

Investigating the Dynamics of Trust in Government: Drivers and Effects of Policy Initiatives and Government Action¹

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Introduction

Governments face important challenges today, including the erosion of the social systems, terrorist activities, and global warming. In order to be successful, governments must have support from its citizens in the form of confidence and trust. (For a review of the literature, see Blind, 2007.) Because “trust is an important barometer of public satisfaction with government, and has important electoral consequences” (Keele, 2005, p. 884) and because “low trust helps create a political environment in which it is more difficult for leaders to succeed” (Hetherington, 1998, p. 791), understanding the dynamics of trust in government seems central for determining the ways to generate government actions that lead to adequate government performance. Building on the work by Baldwin, Ramaprasad, and Samsa (2006), which examines the components of public confidence in government as they relate to prevention of terrorist attacks, we create a framework for understanding the dynamics of trust in government and how these influence policy initiatives, government actions, and, ultimately, outcomes observed by the public. Following the rationale presented in the literature (Keele, 2005, 2007), we hypothesize that people’s trust (or distrust) in government has a direct effect on the success of the government’s initiatives. Similar to the work of Cook and Gronke (2005b), we conceptualize a trust continuum from low to high in which the population falls in a normally distributed fashion under normal circumstances (see Figure 1). Cook and Gronke (2005b) identify what they call an active trust/distrust continuum, in which, at the low end, individuals have a very strong distrust in government (see Cook et al., 2005b, p. 790 Figure 1). This conceptualization is consistent with our study in that we hypothesize that individuals at the low end of the spectrum will have a higher likelihood of engaging in actions to counter government initiatives.

¹ This work was funded in part by the U.S. Department of Homeland Security. This article has been created by UChicago Argonne, LLC, Operator of Argonne National Laboratory (“Argonne”). Argonne, a U.S. Department of Energy Office of Science laboratory, is operated under Contract No. DE-AC02-06CH11357. The U.S. Government retains for itself, and others acting on its behalf, a paid-up, nonexclusive, irrevocable worldwide license in said article to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government.

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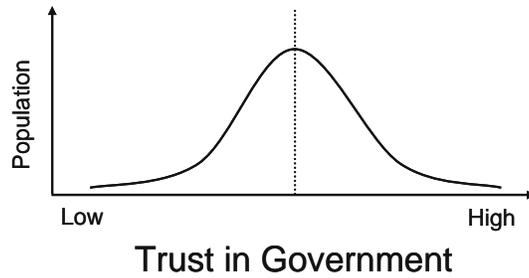


Figure 1 Distribution of Trust in Government in the Population

In addition, we hypothesize that as a result of government actions and perceived outcomes of these actions, public trust in government changes over time. Thus, public trust in government could increase or decrease depending on the alignment of these actions and outcomes with the public's goals and values. As individuals change their views on how trustworthy their government is, other individuals are influenced, which could result in a global shift. Figure 2 shows a shift from lower levels of trust to higher levels of trust. A shift in mean trust is presented, which goes from a mean a to a higher mean b to an even higher mean c . The relative distribution remains the same. The progression could be achieved by going the opposite way (from relatively high levels of trust to lower levels) when government actions and outcomes are not aligned with public values.

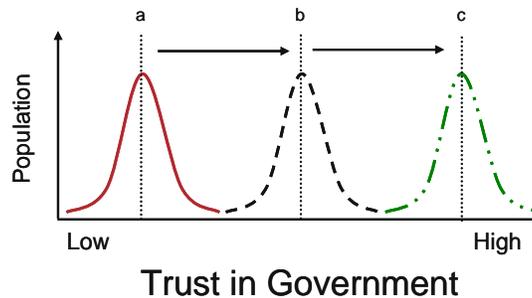


Figure 2 Distribution Shift

Furthermore, the case depicted in Figure 2 is not the only one likely to happen. Government policies and outcomes can create shifts in the mean and in the distribution of trust in government. Figure 3 shows a progression from a relatively low level of trust to a higher level of trust with a change in distribution. First, when the population, as an aggregate, has a low level of trust (mean a), a higher fraction of that population would be willing to engage in actions to prevent or obstruct government actions, since a low level of trust in government influences negative views of government activity (Weakliem and Villemez, 2004) and thereby changes the actual and perceived outcomes that the population uses to update its view of the level of trust that the government deserves over time. As the overall trust level grows (from mean a to b to c), we

hypothesize that the fraction of the population that is anti-government decreases significantly, increasing the success rate of government actions.

