Problem Solving and Communication Activeness:

A Situational Theory of Problem Solving (STOPS)

Jeong-Nam Kim
Assistant Professor
Department of Communication
Purdue University
2114 Beering Hall
100 N. University Street
West Lafayette, IN 47907-2098
(765) 496-6138 (office)
(765) 496-1394 (fax)
jnkim@purdue.edu

James E. Grunig
Professor Emeritus
Department of Communication
University of Maryland, College Park
2112 Skinner Building, College Park
MD 20742-7635
(301) 405-6525
(301) 570-8626 (fax)
jgrunig@umd.edu

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Abstract

The situational theory of problem solving (STOPS) is an extended and generalized version of the situational theory of publics (STP), which was introduced by J. E. Grunig in 1966 as a theory of information seeking in economic decision making and has been used extensively in public relations research and practice since then. STOPS inherits the STP's theoretical goals and power. STOPS introduces a new concept, communicant activeness in problem solving (CAPS), as its dependent variable. CAPS consists of six subvariables: information seeking, information processing, information forwarding, information sharing, information forefending, and information permitting. To explain CAPS, STOPS refines the STP's independent variables: problem recognition, constraint recognition, involvement recognition, and referent criterion. Finally, it introduces a new variable: situational motivation in problem solving. The new motivational variable mediates the effects of perceptual and cognitive variables on communicative behavior. We report the supporting evidence for STOPS' theoretical propositions based on SEM testing using survey data. [153 words]

Key Words:

Problem Solving, Communication Behavior, Perception, Motivation, Situational Theory of Publics, Public Relations

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The Situational Theory of Publics (STP) has provided a means of categorizing publics in terms of their 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. E. Grunig, 1997, 2003). J. E. Grunig (1966, 1997) developed what is now called the situational theory of publics as a theory of individual communication behavior and decision making. Later, the theory moved to a collective level of analysis as the concepts in the individual-level theory were used to explain and identify who are *publics* of organizations, as that term is used in public relations (J. E. Grunig, 1989). The STP refined, improved, and formalized two classic theories of publics and public opinion, those of Dewey (1927) and Blumer (1966). According to Dewey and Blumer, publics are critical components of the democratic process who recognize problems affecting them and organize and act similarly to resolve those problems. Because the STP has the power to explain and predict who is most likely to communicate actively on social or individual problems, it has been an applied communication theory used heavily both by public relations theorists and practitioners (Aldoory & Sha, 2006).

In the years during or after the development of the STP, other researchers in communication and information science have developed theories of information seeking and use that contain one or more concepts similar to those in the situational theory (see, e.g., Case's, 2007, review), although these theories do not integrate the concepts in the same way (see J. E. Grunig & Repper, 1992, for a review of similar theories developed before 1992).

The STP contains three variables that explain and predict communication behavior (problem recognition, level of involvement, and constraint recognition[1]) and two dependent variables that describe active and passive communication behavior (information seeking and processing). In addition, the STP explains when and why members of publics develop attitudes, cognitions, and behaviors as a result of communication behavior. Of these variables, active and

passive communication behavior have been widely discussed and researched (see, e.g., Case, 2007, pp. 89-93), although most researchers have concentrated on active forms of information acquisition. Of the independent variables, problem recognition is similar to Dervin's (e.g., 1992) use of the term "gap" to explain the motivation for sense-making. Cowan (1986) also developed a model of problem recognition based on the literature of problem solving and decision making in organizations.

Level of involvement has been a heavily used concept in psychology, consumer behavior, and communication, most notably in Petty and Cacioppo's (1986) widely studied Elaboration Likelihood Model (ELM). However, several reviews of the involvement concept (e.g., Salmon, 1986; Slater, 1997; Zaichokowsky, 1986) have noted that the concept has been used in widely different ways and, according to Slater, has been "simultaneously one of the most theoretically and empirically useful concepts, and among the most problematic" (p. 125). The concept most similar to constraint recognition is Bandura's (1977) concept of efficacy, although that concept is more of a mirror image of constraint recognition than an equivalent term (efficacy occurs when constraint recognition is low). Constraint recognition also has a somewhat different meaning within the context of the STP than it does in Bandura's social learning theory. Recently, Afifi and Weiner (2004) included both efficacy and "uncertainty discrepancy" (a concept similar to problem recognition) in their Theory of Motivated Information Management (TMIM) and applied it to research on information seeking in personal relationships (Afifi, Dillow, & Morse, 2004) and sexual health (Afifi & Weiner, 2006).

Although these theories have passed through some of the same conceptual territory as the STP, most of them have been limited to specific contexts such as health-related behavior, response to information campaigns, consumer behavior, library searches, and the like. As Case (2007) pointed out: "Ideally, what we would really like to know is how people go about seeking (or avoiding) information in a *generic* way, free of specific contexts like heart disease or car purchases" (p. 12). The situational theory, we believe, has the potential to be such a generic theory, although we believe it has not yet reached that point. The purpose of this article is to

extend the STP into a Situational Theory of Problem Solving (STOPS) that is a more *general* theory. Scientific progress is possible not only when theorists introduce new theories or concepts, but also when they increase the abstraction—"generalization"—of a key concept or a theory to achieve more explanatory power (Kruglanski, 2006).

In extending the STP into the Situational Theory of Problem Solving, we attempt to provide a more comprehensive and general account of communication behavior during problematic life situations. We believe the emerging theory can contribute to diverse communication subfields beyond public relations. We assume that communicative action is a *purposive* and *instrumental act* in dealing with problematic situations—a teleological rather than a deterministic theory. Because the theory conceptually considers communication action as *epiphenomenal* to problem-solving efforts, communication behavior is a useful proxy variable that explains and predicts how and why problem-solving potential varies.

We foresee rich implications for communicating with individuals in many different problem-solving situations (e.g., health, political, consumer, managerial, and scientific problems) as well as with aggregates of individuals who make up publics that are the objects of information campaigns and communication programs. We propose STOPS as a communication theory for *many*, if not most, life problems. STOPS should therefore demonstrate its applicability in various applied communication fields such as health communication, political communication, marketing communication, risk and science communication, business management, and library and information sciences.

Next, STOPS addresses criticisms of the STP by scholars who have stated a preference for a more social theory of publics, rather than one built on the aggregation of individual behaviors. For example, Vasquez and Taylor (2001) claimed that the STP explained 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.

The general conception of communication behavior that we propose in STOPS moves beyond the acquisition of information to include information giving, selecting, and taking. It thus explains both information supply and demand and why active publics develop a preference for certain kinds of information. STOPS' explanation of information trafficking and selecting helps to capture the evolution and devolution of issues and collective actions. STOPS thus addresses the criticism that the STP does not explain the role of communication in the development of publics as social collectivities.

In this article, therefore, we propose a renewed version of the situational theory by, first, replacing its dependent variables (information seeking and processing) with a more generalized dependent variable (*communicant activeness in problem solving*), which itself integrates several communication behaviors. Second, we expand the focus of the STP from "decisions" to a more general concept of life "problems." Third, we develop a new variable (*situational motivation in problem solving*) that mediates the effect of the independent variables of the STP on the new generalized dependent variable and reintroduce the concept of a referent criterion. Finally, we address Aldoory and Sha's (2006, p. 249) call for using new methods to test and apply the STP by using structural equation modeling to explicate and test each conceptual building block and its relationships within the emergent theory. We begin with the task of generalizing the dependent variables of STOPS.

Variables in the Situational Theory of Problem Solving

Problem and Problem Solving

The situational theory of problem solving (STOPS) begins with the assumption that most human behavior is motivated by problem solving. We define a problem as *a perceptual discrepancy between expected and experienced states in a given situation that produces an uncomfortable feeling of badness-of-fit*. We define problem solving as *one's effort to decrease this perceived discrepancy*.

