” CAPS provides a way to distinguish the lay problem solvers and scientific problem solvers with 1) the extent of their *information permitting* to different or competing ideas and 2) their distinct “causes” of *information forefending*.

Types of referent criterion, whether subjective beliefs (e.g., wishful or willful thinking) or a more objective knowledge (e.g., carried solution from experts or experience of the successful problem solving in past), affect the types of information forefending, such as “reinforcing selectivity” (e.g., avoidance in the dissonance theory) or “revising selectivity” (e.g., becoming effective in distinguishing relevant information as a result of extended problem solving). In reinforcing selectivity, the purpose is to enhance cognitive confidence in the preferred solution, whereas in revising selectivity, the purpose is to enhance “efficiency” in problem solving stemming from information saturation. In addition, it is interesting to see whether problem solvers will continue to permit information even when it conflicts with or refutes one’s current beliefs in the problem-solving outcome. I reason that the scientific problem solver would be more permitting than the lay problem solver (cf. “Scientific theories are distinguishable from myths merely in being criticizable, and in being open to modifications in the light of criticism,” Popper, 1963).

CEPS will add knowledge to why and how a communicant's information selectivity arises and how, in turn, selective communicant activeness would reduce the entrepreneurial mindset in problem solving. Then, it is interesting to investigate whether cognitive retrogression (i.e., backward reasoning) led one being equally capable in problem solving as a less retrogressive problem solver would be (i.e., forward reasoning). In addition, it is interesting to investigate whether cognitive entrepreneurship and its subdimensions can also be conceptualized as an enduring personal trait. If so, I can test how scientific problem solving and the traits of an entrepreneurial mindset would correlate with each other.

Assuming that there are differences between scientific and lay problem solvers in their approach, those situational antecedent variables will explain what causes such differences and how we encourage positive aspects and discourage negative characteristics in approaching both scientific and lay problems. For example, with knowing what factors (e.g., subjective type of referent criterion such as wishful or willful thinking) causes an undesirable problem-solving approach for some problems (e.g., less information permitting, less cognitive multilateralism, or more cognitive retrogression), we can cultivate problem solvers' self-awareness about their problem-solving approach (e.g., train children which cognitive and communicative approach one should take for some special problems).

Limitations

Validity of Findings

In general, CAPS and its subdimensions had close to or more than 50% construct validity in terms of variance extracted. Construct reliabilities for CAPS and its six dimensions were also more than the minimum values of .70. However, CEPS (i.e., about

20%) and its two subdimensions (i.e., 30-40%) and low variance extracted. For construct reliability, two subdimensions of CEPS in two issues were close to .70 or higher. For CEPS, itself, .612 and .627 which is lower than .70. The lower H and construct validity seemed to originate from the smaller pool of CEPS items. The sheer number of question items for three problems reached 100 questions and up to 300 responses. In order to minimize participant fatigue, I reduced the number of items from what I originally proposed. I set more priority on the CAPS items, with its six dimensions, and thus the number of items for the CEPS dimensions was smaller. As a result, it was difficult to identify good items, as I could do in the CAPS case. With this notion in mind, it is necessary to be more conservative in interpretation of the CEPS concept. Future research should address this limitation by using more items and a multiple-item approach for the cognitive multilateralism and the cognitive commitment dimensions.²⁵

Generalizability of Findings

In the present study, I chose the convenient snowball sampling method. This is a non-probability sample that has great limitations if the purpose of the study is statistical generalization. For example, the However, the purpose of this study was to develop new variables and new theory. In practice, “most early tests of nascent theories” adopt non-probability student samples. Such a strategy is not ideal, but they are useful for initial theorizing and hypothesis testing with “multivariate relationships” (Caplan, 2005, p. 732). Besides, I delimit the scope to “theoretical generalizability” rather than statistical generalizability. Calder, Philips, and Tybout (1981) pointed out:

²⁵ However, the multiple-item approach can lead to a more participant fatigue. Thus, narrowing-down the research focus either to SITCAPS or SITCEPS, not both, will be necessary to reduce the number of questionnaire items.