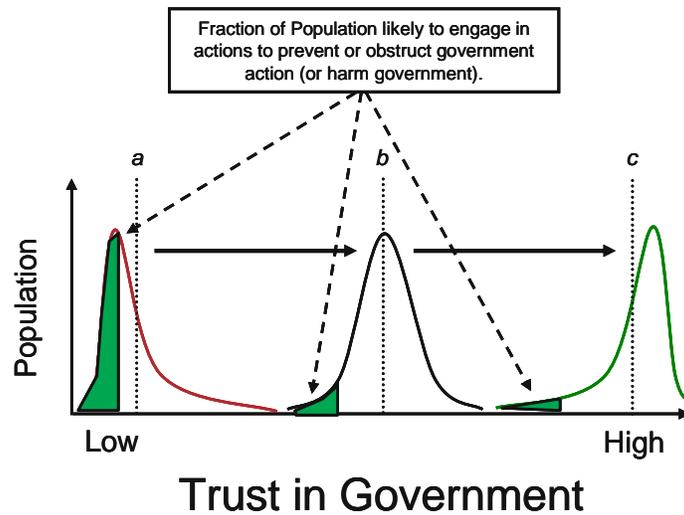


Figure 3 Asymmetric Changes in Distribution

Trust and Confidence

Trust is a key concept in social studies, and there seems to be general agreement in that trust is an important antecedent to cooperation (Ho and Weigelt, 2005; Lundin, 2007; Martinez-Moyano, 2006; Putnam, 1995). Recent research, however, suggests there is a possibility of achieving cooperation without trust (Cook, Hardin, and Levi, 2005a; Raymond, 2006). In addition, trust has been mentioned as the foundation for good governance (Cheema, 2005), and although “trust is an unattractive concept for economists since it is not measurable” (Perelman, 1998, p. 386), and “regardless of the difficulty of placing trust in econometric equations” (Perelman, 1998, p. 387), trust is gaining acceptance and importance as a crucial economic variable that needs to be included in studies related to government performance (Yang and Holzer, 2006). Also, theoretical work aimed at clarifying antecedents and outcomes of trust has been developed (Dirks and Ferrin, 2001; Mayer, Davis, and Schoorman, 1995).

Although some scholars use the terms trust and confidence interchangeably and, in some cases, as part of mutual definitions (Barnes and Gill, 2000), others have spent a great deal of effort into distinguishing the two concepts and their importance (Baldwin et al., 2006; Cook et al., 2005b; Earle and Siegrist, 2006; La Porte and Metlay, 1996; Siegrist, Earle, and Gutscher, 2003; Simonson, 1999; Tolbert and Mossberger, 2006). For example, Barnes and Gill (2000, p. 1) define trust as “the level of confidence citizens have in their government (both politicians and

public officials) to ‘do the right thing,’ to act appropriately and honestly on behalf of the public.’” Alternatively, La Porte and Metlay (1996, p. 342) clearly distinguish the two concepts by defining trust as “the belief that those with whom you interact will take your interest into account even in situations where you are not in a position to recognize, evaluate, and/or thwart a potentially negative course of action by *those trusted*,”³ and by defining confidence as “when the party trusted is able to empathize with (know of) your interests, is competent to act on that knowledge, and will go to considerable lengths to keep its word.” La Porte and Metlay (1996) also propose the construct of trustworthiness as the combination or concurrent existence of both trust and confidence. Das and Teng (1998), in their research, distinguish between trust and control and use confidence as the element to understanding this distinction.