The STP was based in part on J. E. Grunig's (1966; 1968; 2003) interpretations of the concept of problem recognition in four of John Dewey's books, *How We Think* (1910), *Human*

Nature and Conduct (1922), *The Public and Its Problems* (1927), and *Logic: The Theory of Inquiry* (1938). Dewey maintained that both human thought and inquiry (information seeking) begin when a person experiences an "indeterminate" situation ("a felt difficulty" [Dewey, 1910, p. 72]). When a person recognizes and defines an indeterminate situation, it becomes a "problematic" situation.

Dewey's theory also described a rational model of thought that ended with a conclusion or decision about which of several possible solutions to a problem was best. In his early work, J. E. Grunig (1966, 1968) integrated Dewey's theory with microeconomic and behavioral economic theories of decision making as he searched for the role of information in decision making. Although the microeconomic theories assumed rationality, the behavioral economic theories did not. As a result, the STP became more of an explanatory theory of problem solving, decision making, and communication behavior than a rational, prescriptive theory.

Next, we expand the conceptual meaning of information behavior from information taking to information taking, giving, and selecting.

Dependent Variable: Communicant Activeness in Problem Solving (CAPS)

Communicant activeness in problem solving (CAPS) is a new concept that describes a problem solver's heightened communicative activeness in information taking, selecting, and giving as one engages in problem solving. Information taking, selecting, and giving are further delineated by an active and passive component. As such, CAPS expands on the dependent variables explained by the STP, which was limited to active and passive components of information taking (named information seeking and information processing in the STP).

In the expanded STOPS, therefore, we conceptualize CAPS as a second-order factor that integrates the six communication variables related to three domains of communicant activeness: *information acquisition, information selection*, and *information transmission*. The six variables are *information seeking* (active) and *information processing* (passive) in the information acquiring domain, *information forefending* (active) and *information permitting* (passive) in the information selecting domain, and *information forwarding* (active) and *information sharing* (passive) in the

information transmitting domain. CAPS hypothesizes that a heightened level of problem-solving effort will increase information behaviors in all three domains.

We conceptualized these six variables as a second-order factor because we believe they share common conceptual components but, at the same time, are not completely subsumed by a single first-order factor. Preliminary confirmatory factor analyses, using nested model testing, confirmed that our conceptualized second-order structure for CAPS provided a better model fit than a single factor structure, which would suggest that the six variables can be *subsumed* by a single underlying variable, or a six-factor oblique structure, which would suggest the variables are correlated but not *integrated* by a common underlying variable.

A main assumption in CAPS is that communication is "epiphenomenal" to the human problem-solving process – that is, people use communication *instrumentally* and *purposefully* to solve their life problems (J. E. Grunig, 1997, called the STP a teleological rather than deterministic theory for this reason). CAPS postulates that the instrumental uses of communicative behavior increase as people perceive given life situations as more problematic. The general postulate is thus:

> The more one commits to problem resolution, the more one becomes *acquisitive* of information pertaining to the problem, *selective* in dealing with information, and *transmissive* in giving it to others.

In general, people *seek* information as they become more motivated to solve a problem (J. E. Grunig, 1997). People also *select* certain kinds of information as they solve problems. Prolonged information taking tends to increase the inventory of information, but it also creates a problem when it produces too much information (i.e., information overload or information inconsistency). Also, as people attempt to attract the attention and resources of others, they need stronger rationales for selecting information. Thus, they develop a subjective rule of relevance: Some pieces of information are more useful than others. Finally, active problem solvers experience a need to *transmit* information to others. A person's problem-solving potential or effectiveness increases as a problem draws attention or resources from others. Thus, active

problem solvers talk diligently about their problems and preferred solutions to attract attention and resources.

Information seeking and information processing. The two variables in information acquisition come from the situational theory of publics (J. E. Grunig, 1997). Information seeking represents an active communication behavior, that is, "the planned scanning of the environment for messages about a specified topic" (J. E. Grunig, 1997, p. 9) – described by others as "premeditated information seeking" (Clarke & Kline, 1974), "consumer information search" (Moorthy, Ratchford, & Talukdar, 1997), and "opinion-seeking" (Vishwanath, 2006). Information processing represents a passive communication behavior, an "unplanned discovery of a message followed by continued processing of it"— described by others as "message discovery" (Clarke & Kline, 1974) and "news attention" (Eveland, Jr., Sha, & Kwak, 2003).

As a first step in problem solving, people tend to search for information that can enhance problem-solving potential (Dutta-Bergman, 2005). Thus, as we perceive a current situation to be more problematic, we are more likely to *seek* and *process*, not to ignore the information we encounter. In contrast, with low problem perception we tend only to *process*, not to seek information, even if the cost of information seeking is low (Ramanadhan & Viswanath, 2006). Therefore, active communicants will be both high in information processing and seeking, whereas less-active communicants only engage in information processing—if they communicate at all.

Information forefending and information permitting. Information forefending is defined as the extent to which a communicant fends off *certain* information in advance by judging its value and relevance for a given problem-solving task. As information forefending increases, problem solvers become more *specific, systematic,* and pursuing of *relevance* in dealing with information to reduce information overload or information inconsistency. As one's problem-solving efforts are prolonged, he or she uses "forethought" or "discriminatory rules" to sort out information (Brashers, Goldsmith, & Hsieh, 2002) in what we call the "effectuating phases" of problem solving. Although the search process could be partial and incomplete (Huckfeldt & Sprague,

1987), it helps problem solvers distinguish irrelevant from relevant information (Muha, Smith, Baum, Maat, & Ward, 1998).[2]

In contrast, information permitting refers to the extent to which a communicant accepts *any* information related to a given problem-solving task. Quite commonly, highly motivated problem solvers try to remain open and inclusive in making information choices. As one becomes more motivated for problem solving, he or she attempts to adapt to the situation by increasing the breadth of information used to build candidate solutions in what we call the "inquiring phases" of problem solving. Thus, the more effort one makes to solve a problem, the more likely he or she will be to engage in information permitting behavior, especially at an earlier phase of problem solving.

Information forwarding and information sharing. CAPS differentiates between two levels of communicative activeness in information giving. Passive information giving is the *sharing* of information reactively only when someone requests one's opinion, idea, or expertise about the problem. In contrast, an active information giver *forwards* information proactively even if no one solicited it – a planned, self-propelled information giving to others. An information forwarder is eager to disseminate his or her problem perception and preferred way of problem solving to other communicants (e.g., Shah, Cho, Eveland, Jr., & Kwak, 2005). Thus information outflow from an information forwarder is voluntary, premeditated and self-propelled by heightened problem perception. Information transmission evolves from *problem giving* (e.g., "question asking," Berger & Kellermann, 1983) to *solution giving* as a problematic situation continues (e.g., "opinion-giving," David, Cappella, & Fishbein, 2006). At the early stage, the purpose of information giving is to obtain the information necessary to build a solution – i.e., problem forwarding. At a later phase of a situation, the purpose of information transmission is to reproduce a similar *problem* perception and to promote the preferred solution –i.e., problem and solution forwarding.

In summary, CAPS posits that as a problem solver works toward problem resolution, his or her communicative activeness increases in three communication behavioral domains -- information acquisition, transmission, and selection. Each domain consists of "proactive" or

"active" information behaviors – information seeking, information forwarding, and information forefending and "reactive' or "passive" information behaviors – information processing, information sharing, and information permitting. As one becomes a more active problem solver, one's information selectivity evolves from *unsystematic* to *systematic*, from *general* to *specific*, and from *related* to *relevant*. While passive problem solvers are *only* high in reactive and passive information behaviors (i.e., information processing, sharing, and permitting), active problem solvers are high in all information behaviors (e.g., an active problem solver is high in information forwarding as well as sharing).