[to make] theoretical generalizations, a representative sample is not required because statistical generalization of the finding is not the goal. It is the theory that is applied beyond the research setting. The research sample need only allow a test of the theory. And, any sample within the theory's domain (e.g., any relevant sample), not just a representative one, can provide such a test. (p. 200)

In addition, Shapiro (2002) said:

[the issue of] rejecting a study that seeks to expand theory and that detects a potentially important effect on the basis of a nonrandom sample usually reflects a misunderstanding of the nature of generalizability. If a study detected important effect, no matter what kind of sample is used, it is clearly true for some group of people, in some setting, at some time, for some message. The next step may be to conduct a theoretically driven boundary search to determine to whom the effect applies and to whom it does not. (p. 499)

Thus, I delimit the generalizability of this study only as theoretical generalizability, no further than that.

Cross-validation with Single Sample

Related to convenience sampling, in an ideal study cross-validation tests for the variables should be tested using different samples. In the present study, I used a sub-sampling strategy (randomly select subsamples from the total sample) for cross-validation tests. In future research, this limitation can be addressed by using multiple samples.

Nonrecursive Model Identification

It was interesting to test an integrated model that contained nonrecursive relationships between CAPS and CEPS while specifying situational antecedent variables as exogenous variables. However, such model is either hard to identify (just identified at best) or hard to converge. As a realistic alternative, I used the referent criterion variable only for identifying the nonrecursive model. However, it was still an interesting model

that integrated all the variables into a single model. Future study should continue to attempt such an integrative model.

Similarity between CAPS and CEPS Survey Instruments

Although cognitive and communicative characteristics are conceptually distinct, the measurement items for CAPS and CEPS bear some similarities. Such similarity among survey instruments was unavoidable, but it is still a limitation from the survey instrument approach. Thus, it is necessary to be cautious interpreting the nonrecursive model findings between CAPS and CEPS, although the nonrecursive models converged and reached to acceptable model fit.

Demographic Variables and Problem Sensitivity

The current study did not include demographic variables such as sex, age, and income. However, it would be interesting to examine whether there are some mediating effects from demographic variables (e.g., gender difference in situational perception). In addition, the theory may depend on the problem chosen. For example, the structural path coefficients in SITCAPS could be different with other types of problems (e.g., Tuition Increase) for the current respondent group. Future study should test whether there is such problem sensitivity using different problems.

Future Research

Findings from the current study generate interesting new studies. First, CAPS is an apt model whereby I can test reversal effects from communication behaviors to situational antecedent variables. The CAPS model captures information transmission from the focal communicant to other peripheral communicants in their communicant networks. It would be interesting to test how the activeness of focal communicant's

communicant activeness in problem solving would influence perceptual gaps between focal and peripheral communicants (e.g., problem recognition gap). In addition, it is interesting how peripheral communicant's own communicant activeness would affect perceptual gaps regarding a problem. Finally, I can test the effect of communication on "accuracy," "understanding," and "agreement" in the coorientation model (McLeod & Chaffee, 1973). This is a way of empirically testing the coorientation model within the situational theory framework. Also, this study answers Hallahan's (2001) call for research on using communication as an independent variable. Snowball sampling can provide a way to test such a hypothesis using the clusters within a snowballed sample.

Second, I conceptualized relationships between the six dimensions in CAPS and problem-solving potential in socially conflicting issues. In doing so, I proposed three types of problem-solving potential symmetrical problem-solving potential, collective problem-solving potential, and stagnant problem-solving potential. The relationship between a public's communication behavior and issue resolution potential has rarely been studied. The study of CAPS and problem-solving potential in conflicting social issues will contribute to a body of knowledge in public relations as well as conflict resolution.

Third, J. Grunig (1982) studied how the situational variables explain the occurrence of cognitive, attitudinal, and behavioral effects of communication behavior as well as the occurrence of communication behavior. This study expanded the situational theory of publics not only theoretically but also practically. In his study, J. Grunig presented a table of probabilities of communication behaviors and effects of 16 behavioral situations. As discussed in the implication section, this table is useful in budgeting and decision making of public relations programs. It helps to predict how a

given communication program would pay off by expected-value analysis. Thus, it would be interesting to revisit what J. Grunig did in his 1982 study with CAPS, CEPS, and STOPS (e.g., probabilities of information forwarding, sharing, permitting, and cognitive multilateralism). The resulting probability tables can enhance public relations practice as the 1982 study has done.