For the purposes of this study, we define trust in government as the public’s belief that the government will act in the right way, and we define public confidence as the public’s belief that the action that the government takes will produce the right outcomes.

The Model

Expanding on previous work related to insider threat identification dynamics (Martinez-Moyano, Conrad, and Andersen, 2007; Martinez-Moyano, Rich, and Conrad, 2006; Martinez-Moyano, Rich, Conrad, and Andersen, 2006; Martinez-Moyano, Rich, Conrad, Andersen, and Stewart, Forthcoming; Martinez-Moyano, Rich, Conrad, Stewart, and Andersen, 2006), and on work related to identification of collaboration dynamics in interorganizational settings (Martinez-Moyano, 2006), we use the system dynamics approach (Forrester, 1961; Richardson and Pugh, 1981; Sterman, 2000) to create a feedback-rich view of the dynamic influence of trust in government in government actions and outcomes and of the dynamic drivers of trust in government (see Figure 4). In the model, we use concepts and constructs of social judgment theory (Brunswik, 1943, 1956; Hammond, 1996; Hammond, 2007; Hammond, McClelland, and Mumpower, 1980) and signal detection theory (Green and Swets, 1966; Swets, 1973) to characterize the judgment and decision-making processes that the public can use to determine its level of trust in government in a dynamic way. In addition, we use appropriate insights from the system dynamics literature to model and characterize the processes of perception and of expectation formation. Lastly, in modeling the perception process, we also draw on concepts from the cognitive psychology literature (Goldstein, 2005).

³ Emphasis in the original.

We gradually present our model of trust in government by starting with a simple government-centric model of government actions and results and elaborating from there to our final bilateral trust model. The first model discussed, the government-centric model shown in Figure 4, captures the way in which the government assesses a given situation, acts accordingly, and updates the conditions for future action as a function of the results experienced.

In this model, we characterize the process of assessing a given situation as a judgment process taken prior to the decision-making process that leads to action. To model the judgment process, we use elements from the social judgment theory literature; specifically, a variation of the lens model proposed in the Brunswikian tradition (for details, see Brunswik, 1943, 1956; Hammond, 1996; Hammond and Stewart, 2001).

The lens model of judgment captures the relationship between the mental process of judgment and environmental information cues by using a linear additive combination of the latter that has been empirically identified as a robust characterization of human judgment processes (Stewart, 2000; Stewart and Lusk, 1994). In a fully mathematically characterized model, the judgment equation is of the form shown in Equation 1:

$$(1) \quad Y = w_1X_1 + w_2X_2 + \dots + w_nX_n + e$$

where Y represents the judgment of certain event or phenomenon, X_n represents the information cues used in such judgment process, w_n represents the relative weight that each information cue has on the judgment, and e represents the unavoidable uncertainty in the judgment process (for a more elaborate discussion of the lens model equation, see Stewart, 2001). In our model, the judgment of interest is the government's judgment of a critical/crisis situation. For example, when the government confronts intelligence that suggests a possible terrorist attack, it needs to assess the situation and decide if action is warranted. To judge the situation, the government officials look at several information cues and combine them with different relative weights to conclude if the cues are indicative of eminent danger. Information cues might be intelligence reports, military activity abroad, previous terrorist attacks, or the release of a video about the threat on world media outlets. The government knows that the information cues are neither perfect nor complete, making the judgment process unavoidably uncertain and, therefore, subject to error. In addition, all errors are not the same in terms of consequences. On one hand, the government might err on the side of triggering unnecessary actions if the information cues that it judged to be a credible terrorist threat were not that in reality. In this case, the government may incur high financial costs and credibility-related costs with the citizenry. On the other hand, the

government might err on the side of not acting when action was actually warranted, potentially creating conditions that could have very negative consequences on the population (high financial cost, lives lost, etc.). In this second case, the government's misjudgment of the situation might result in a major loss of confidence and trust that would be difficult to overcome in the future.