Independent Variables: Perceptual and Motivational Antecedents

As people enter into problematic life situations, communication action becomes more salient (Carter, 1973). Communicative action facilitates solution building in the inquiring stages of problem solving and the application of solutions in the effectuating stages of problem solving. In the following section we explain the antecedent variables that lead to active communication behaviors in problem solving. We start by explaining further our definition of what a problem is and how we recognize one.

Problem Recognition

A problem does not exist until we recognize it. We do not discover a problem externally; it is born and lives *inside* of our mind. Thus, a problem is not independent of our individuality in thinking. A problem is a joint product of our mind at work and the perceived world in which we reside. The interaction between *what we expect* and *what we experience* creates a sense that a problem exists. The extent of discrepancy or collision between an expectation (e.g., being healthy) and an observation (e.g., diagnosis of a disease) will create the sense of a problematic state. We contrast two types of problems – a *perceptual problem* (*problem*) and a *cognitive problem* (*metaproblem*). A perceptual problem is a perceptual discrepancy between expected and observed states – a badness-of-fit; a cognitive problem is the absence of a readymade solution to a (perceptual) problem. A cognitive problem requires a judgment on what needs to be done to narrow the perceived gap. This judgmental phase consists of the perceiver's evaluation of what

caused the problem, how it can be resolved, and the extent to which he or she is competent to solve a problem of this kind.

Definition. The situational theory of publics defined problem recognition as occurring when "people detect that something should be done about a situation and stop to think about what to do" (J. E. Grunig, 1997, p. 10). In this article we define *problem recognition* as *one's perception that something is missing and that there is no immediately applicable solution to it.* It is thus a cognitive problem following a perceptual problem—i.e., a perceptual state one experiences after the failure of *preconscious problem solving*.

A person who perceives a problem but feels incapable of finding an immediate solution to it, or lacks a mechanism to narrow the *perceived* psychological discrepancy, enters a problematic situation (J. E. Grunig, 1968). Higgins (1996) described the same idea as failing to experience "knowledge activation." As a result, the person is likely to stop his/her current routine to determine a solution ("detect" in the behavioral molecule described by J. E. Grunig, 2003, which he derived from Carter, 1972). The degree of perceived discrepancy increases one's probability of "stopping to think about what to do," but the discrepancy alone cannot determine the extent of subsequent thinking.

There are other perceptual factors that affect how much people think, such as the extent of perceived connection to the problem (involvement recognition) and perceived obstacles in doing something about it (constraint recognition). These additional factors conjointly influence whether one "stops" what 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. Problem recognition is the prime mover but not the singular cause of subsequent communicative and cognitive activity in a problematic situation.

Involvement Recognition

Several influential social psychological and communication models have made heavy use of the concept of involvement (e.g., it appears in Petty & Cacioppo's, 1986, ELM and Kruglanski & Thompson's, 1999, Unimodel). The concept has its greatest utility when it is used to segment

and discriminate the extent and nature of communicative and cognitive activity among people with varying levels of involvedness (Salmon, 1986; Zaichkowsky, 1986). Specifically, communicators who know an individual's level of involvement can predict how that individual is likely to behave in relation to problems, issues, products, and ideas (Slater, 1997). Singling out a cohesive but distinct group of people from a general population increases the economy, efficiency, and effectiveness of a communicator's activities designed to achieve communication objectives (J. E. Grunig, 1997). However, a great deal of confusion has arisen among communication researchers from the overuse of the concept, coupled with limited agreement about its meaning (Zaichkowsky, 1986). We therefore conceptually delimit the meaning of involvement as used in our STOPS theory.

Definition. Lovelock and Weinberg (1984) gave a "common-sense" definition of involvement as the "degree of importance or concern" that a product or behavior generates in different individuals (p. 73). In contrast to our use of the involvement concept, previous researchers have described the meaning of involvement in a nonperceptual way. For example, Krugman (1965) defined involvement as a characteristic of a medium; and Ray (1973) saw it as a characteristic of a product. However, J. E. Grunig (1976) defined it as a "perception" that people come to have within a given situation. Building on Krugman's (1965) use of the term, he defined *level of involvement* as "the extent to which people connect themselves with a situation" (1997, p. 10). The extent and nature of people's communicative action is affected *by their perceived connection*—involvement—of self to the problematic situation. When their perceived connection is low, people are likely to be passive in communication behavior – to engage in "information processing" (J. E. Grunig, 1976). When they perceive a close connection, they are likely to be active in communication behavior – to engage in "information seeking" (J. E. Grunig, 1976). Thus, we believe it is better to conceptualize involvement as a perceptual variable, rather than conceptualize it as a variable that triggers perception. That is, the *actual connection* of events or problems is important as a trigger of perception, but people will not initiate behavior to do something about that problem unless they consciously perceive a connection.

There is a significant leap from one's *actual connection* to one's *perceived connectio*n. We do not live in an objective world; we live in a perceived world (Lippmann, 1922). We thus base our thoughts on our *perception* of the world, not the *world* itself. We cannot do anything until we happen upon this perception. *Actual* connection is thus different from *perceived* connection – i.e., it is a "biased" or nonobjective sense of involvement (Fiske & Taylor, 1991). A person who is not aware that he or she is terminally ill (i.e., of an *actual connection* to the health problem) will not do anything about it until he or she finds signs of abnormal physical condition—problem recognition. It is only after he or she recognizes the health problem that he or she evaluates how important this problem is to him or her (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 to*. Therefore, we define level of involvement (J. E. Grunig, 1976) as *involvement recognition* – a perceived connection between the self and the problem situation.

Constraint Recognition

In contrast to their use of the concepts of involvement and problem recognition, few communication and marketing theorists explicitly use the concept of constraint recognition (J. E. Grunig, 1989). Constraint recognition is one of two original conceptual variables developed by J. E. Grunig (1968) in the earlier version of the situational theory of publics. Constraint recognition has its origin in economics and management science rather than psychology, unlike many variables in communication theories (e.g., ego involvement, Sherif & Hovland, 1961, and personal involvement, Apsler & Sears, 1968). 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. E. Grunig, 1968). In social psychology, Bandura (1977) later proposed "personal efficacy" in his social learning theory, which is a very close concept to J. E. Grunig's (1968) constraint recognition.[3]

Definition. The situational theory of publics defined constraint recognition as occurring when "people perceive that there are obstacles in a situation that limit their ability to do anything about the situation" (J. E. Grunig, 1997, p. 10). We follow his definition of constraint recognition in the present paper. From studies about large land owners and peasants in Colombia, J. E. Grunig (1971) found that "people have little need to communicate in situations where constraints prevent people from making choices" (J. E. 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 (Ramanadhan & Viswanath, 2006). As noted by J. E. Grunig's (1971) 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. E. Grunig, 1989, p. 212).

Referent Criterion

People approach their problems by recalling relevant experiences of success in dealing with problems similar to a current problem (Carter, 1965; Higgins, 1996). Some called this phenomenon "a referent" to repeated problems (Simon, 1957), a cognitive "schema" (Fiske & Linville, 1980), "categories" (Carlston & Smith, 1996), or a "cross-situational attitude" that guides problem solving and decision making (J. E. Grunig, 1997). The presence of an applicable referent criterion has been associated with "top-down" processing (Carlston & Smith, 1996), which generally reduces a problem solver's need to search for additional information (Higgins, 1996).

Upon recognition of a problem, one starts an internal, cognitive search for prior experience. If this search is fruitless – i.e., does not result in "knowledge activation" (Higgins, 1996), he or she will turn to external sources for a solution –i.e., engage in *knowledge action*. According to J. E. 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).