Fourth, J. Grunig has developed a methodology to identify publics formed around particular issues. The method is useful for public relations practitioners to target communication programs (J. Grunig, 1975, 1977, 1978, 1979, 1982, 1983). In addition to continuous testing and refinement of the new situational theory, it will be necessary to devise specific steps of how public relations practitioners can segment publics with the new situational theory. Replication of the STOPS with different problems, organizational settings, and societies should be done. Those accumulated findings from validation and replication studies will provide examples for practitioners to apply in actual public segmentation tasks.

Fifth, studies using the situational theory of publics have found four recurring types of publics. They are all-issue publics, apathetic publics, single-issue publics, and hot issue publics. J. Grunig (1997) noted that these types of publics seem to have theoretical regularity, which he found repeatedly from canonical correlation analysis. I consider a canonical correlation study with different issues and with the new situational theory interesting. With CAPS and CEPS and the newly revised antecedent variables, I may or may not replicate those types of publics (e.g., all-issue publics, hot-issue publics etc). If replicated, I can study how those publics differ and how each type of public would differ in the six dimension of CAPS and four dimensions of CEPS. For example, we may

inquire how single-issue publics and hot-issue publics differ in terms of their information forefending and permitting and information forwarding and sharing. The findings will result in better understanding of different kind of publics that are critical in practice.

Sixth, I deployed survey methodology for testing CAPS, CEPS, and STOPS in this study. However, I found a need for validation studies with experimental design. Specifically, a validation study setting experimental manipulation of antecedent variables will test how and to what extent CAPS and CEPS would differ. In addition, I believe CAPS and CEPS constructs are useful and promising on their own. For example, an experimental design that manipulates cognitive retrogression as an independent variable and the extent of information forefending, information permitting, cognitive multilateralism and cognitive suspension as dependent variables can help clarify causal interpretations between cognitive strategies and communicative behavior in problem solving.

Seventh, in the developmental stage of the CAPS and CEPS, I conducted a few qualitative interviews to understand communicants' characteristics in social issues. Such exploratory study lead me to propose the propositions in CAPS and CEPS. However, I found a need for conducting qualitative study on CEPS and CAPS. I conducted a SEM analysis for a nonrecursive relationship between CAPS and CEPS. The finding was helpful in understanding the interrelationship between the two concepts. However, quantitative study using survey methods is quite limiting as a way to test in-depth and to develop rich description about how cognitive features and communicative behaviors are interconnected. Future study with focus groups, elite interviews, and in-depth interviews

with different types of publics (e.g., open-situational activist public) would provide a better understanding.

Eighth, CAPS and CEPS have been conceptualized as “situational” constructs in the present study. However, I am interested in whether these concepts can be conceptualized as enduring personal traits. From informal studies, I found that people tend to develop more enduring cognitive and communicative styles in dealing with problems. Hence, in future study, I will reconceptualize and test CAPS and CEPS as personal traits.

Ninth, assuming CEPS as a personal trait, it is interesting to test whether the tendency of entrepreneurial mindset in problem solving would affect the styles in ethical decision making (e.g., teleological or deontological approach). Testing of the relationships between CEPS and ethical decision-making style will enhance our understanding regarding ethics in public relations and business management. Further, it will result in some normative knowledge, such as how we train decision makers to be aware of their ethical decision-making style and problem-solving approach.

Finally, I asked what kind of relationship exists between the extent of cognitive entrepreneurship of dominant coalition members and excellence in public relations and organizational effectiveness (L. Grunig, J. Grunig, & Dozier, 2002). Such study as a continuous theory-building for strategic management of public relations will improve our understanding of what factors explain and affect communication excellence and management excellence.