In our government-centric model, we propose that government action is the only determinant of outcomes experienced in the system (Figure 4). This captures a case in which, after the government judges the situation as critical and decides to embark on a course of action believed to be a solution, government intervention alone, without interaction with the public, can deal with the problem. For example, suppose the government receives information cues related to the possible strike of a hurricane in an area that is believed to be at risk of flooding if that were to occur. In addition, suppose the government has access to information that leads it to believe that a massive mobilization of the people living in that area is not warranted if adequate precautionary measures are taken. The measures believed to be necessary include reinforcement of levees, additional pumping mechanisms at strategic points in waterways leading to that geographic area, and other precautionary measures. As a result of this judgment of the situation, the government deploys resources and actions within full control of the government and takes care of the situation. As a result, the outcome experienced is that the atmospheric event passed through the geographical area without causing any damage or inconveniencing the population. The basic problem of causal attribution remains, however, but the government assumes that its intervention was successful and that the outcome experienced was a result of the intervention.

In our model, after the government action is taken and the outcome is experienced, we propose that an important process develops: the perception of outcomes. In this initial model, we say that the perception of the outcome experienced is solely a function of the actual outcome and that this perception of outcome allows the government to adjust its decision threshold for future action. The government decision threshold represents the level at which a given situation is determined to be a problem that warrants government intervention and action. In this rationale, higher decision thresholds make government intervention less likely, since more necessary conditions for action are needed than when lower decision thresholds exist. For a given distribution of events, an optimal decision threshold — that would minimize error and/or consequences of error — can be identified.

Considering actual outcomes to be the only drivers of government perception of outcomes is consistent with most of the literature on dynamic decision making and dynamic learning in

complex systems. In these strands of literature, the perception of outcomes is generally modeled as a delayed understanding of outcomes and, in most cases, as directly related to these outcomes enjoying the benefits of complete and perfect information. This is, in reality, an extremely stringent assumption that we address as we further elaborate our model.

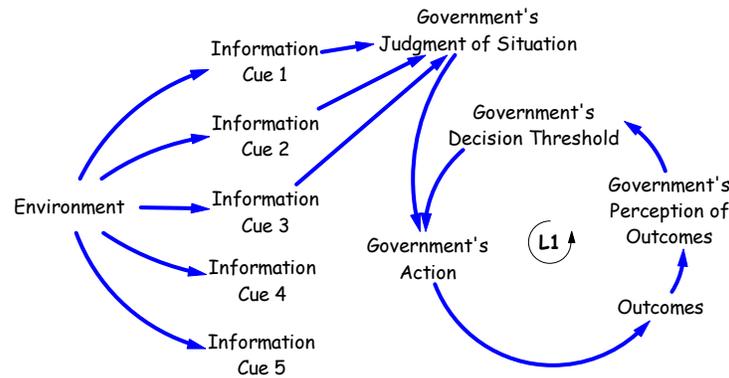


Figure 4 Government-centric Model

In the government-centric model, the construct *government's action* is part of one feedback mechanism (Feedback Loop L1 in Figure 4), and so is the *outcomes* construct. In this model, we propose that government's action determines the outcomes experienced in the system, which, after a process of identification, become the government's perception of outcomes. Once the outcomes have been perceived by the government, the government uses this information to update its decision threshold (evaluation of the results of the previous action taken); this threshold, when compared with the government's judgment of the situation, determines the next set of government actions to be taken. The feedback mechanism described above captures a learning loop in the side of the government, in which the government learns on the basis of the outcomes experienced.

The theory of learning used in this part of the model is consistent with reinforcement learning theories (Kolb, 1984) and with outcome-based learning theories (Erev, 1998; Erev, Gopher, Itkin, and Greenspan, 1995; Hammond, 2000) found in psychology and economics literature. In reinforcement models, good outcomes reinforce the strategies used, and bad outcomes generate pressures for changes in these strategies (Erev, 1998; Hammond, 2000). Other models of learning include belief-based learning models that focus on the role of past performance and expectations of future performance as drivers for changes in strategies (Feltovich, 2000) and mixed models that use characteristics of reinforcement models and belief-based models to be able to characterize a larger variety of learning processes (Camerer and Ho, 1999; Klayman, 1984). Some learning-related research, however, points against the use of reinforcement models based

on outcomes, given the inherent causal attribution problem existent in linking action and outcomes (Klayman, 1988a, b).