Definition. Although the referent criterion has some perceptual characteristics, it is closer to a cognition because it taps and measures "available" and "applicable" knowledge and inferential rules from one's prior problem-solving experiences (Higgins, 1996). We define referent criterion, therefore, as *any knowledge or subjective judgmental system* that influences the way in which one approaches problem solving. The referent criterion can include *decisional guidelines* or *decision rules* perceived as relevant to a given problem. Problem solvers bring referent criteria from prior problematic situations.

One's degree of communicant activeness in problem solving varies with the success of internal searching for retrievable solutions or pieces of knowledge for constructing a new solution (Kruglanski, 1989, called this a "search light metaphor"). On the one hand, a problem holder who finds a recyclable and workable referent criterion will be less eager to *search* for information in dealing with a current problem and to want a closure of search (J. E. Grunig, 1968). If one has difficulty in retrieving a workable solution from internal storage, then he or she is likely to show greater communicant activeness for composing a novel solution. At the same time, the problem holder will be eager to *select* and *give* information when a referent criterion is present. Overall, therefore, we expect that the presence of, or a stronger subscription to, a referent criterion will lead to higher communicant activeness in problem solving.

In addition to the knowledge or *objective* aspect of a referent criterion, we now include a more *subjective* aspect--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 (Koehler, 1993). When 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 (cf. directional motivation, Ben-Shakhar, Bar-Hillel, Bilu, & Shefler, 1998). The stronger presence of such self-fulfilling decisional referents will result in more information selecting and giving in problem solving.

Situational Motivation in Problem Solving

Situational motivation in problem solving is a new variable that mediates the effect of problem recognition, constraint recognition, and involvement recognition on the dependent variables that make up CAPS. We believe that the presence of one or more referent criteria will have an independent effect on CAPS because a referent criterion is more cognitive than perceptual. Situational motivation in problem solving represents the extent to which a person stops to think about, is curious about, or wants more understanding of a problem. As such, it captures a motivation that the STP previously measured *as* problem recognition rather than an *effect of* problem recognition.

Problem, involvement, and constraint recognition are perceptual and situational. One's perception is *subjective* to the individual (there are individual differences related to the same perceptual object and event), *situational* across time periods (they dissipate and no longer exist after problem resolution), and *antecedent* to motivation (individuals 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., a referent criterion) are enacted by the perceptions. We can say that the perception of a problematic state, perceived capacity or capability regarding a problem, and perceived connectedness jointly influence the subsequent extent of adaptive (communication) behaviors related to the perceived states (i.e., problems).

Our situational motivation concept is different from a non-situational communicative motivation such as "pleasure," "escape," "interpersonal goals," or "need for social interactions" (Graham, Barbato, & Perse, 1993). Instead, it is more situation-specific and goal-oriented in nature. Theoretically, the motivation concept advances situational theory because it is a conceptual pivot summing up and mediating the relative contributions from problem recognition, constraint recognition, and involvement recognition into a single conceptual statement.

Other theories contain similar concepts, but none of them integrate all of the variables in a conceptually consistent way as we do. For example, Murray-Jones and Witte (2003) found that motivation is created by "personal relevance," "perceived susceptibility," or "efficacy expectation" about a situation. Becker and Maiman (1975) found that as one experiences heightened motivation toward problem resolution, his or her situational activeness in cognitive processing and information and non-informational behaviors related to a given problem also increase. In health and risk communication, Neuwirth, Dunwoody, and Griffin's (2000) "utility of protection motivation theory" showed that the severity of hazards and one's efficacy jointly produce a greater willingness to take actions against risks. All of these variables are related in some way to our concepts of problem recognition, involvement recognition, or constraint recognition.

The single motivation concept also should make it easier to distinguish types of publics by classifying them according to varying degrees of situational activeness (J. E. Grunig, 1989). After doing research to classify publics by the extent of their situational motivation, professional communicators should be able to evaluate the relevance of information to subgroups of publics (e.g., apathetic public or latent public) before a communication program begins.

Integration of Dependent and Independent Variables

In this section, we integrate the antecedent and consequent variables that we have reviewed and refined thus far. These integrated variables consist of a new version of the situational theory of publics – the *situational theory of problem solving* (STOPS). In Figure 1, we illustrate sequentially how STP and STOPS are theoretically different in terms of three communicative domains. STP uses the information seeking and processing variables (information acquisition domain) to explain individual effectuating of a solution. STOPS also explains collective effectuating – an active problem solver's information selectivity, transmission, and acquisition.

Situational theory of problem solving. Up to this point, we have taken a backward approach to building a situational theory of problem solving. In the first section, we established our focal dependent variable, communicant activeness in problem solving (CAPS). We then

constructed conceptual explanations of the *how* and *why* of the focal phenomenon—i.e., the effect of independent variables.

The focal dependent variable we have thus far elaborated is communicant activeness in problem solving. It consists of six subdimensions related to information selection, transmission, and acquisition. Figure 1 summarizes the conceptual predictions of the effect of the antecedent variables and mediating variable on the dependent variable, CAPS, and illustrates the difference between STOPS and the STP. We therefore posit five hypotheses. The first three hypotheses specify the relationship of the three situational motivators to the mediating variable of situational motivation in problem solving. The fourth and fifth hypotheses represent the major hypotheses of this study: the relationships of situational motivation in problem solving and presence of a referent criterion to CAPS. [4]

H1: The higher the problem recognition, the higher the situational motivation in problem solving.

H2: The higher the constraint recognition, the lower the situational motivation in problem solving.

H3: The higher the involvement recognition, the higher the situational motivation in problem solving.

H4: The higher the presence of a referent criterion, the higher the communicant activeness in problem solving.

H5: The higher the situational motivation in problem solving, the higher the communicant activeness in problem solving.

Method

Participants and procedure. We conducted two studies. In Study 1, participants from introductory communication classes at an East-Coast university were invited to complete a questionnaire in April and May 2005 (N = 1,380). We chose a snowball sampling technique to secure a large sample size for cross-validation studies.[5] We began by recruiting an initial contact person who volunteered for the study in exchange for extra credit. These contact persons then recruited additional participants. They were instructed to avoid any coercion in recruiting other

candidates for participation. In Study 2, participants were invited from communication classes at an Mid-West university in November 2007 (N = 338).

We used web-based questionnaires to collect the data.[6] Once the initial contact person agreed to participate, he or she provided a login code to the others to form a cluster under that code. This login method secured confidentiality for each participant. To avoid multiple responses by a single participant, we used a "duplicate tracking function," a technical service provided by *CreateSurvey,* to limit each participant to one entry.

Measures. The situational theory of problem solving consists of five antecedent variables and one consequent variable with six subvariables. The antecedent variables are problem recognition, constraint recognition, involvement recognition, presence of a referent criterion, and situational motivation in problem solving. The consequent variable is communicant activeness in problem solving. Its six subvariables are information forefending, information permitting, information forwarding, information sharing, information seeking, and information processing.

The measures of constraint recognition and involvement recognition came from the STP (items can be found in the appendix of J. E. Grunig, 1997); whereas the items for information seeking and processing were modified slightly from the wording used in the STP to apply to an online information search. Items to measure problem recognition; presence of a referent criterion; situational motivation in problem solving; and information forwarding, sharing, forefending, and permitting were newly created for STOPS. Although problem recognition and referent criterion were measured in the STP, they were conceptually redefined in STOPS, requiring new measurement items. Items used to measure situational motivation in problem solving had been used to measure problem recognition in the STP. We attempted to develop measurement items that were unambiguous and easy to comprehend. We also tried to avoid multiple negatives, double barreled sentences, ambiguous pronoun references, and misplaced modifiers (Netemeyer, Bearden, & Sharma, 2003). We used a nine-point in Study 1 and a seven-point Likert type scale in Study 2 ("*not at all*" to "*extremely*") in a unidirectional format (*absence of agreement* to *extreme*

agreement). We chose this scale after we pretested five-point, seven-point, nine-point, and magnitude scaling methods and found that all worked equally well.