INFORMED CONSENT FORM

Identification of Project/Title	Situational Theory of Publics
Statement of Age of Participant (parental consent needed for minors)	I state that I am 18 years of age or older and wish to participate in a program of research being conducted by Jeong-Nam Kim and Dr. James E. Grunig in the Department of Communication at the University of Maryland, College Park, MD 20742-7635.
Purpose	The purpose of the research is to test the influence of personal traits on perception of issues and communication behavior in the United States and Korea.
Procedures	The procedures involve answering a number of questions. I understand my participation will require approximately 20 minutes.
Confidentiality	All information collected in the study is confidential. The data I provide will not be linked to my name and, furthermore, will be grouped with data others provide for reporting and presentation.
Risks	I understand that there are no foreseeable personal risks associated with my participation.
Benefits	I understand that the study is not designed to help me personally, but that the investigator hopes to learn more about communication behaviors in the United States and Korea.
Freedom to Withdraw, & Ability to Ask Questions	I understand that this participation is voluntary and free to ask questions whenever I feel like to do. I understand that I can withdraw from participation at any time without penalty and/or decline to answer certain questions. I understand that alternative assignments are available if I decide not to participate and it is possible to earn equal extra credit I would get from participation of this study. Finally, I understand that any record of my participation will be destroyed, if I withdrawal from the study.
Principal Investigator	Dr. James E. Grunig Department of Communication 2118 Skinner Building University of Maryland, College Park, MD 20742-7635 Phone: (301) 405-6525; Email: jgrunig@umd.edu
Obtaining a copy of the research results	I understand that I may obtain a copy of the results of this research after July 2005 by contacting Jeong-Nam Kim, at the Department of Communication, 2118 Skinner Building, University of Maryland, College Park, MD 20742-7635. Phone: (301) 405-6533; E-mail: jnkim@umd.edu .

<< Disagree >>

<< Agree >>

Please Read Each Statement and Pick a Number that Best Reflect Your Feeling, Thoughts, and Opinion Regarding Three Problems.

Please enter the last four digits of SSN and the first letter of your last name ("S6789", "D3212", ...)

1. In your mind, how much of a connection do you see between yourself and this problem?

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

2. To what extent do you think there is something missing in this problem?

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

3. I continue to think about the pros and cons of possible solutions regarding this problem.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

4. How much does the current situation differ from your expectation?

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

5. I have found enough support for the position I take in this problem.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

6. How strong do you feel that something needs to be done to improve the situation for this problem?

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

7. From time to time, I contact people about this problem to learn what kind of solutions there are.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

8. I hesitate to make up my mind about what should be done for this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

9. I have made efforts to justify my decision on this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

10. To what extent do you believe this problem could involve you or someone close to you at some point?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

11. I want to take more time before making up my mind for this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

12. I know what people around me think about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

13. I have found much evidence that reinforces my decision regarding this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

14. Sometimes I find I am engaging in aggressive conversations on this problem.

War in Iraq	Please rate <input type="button" value="v"/>
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Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

15. Regarding this problem, I regularly meet and chat with likeminded people whose views about the problem are similar to my own.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

16. It is one of my top priorities to share my knowledge and perspective about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

17. If it is possible, I take time to explain this problem to others.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

18. How much does the current situation deviate from what you think it should be?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

19. Others respect my perspective about this problem because it is simple and clear.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

20. To what extent would you say you are curious about this problem?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

21. I am frustrated because there is too much information available about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>

Elimination of Affirmative Action in American Higher Education

Please rate

22. There are many misleading but widely accepted opinions about this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

23. To make better decisions regarding this problem, I listen to opposite views and information as long as they are related to the problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

24. Some publicized statements about this problem are worthless.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

25. I have spent too much time on this problem to change my position now.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

26. I have invested enough time and energy so that I understand this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

27. I know where to go when I need updated information regarding this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

28. I have studied this problem enough to judge the value of information.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

29. I have found counter evidence that rejects the positions different from mine.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

30. I am confused with what is going on when I hear something about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

31. To what extent would you say that this problem is more difficult for you to understand than other problems?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

32. I am confident about my knowledge about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

33. I paid attention to a news report about the problem recently.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

34. It is too late to change the position I now have on this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

35. It is worthy spending some time to persuade others about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

36. I feel like resisting some persuasive efforts around this problem.

War in Iraq	Please rate <input type="button" value="v"/>
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Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

37. I will keep my current position even if someone challenges it with contradictory evidence.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

38. Please, indicate how much you would like to understand each of these problems better.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

39. I express my opinions confidently about what should be done to deal with this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

40. I feel it is costly to change my mind on this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

41. How much do you believe this problem affects or could affect you personally?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

42. Although I am knowledgeable about this problem, I rarely speak up.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

43. I look for chances to share my knowledge and thoughts about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

44. I actively seek out opportunities to participate in public opinion polls about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

45. For this problem, I welcome any information regardless of where it comes from.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

46. It is important to learn the latest information around this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

47. To what extent do you believe this problem is a serious national or social problem?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

48. I am shy in expressing my opinions publicly about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

49. I strongly support a certain way of resolving this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

50. I have a preference for how the problem should be settled.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

51. I am careful in accepting information about this problem because of the vested interests of those who provided the information.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