The government-centric model presented assumes that government action alone can generate the outcomes experienced. In crisis situations (either natural or manmade), however, government initiatives are just part of an orchestrated set of actions in which the general public plays a key role in generating the experienced results. Existing research explores public participation before (King, Feltey, and Susel, 1998) and after (Kasperson and Pijawka, 1985) an event occurs. Our concern in this model is with public response during the event as part of the necessary actions to create positive outcomes in the system. To address the interaction of government and public action in the creation of experienced outcomes, we propose the government-public model as an extension to our government-centric model. Figure 5 shows the additional structure included to account for public participation.

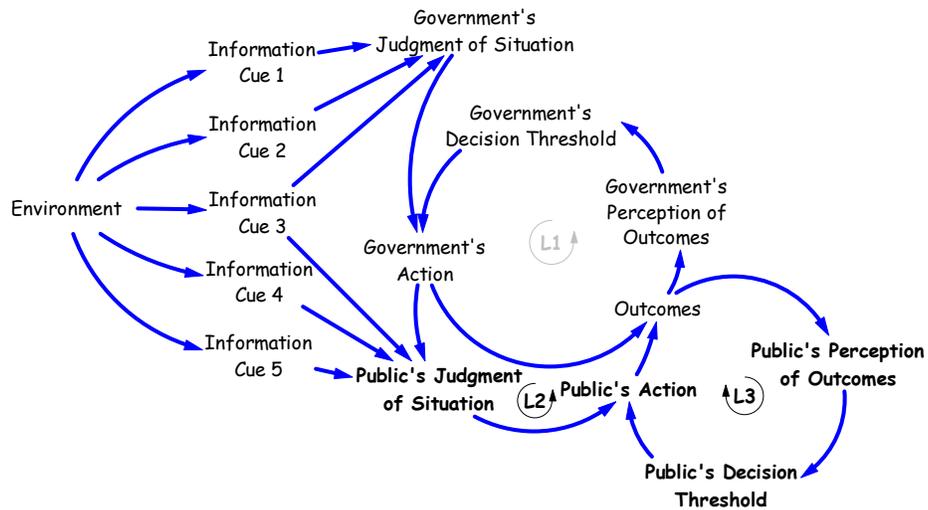


Figure 5 Government-Public Model

The government-public model includes an additional feedback structure that captures the existence of the public in generating the outcomes experienced in the system. In this extension of the government-centric model, we recognize that in most of the cases in which government intervention is required, the response of the public to the directives of the government influence and determine the outcomes experienced. In this case, the outcomes experienced are a function of the action of both actors in the system (Bhattacharya, Devinney, and Pillutla, 1998). This model conceptualizes the public's judgment of the situation in the same way that the government creates a judgment of the situation. Both the government and the public look at information cues and, through a process of information integration, judge the severity of the situation. One important difference, though, is in the information vector that the two actors are able to consult. In the

government side, the information cues available can be more profuse and of higher quality than those that the public can access. For example, in the case of a potential terrorist attack, the government might have privileged (secret) information that would provide a clear picture of the severity of the situation, while no information whatsoever might be available to the public. In a case such as this, the public would know only what the government releases, and that information would have to suffice to judge whether the action required by the government is warranted or not. Alternatively, in the case of an atmospheric event such as a hurricane, the public might have access to a wide set of information cues to inform their judgment. The government, however, with more resources and infrastructure, might be able to analyze and interpret the same information vector in a more efficient and effective way and determine more accurately the severity of the situation.