The STP and STOPS, its successor, generally asks participants to apply the measures of each variable to several problems or situations to test whether responses change with the situation or are produced by individual differences. To choose problems for this questionnaire in Study 1, we asked about 50 undergraduate students, from the same groups on which our actual data collection was done, to name ten of the top problems they personally thought to be problematic. The problems varied from individual matters (e.g., romantic relationships, tuition, summer internship, family conflict, or health issues) to more social matters (e.g., the war in Iraq, terrorism, the U.S. economy). We chose three social and individual problems for the final questionnaire to test whether STOPS was equally applicable to both types of problems. These problems were "war in Iraq," "losing weight," and "elimination of affirmative action in American higher education." In addition, one of the authors conducted additional discussion sessions with students about these issues and learned that most of them were aware of the issues and understood them.[7] In Study 2, we selected two health-related issues, "thriving organ sales in poor countries" and "controversy in judging brain stem death for organ donation."

Analysis. Using several samples, we first conducted a series of principal component analyses of all variables to remove low- or cross-loading items and a confirmatory factor analysis to check for equivalence of factor structures. We conducted an *internal consistency test* using Cronbach's alpha. The analysis consisted of two-step structural equation modeling (Kline, 1998). In the first step, the measurement phase, we analyzed and selected the best measurement items for each construct. We checked for correlated residuals and cross-loadings using LM tests and removed low loading items in each construct. In the second step, the structural phase, we compared the final confirmatory models with the proposed structural models. When necessary, we respecified the initial structural models with applications of the LM test and Wald test. Most of the initial structural models produced reasonable data-model fits based on multiple-fit indices. Hence, most models were tested as originally specified.

To evaluate the proposed structural equation models, we adopted commonly used model fit indices. They are χ^2 and its degree of freedom, Comparative Fit Index (CFI), Root-Mean-Square-Error-of-Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), and Akaike Information Criterion (AIC).[8] Often χ^2 values are sensitive to large sample sizes; thus, the χ^2 statistic would be significant even if the differences between observed data and model-implied covariances were small (Kline, 1998). To judge model viability, we also applied the Hu and Bentler (1999) joint-criteria approach: A model was considered viable when it achieved CFI $\geq$ .96 *and* SRMR $\leq$ .10 or RMSEA $\leq$ .06 *and* SRMR $\leq$ .10. When our test models achieved a reasonable model-data fit, we interpreted their paths to evaluate the hypotheses and research questions.

Results

Reliability and Validity of the Dependent and Independent Variables

As a first step, we examined the effectiveness of CAPS and its subvariables in measuring the intended constructs. We assessed the reliability and internal consistency using the SPSS 11.5 program. The items measuring the dependent variables of CAPS generally resulted in strong alphas (Table 1). The exceptions were information processing (for affirmative action) and information permitting. The reliability of these measures improved in Study 2. As a second step, we examined the reliability and validity of the five antecedent variables. They are problem recognition, constraint recognition, involvement recognition, referent criterion, and situational motivation in problem solving. As seen in Table 1, most antecedent variables reached or approached an acceptable level of reliability (higher than .70 of alpha). We proceeded to test the structural model using the selected best items.

Structural Model Testing and Hypothesis Testing

According to Hu and Bentler's (1999) joint criterion, all three structural models in the two studies reached an acceptable level of model fit. We proceeded to interpret the model parameter estimates to test the hypotheses. We posited five hypotheses that specified the relationship between communicant activeness in problem solving, four situational antecedent variables, and the

mediating motivational variable. Findings for the five structural testing models in the two studies are summarized in Figure 2.

In H1, we expected a positive relationship between problem recognition ("detect something is missing and something should be done") and situational motivation in problem solving (the likelihood of "stopping to think about" the problem). We found positive path coefficients for all five problems. In H2, we expected a negative relationship between constraint recognition ("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. We found negative path coefficients for all five problems. In H3, we expected a positive relationship between involvement recognition (perceive some "connection" between a situation and oneself) and situational motivation. We found strong positive relationships.

H4 asked how one's problem solving, as captured by the CAPS model, would differ in the presence of a referent criterion. A referent criterion is any knowledge, decision rules or guidelines, or subjective judgmental system that exerts specific influence on the way one approaches problem solving. A referent criterion can be either an *objective* referent, one carried from prior problem solving, or a *subjective* referent, one improvised at an early phase of problem solving, such as wishful thinking or willful thinking about the problem outcomes. The CAPS model includes variables in information selection (e.g., information forefending) and information transmission (e.g., information forwarding) as new key dimensions. We thus conceptually predicted that a problem solver's selectivity and transmission of one's knowledge about the problem will increase as he or she possesses a stronger referent criterion about the problematic situation. We found support for this prediction from the analysis of both studies.

Finally, we expected that situational motivation in problem solving would increase communicant activeness in problem solving (H5). Situational motivation is a new concept in STOPS, a mediating variable between problem, involvement, and constraint recognition and the information behaviors integrated in CAPS. In all five problems, we found support for this prediction. We thus conclude that as situational problematic perception increases, one will

experience a heightened situational motivation toward problem solving. This subsequently increases one's active communication behavior through 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 sometimes differed across different issues. We reason that the fluctuation originated from issue sensitivity in these particular samples (students). For these student groups, respondents were more sensitive to some issues than others (e.g., the war in Iraq and organ sales). In addition, the current data were drawn from a nonrandom sample of a limited population. With more heterogeneous samples of a broader population (e.g., random samples drawn from a national population), the path coefficients might have been more similar across five problems.[9]

Discussion

We proposed and tested a general version of the situational theory of publics (STP), which we named the situational theory of problem solving (STOPS). We introduced a general dependent variable, CAPS, to extend the reach of the theory beyond information acquisition to include the three domains of information selecting, information giving, and information taking. We then refined the independent variables that influence situational motivation in problem solving and communication behavior and added a new mediating variable, situational motivation in problem solving. The situational-perceptual variables are problem recognition, constraint recognition, and involvement recognition, whereas the cognitive schema variable is a referent criterion.

On all five issues studied in two studies (Study 1: War in Iraq, Losing Weight, Eliminating Affirmative Action; Study 2: Organ Sales in Poor Countries, Judging Brain Stem Cell Death), structural equation modeling confirmed our theoretical conceptualizations. Problem recognition and involvement recognition were positively related to situational motivation in problem solving, and constraint recognition was negatively related. All six dependent variables were positively related to the second-order variable of communicant activeness in problem solving. Finally, both

situational motivation in problem solving and the use of a referent criterion were positively related to communicant activeness in problem solving. All of the path coefficients were significant and in the same direction in both studies, although their size differed across issues.

This empirical confirmation and replication of the STOPS theory suggests that it has generic theoretical applications in explaining each of the three types of information behaviors that range from passive to active. It also confirms the value of problem recognition, involvement recognition, constraint recognition, and presence of referent criteria in explaining the motivation for these active and passive communication behaviors. STOPS shares these conceptual variables with several other theories of information seeking and other types of information behavior, so it potentially has the power to explain many, if not most, of the same phenomena covered by other theories. None of the other theories contain all of the independent and dependent variables of the situational theory, however, making STOPS potentially more general and powerful than similar theories. At the minimum, the STP and its successor STOPS deserve a place alongside other theories of communication behavior. Although we cannot explore all of the theoretical links to research problems in a number of communication disciplines in this article, we look forward to applying, and encouraging others to apply, STOPS to research in health communication, political communication, marketing communication, risk and science communication, business management, library and information sciences, and others.