52. I love to start a conversation on this problem with others.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

53. How strong would you say your opinions or thoughts are about this problem?

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

54. I am sure that I will be quite active in passing on information related to this problem in the near future.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

55. I know how I should behave for this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

56. I regularly visit websites relevant to the problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

57. I am a person to whom my friends and others come to learn more about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

58. I volunteer to inform others about the problem.

War in Iraq	Please rate <input type="button" value="v"/>
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Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

59. To what extent do you think this problem is too complicated for you to do anything about?

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

60. Listening to an opponent's view about this problem is a waste of time.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

61. It is too late to shake the conclusion I have drawn for this problem.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

62. I regularly check to see if there is any new information about this problem on the Internet.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

63. I would request booklets containing relevant knowledge about the problem.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

64. Please think of whether you, personally, could do anything that would make a difference in the way these problems are handled. If you wanted to do something, would your efforts make a difference?

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="text"/>

65. I believe there is no need to buy or read books or brochures about this problem.

War in Iraq	Please rate <input type="text"/>
Losing Weight	Please rate <input type="text"/>

Elimination of Affirmative Action in American Higher Education

Please rate

66. I feel happy when I provide new information about this problem to others.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

67. I pay attention to the problem when a news report appears on TV news.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

68. I visit an online or regular bookstore to find useful information about the problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

69. My friends think that I take too much time for learning about this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

70. I feel like I am suffering from information overload about this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

71. To what extent do you believe this problem is a problem that you can do something about?

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

72. I often play a leadership role in initiating conversation about the problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

73. In the past, I researched about this problem seriously.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

74. I am pretty sure, I know how to solve this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

75. I don't want waste my time trying to persuade others about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

76. Past experience has provided me with guidelines for solving this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

77. I may take some time listening if someone tries to give information about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

78. I listen to even opposite views on this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

79. At times, I find that I have accepted conflicting information about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

80. At times, I am asked to give advice regarding this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>

Elimination of Affirmative Action in American Higher Education

Please rate

81. How often do you stop to think about each of these three problems?

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

82. To what extent do you believe that you could affect the way this problem is eventually solved if you wanted to?

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

83. People around me know clearly what I think about this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

84. I am willing to write a letter, email, or fax to express my concern about this problem to a relevant organization.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

85. I hesitate to share my knowledge about this problem with others.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

86. I have never participated in a public opinion poll related to this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

87. I don't want share my ideas and opinions with other people regarding this problem.

War in Iraq

Please rate

Losing Weight

Please rate

Elimination of Affirmative Action in American Higher Education

Please rate

88. I am picky in choosing information sources when I think about this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

89. I need more time to think before I finalize my position on this problem.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

90. For this problem, I will try to suspend any judgment until all the evidence is in.

War in Iraq	Please rate <input type="button" value="v"/>
Losing Weight	Please rate <input type="button" value="v"/>
Elimination of Affirmative Action in American Higher Education	Please rate <input type="button" value="v"/>

Please read the statements below and pick a number that best reflects the extent to which you agree with the statement.

91. The war in Iraq can be justified because the cost of controlling Saddam Hussein while he was in power was higher than that of war.

Please rate <input type="button" value="v"/>
--

92. With the economic and domestic security problems the United States was facing, it was a bad time to go to war in Iraq.

Please rate <input type="button" value="v"/>
--

93. A pre-emptive attack by the U.S. gives credibility to those who describe the U. S. as an aggressive nation.

Please rate <input type="button" value="v"/>
--

94. The war in Iraq has increased anti-American sentiment.

Please rate <input type="button" value="v"/>
--

95. Saddam was connected with terrorists.

Please rate <input type="button" value="v"/>
--

96. Saddam's human rights record, among the worst in the world, was enough justification to go to war.

Please rate <input type="button" value="v"/>
--

97. Affirmative action demeans true minority achievement because success is labeled as a result of

affirmative action rather than hard work or ability.

Please rate



98. Affirmative action levels the playing field because minority students, generally speaking, start out at a disadvantage.

Please rate



99. Diversity is desirable yet won't always occur if left to chance.

Please rate



100. Because of affirmative action, a wealthy minority student who doesn't put in much effort could be chosen over a poor white student who works harder.

Please rate



Thank you! You finish the questionnaire!

Submit

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