In addition to its theoretical value, STOPS offers increased practical value in applied research and professional practice. Communicators in a government agency or corporation may hope to increase communicant activeness about a problem in which they are interested. For example, government health departments would like to increase citizens' protective behaviors from potential risk factors (e.g., sunburn to skin cancer, risky sexual behavior). As members of active publics become active in information seeking and forwarding, the government agency's communication goals/objectives will be better met. Consumer product companies would like to increase communicant activeness about some "problems" that their products can solve. Then, the active problem solvers would generate more word-of-mouth effects. Our theory and findings

suggest that the selective increase of only some dimensions of information behaviors (e.g., information forwarding) would not be feasible, if not impossible. These information behavioral domains are all correlated with heightened motivation about the given problematic situation and they are interrelated in the higher-order concept of CAPS.

In most cases, information campaigns will be ineffective unless the situational motivation produced by the independent variables is present. Many current theories of health communication, for example, assume exposure to messages to be a given – e.g., in experimental research (see also Slater, 1997, p. 129). Some even treat information seeking as a message effect. Our theory would suggest that information seeking is an unlikely effect because people would not be exposed to the message that is supposed to affect them unless they are previously motivated to do so by their perceptions of the problem. Thus, the theory suggests that applied communicators should adjust their strategy to the people they hope to influence rather than try to "persuade" them to follow the directions in a message. Our new STOPS theory is important, however, because it suggests that people may seek to pass on their perceptions of the situation to others, who might in turn then be motivated to engage in information behaviors themselves. Nevertheless, the theory suggests that communicators should see their job as one of helping people solve problems rather than of persuading them to adopt attitudes or behaviors preferred by the communicator.

At the same time, it is interesting to focus on some of the information behavioral dimensions as communicative objectives. For example, information forefending is of two types, objective and subjective forefending, and could be a double-edged sword. In an objective forefending case, a communicant could forefend data faster and more effectively from relevant and quality information than from irrelevant and low-quality information, which is desirable. In subjective forefending, a problem solver may select more self-fulfilling information (to reinforce one's wishful/willful thinking) regardless of its contribution to "genuine" problem solving. Thus, health communicators may aim at decreasing subjective information forefending among risk groups; educators would aim at increasing objective forefending among students to enhance their problem-solving potential with more and better information.

Finally, the expanded STOPS theory increases the relevance of the STP in public relations—the communication discipline where it has been used most. Most importantly, by including information giving among its communication behaviors, STOPS addresses the concerns of critics who have asked for a theory that explains the communicative interactions of members of publics. By adding information selection to the variables, STOPS explains why members of publics seem to ignore or avoid information available to them. They do so not because of the attitudinal valence of the information but because of its relevance to them, the timing of problem solving, and the availability of previous solutions held in referent criteria.

In conclusion, we acknowledge three limitations of the study. First, in Study 1 we were forced to design a lengthy questionnaire in order to construct measurement scales and test all of our concepts across three situations. Participant fatigue might have reduced the validity of measurement. Second, we asked participants to respond to each question for the multiple problems consecutively. Although we believe this method reduces the demands on participants, others might believe that the results would have been more valid if participants had answered all questions for one problem at a time. Finally, we identified poor wording of a small number of items and will correct that wording in future research.

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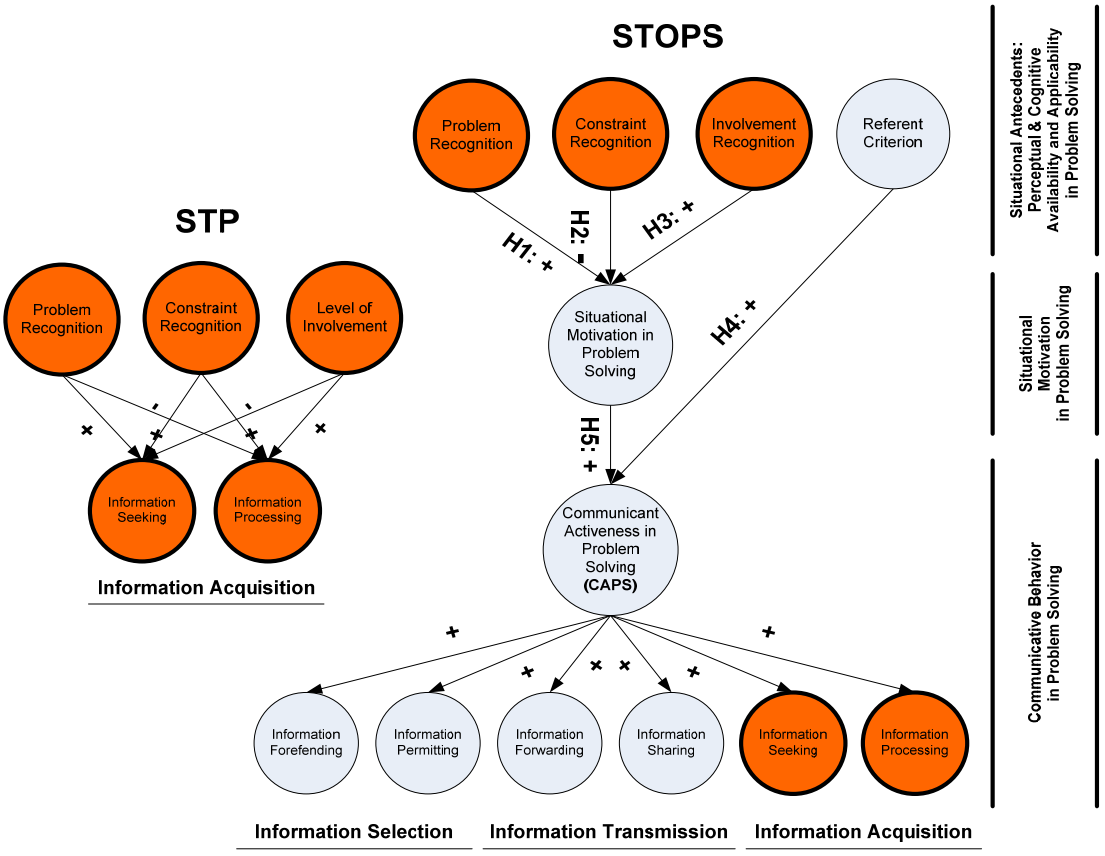
Figure 1: Situational theory of publics (STP) and situational theory of problem solving (STOPS).



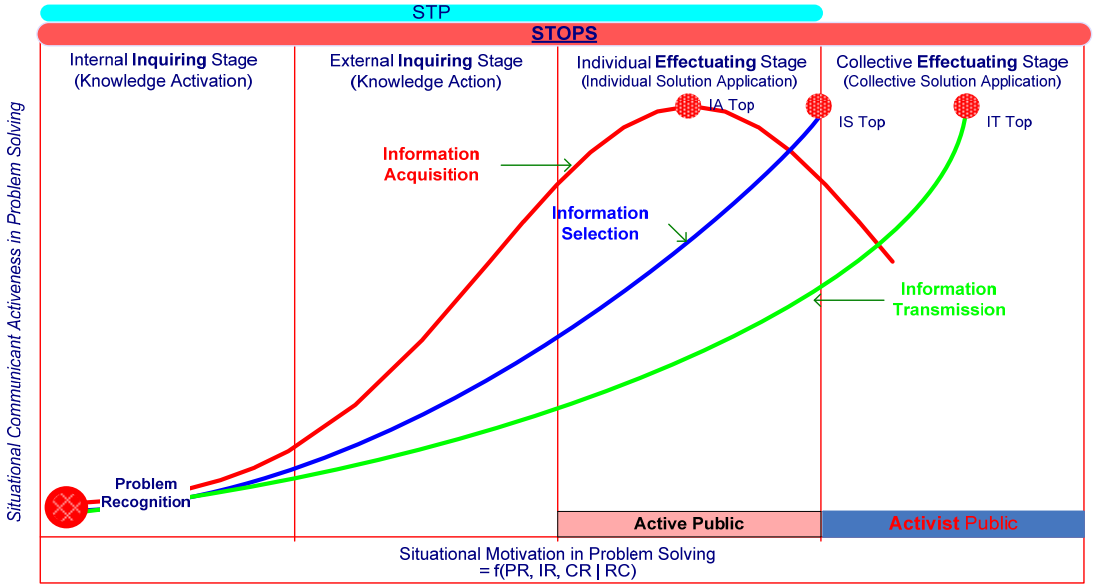
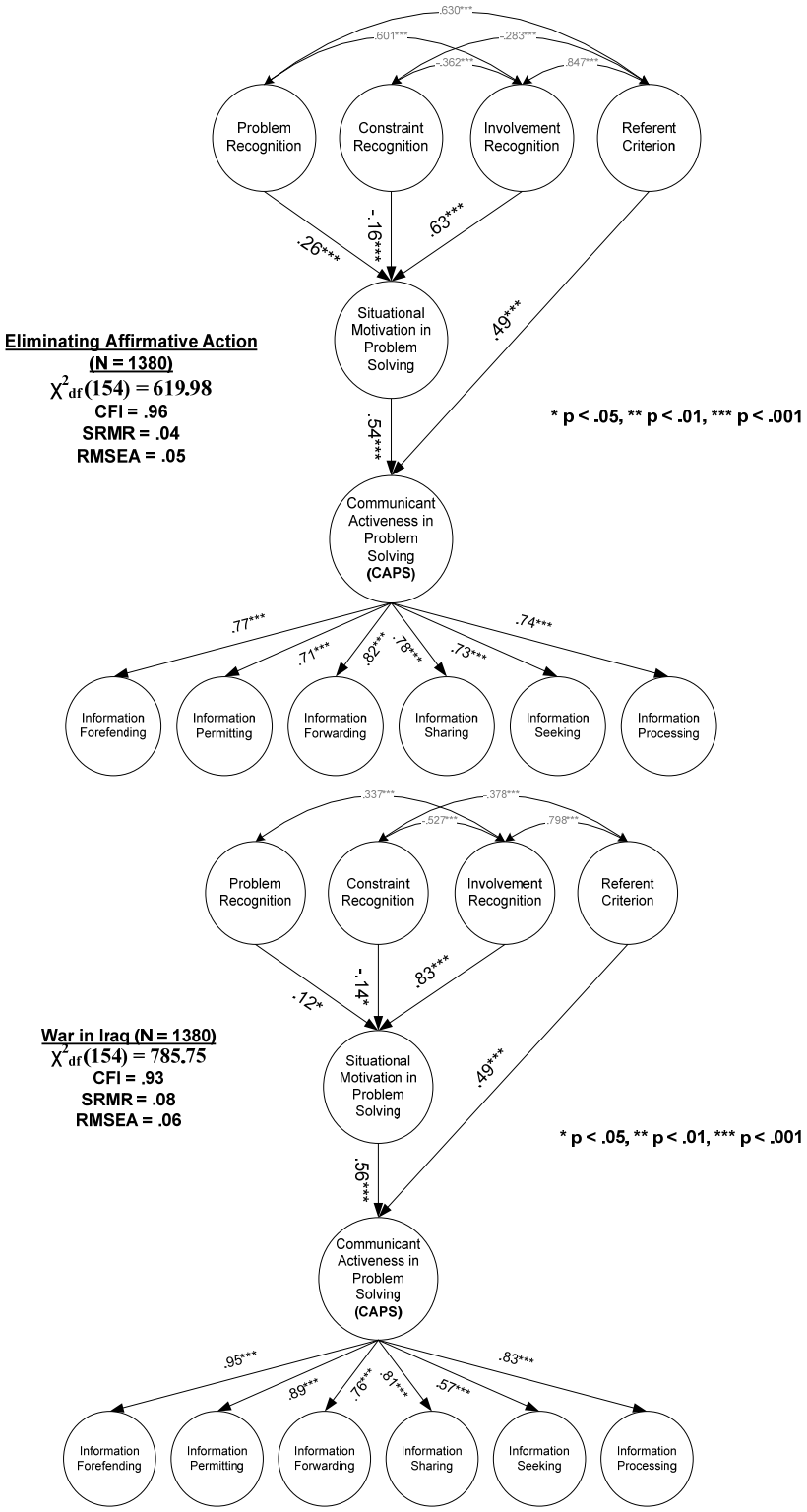


Figure 2: STOPS structural models.

Study 1: Individual and social problems



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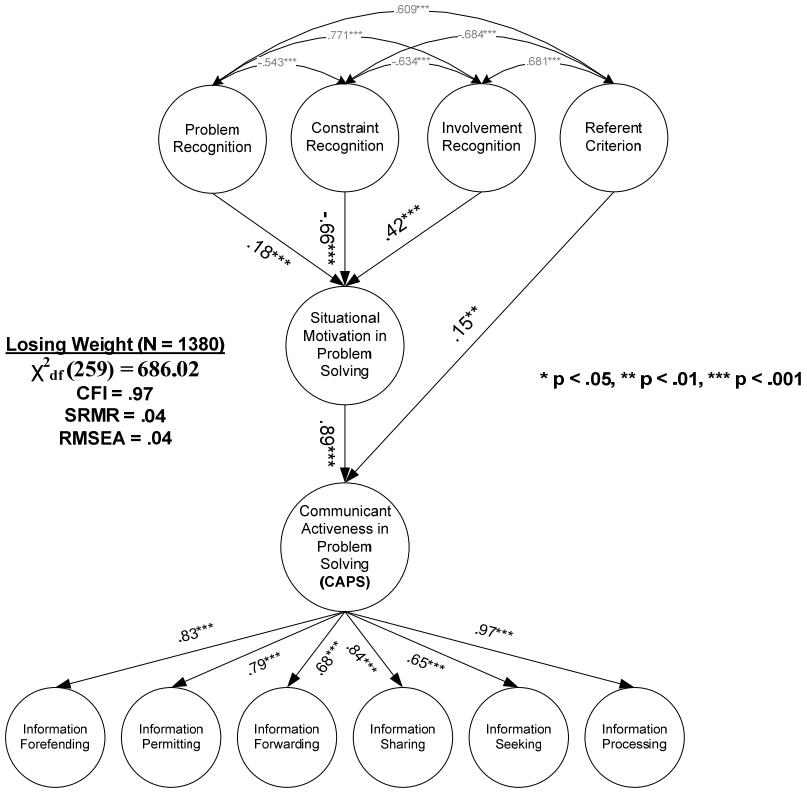
.609***
.771***
-.684***
-.543***
-.634***
.681***
Problem Recognition
Constraint Recognition
Involvement Recognition
Referent Criterion
.18***
-.66***
.42***
.15**
Situational Motivation in Problem Solving
.89***
Communicant Activeness in Problem Solving (CAPS)
.83***
.79***
.68***
.84***
.65***
.97***
Information Forefending
Information Permitting
Information Forwarding
Information Sharing
Information Seeking
Information Processing
Losing Weight (N = 1380)
$\chi^2_{df}(259) = 686.02$
CFI = .97
SRMR = .04
RMSEA = .04
* p < .05, ** p < .01, *** p < .001

Study 2: Health-related controversies

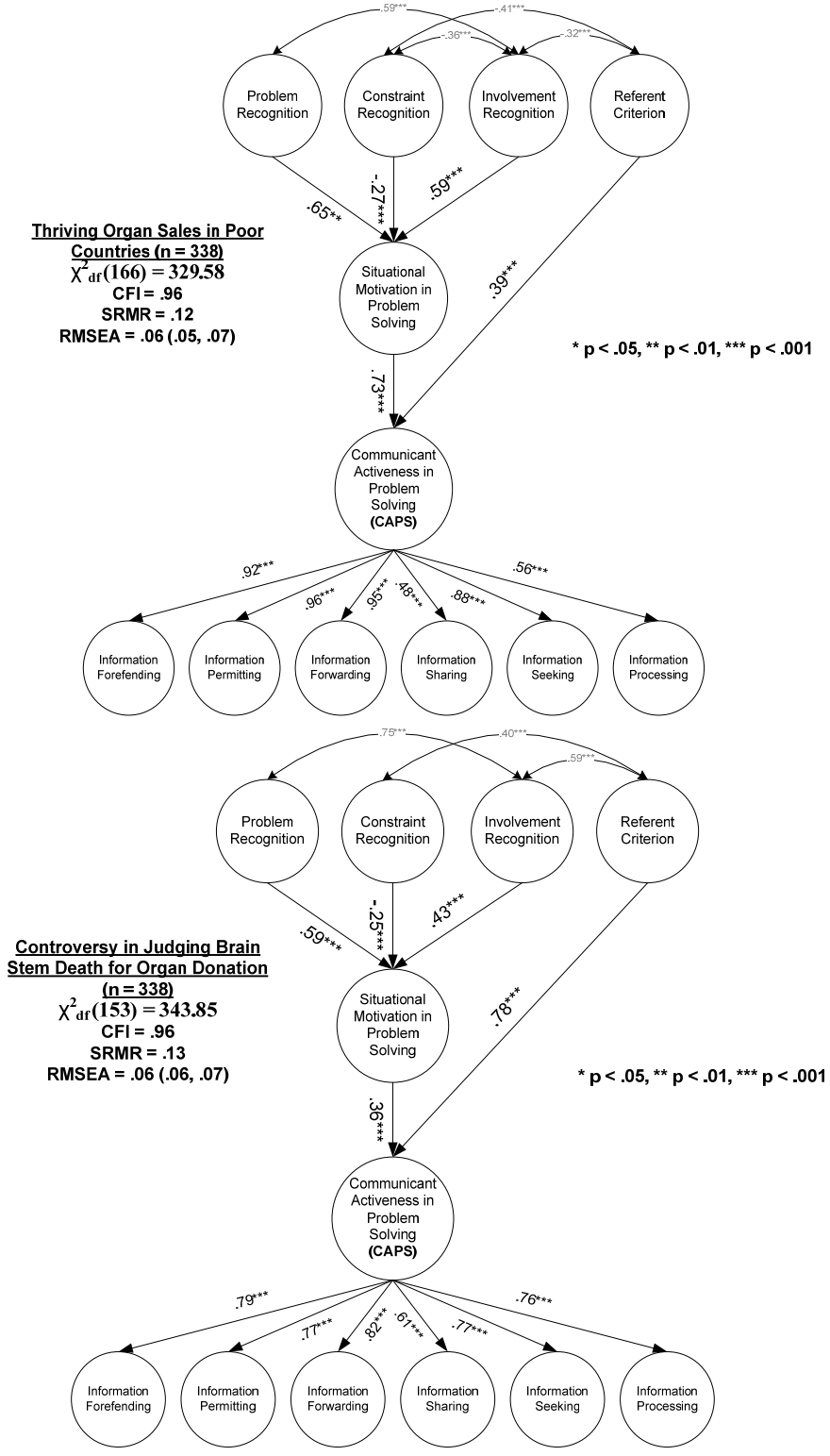

Table 1

Reliability for Dependent and Independent Variables

		Study 1 (N= 1380)			Study 2 (N= 338)	
		War in Iraq	Losing Weight	Eliminating Affirmative Action	Organ Sales	Judging Brain Stem Death
Dependent Variables	Information Forefending	.80	.79	.81	.80	.76
	Information Permitting	.65	.65	.64	.85	.88
	Information Forwarding	.89	.88	.90	.86	.86
	Information Sharing	.79	.79	.78	.74	.77
	Information Seeking	.81	.85	.87	.83	.84
	Information Processing	.70	.70	.58	.74	.76
	Communicant Activeness in Problem Solving	.93	.94	.95	.84	.86
Independent Variables	Problem Recognition	.74	.75	.74	.64	.65
	Involvement Recognition	.69	.74	.76	.72	.76
	Constraint Recognition	.81	.79	.79	.73	.79
	Referent Criterion	.76	.78	.81	.61	.72
	Situational Motivation in Problem Solving	.67	.74	.57	.75	.80

Notes

[1] The concept of a referent criterion was included in early versions of the STP and then dropped because it failed to predict information seeking and processing. This concept will be reinstated in the more general theory developed in this article.

[2] As one's problem-solving efforts increase, both information forefending and permitting increase. Information permitting does not require a tradeoff with information forefending in practice. They coexist, but quite often as communicant activeness arises, information forefending is more salient than information permitting. CAPS was founded on the premise that human actions result from a mixture of internal forces -- i.e., promoting motivation and preventing motivation toward an action can coexist. For example, feeling and acting love do not require the absence of a negative affective state about the beloved. Notably, information permitting is more salient in the earlier stages of problem-solving efforts -- i.e., the inquiring phases; whereas information forefending is more salient in the later stages of problem-solving efforts -- i.e., the effectuation phases (see Figure 1).

[3] In terms of history of the concepts, self efficacy originated in 1977, in Bandura's article in Psychological Review, while our concept, constraint recognition, was introduced at least 10 years before (J. E. Grunig, 1966, 1968). Although social learning theory and the self-efficacy concept have been widely used in social psychological and communication research, our concept of constraint recognition, although similar to efficacy, fits better with the assumptions of our theory; and we prefer to use our own definition and measures rather than Bandura's.

[4] The hypotheses within the CAPS model are not the focus of the current article. We are mainly interested in testing the structural paths in the situational theory. Tests of the hypotheses in the CAPS model as a stand-alone variable can be found in xxx (2006).

[5] The purpose of this study was to develop new variables and new theory. In practice, "most early tests of nascent theories" adopt non-probability samples. Although such a strategy is not ideal, it is useful for initial theorizing and testing with multivariate relationships (Caplan, 2005, p. 732). Also, Shapiro (2002) and Calder, Philips, and Tybout (1981) maintained that a representative sample is not necessary to make theoretical generalizations, if statistical generalization of the finding is not the goal.

[6] The Web site containing the questionnaire was constructed by a professional online survey research firm, CreateSurvey (http://www.createsurvey.com).

[7] To generate and test new measurement items we included 90 items in the questionnaire. These 90 items were applied to each of the three problems we tested. Therefore, participants responded to 270 items. We acknowledge that this large number of items may have created fatigue for participants and thus limits the validity of the measurement.

[8] We used Satorra-Bentler Robust scaled chi-square, using ML, Robust estimator in EQS 6.0.

[9] We conducted multiple pilot tests using different individual/social issues before the main data collection such as legalizing gay marriage, obesity, heredity diseases related with family history, legalizing gay marriage. STOPS explains that the extent of information behavior, not the "valence" such as pro- or con- stance on the problem. Perhaps participants drawn in the sample withheld opposite positions regarding the eliminating affirmative action or war in Iraq. Yet, as long as each group found the change in policy as problematic and relevant to them, their information seeking, forwarding, and forefending will increase. Hence, the influence of the selection of the problems/issues produces quantitative, not qualitative, differences in modeled conceptual relationships. In other words, across the individual or social (controversial) issues, we expected that the magnitudes of the structural coefficients could vary, but in general the valence should not vary.