Our model says that, in addition, once the government decides to take action (which includes the participation of the public), the public uses that piece of information as additional knowledge to judge the situation and, after comparing its judgment with its decision threshold, to determine what action to pursue. In this new model, the construct *government's action* is now part of two feedback mechanisms (Loops L1 and L2 in Figure 5). In this model, the government's action is still directly determined by the learning loop, Loop L1, but now it is, in addition, indirectly determined by the public's judgment process and action, since these influence the outcomes experienced in the system. Furthermore, the construct *outcomes* is now part of three feedback mechanisms (Loops L1, L2, and L3 in Figure 5), which substantially increases the dynamic complexity of the conceptualization of the construct. The dynamic behavior of *outcomes* is now determined by the direct interaction of seven variables in three feedback loops, being the result of the government learning about what to do in a crisis and also determined by a learning process in which the public is trying to establish the best course of action, given its limited access to information and capacity to process it. In this case, two interaction feedback learning processes determine the outcome that later is perceived by both actors and determine the new decision thresholds to be used in the future. Feedback Loop L3 in Figure 5 proposes (as does Loop L1 for the government) a reinforcing outcome-based learning mechanism for the public.

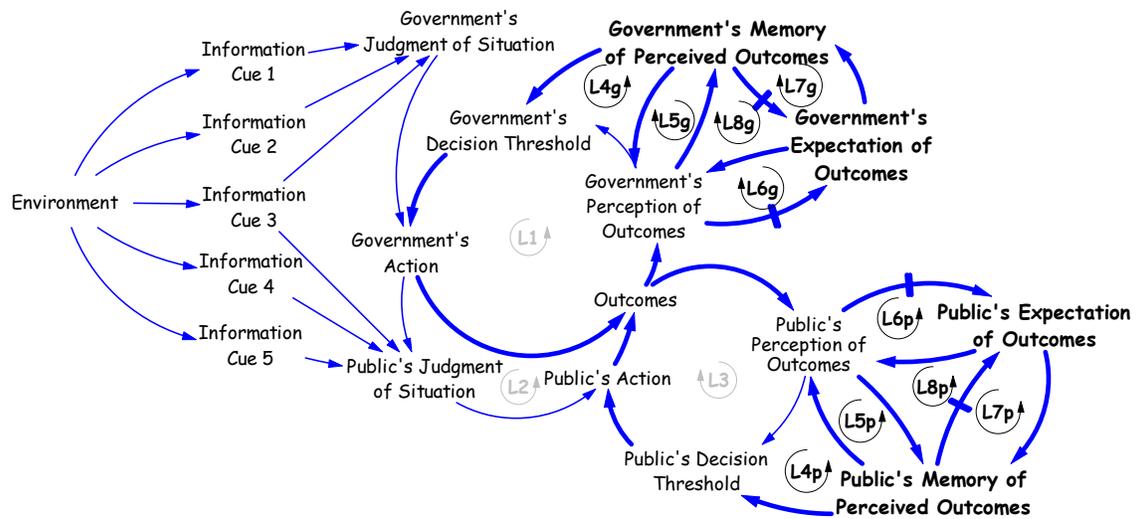


Figure 6 Expanded Government-Public Model

Although the government-public model recognizes the existence of the public in generating outcomes, it is not yet able to capture clearly identified antecedents to trust in the government, as are found in the literature. In Figure 6, an expanded government-public model is proposed to address this issue.

The expanded government-public model presented in Figure 6 reveals the presence of two elements that the literature describes as important drivers of the dynamics of trust in government: memory of outcomes and expectations of outcomes (Bhattacharya et al., 1998; Chanley, 2002; Pinker, 2007). This expanded model captures the influence that the memory of outcomes and the expectations of outcomes have on the perception of outcomes and on the level of the decision threshold of both the government and the public.

In the government-public model, the determination of the level of the decision threshold is posed solely as a function of the perception of outcomes. In the expanded model, first we expand this conceptualization to include the effect that the memory of perceived outcomes has on the determination of the decision threshold (see Loop L4p and L4p in Figure 6). We propose that perceived outcomes are accumulated in a memory of perceived outcomes that also influence the determination of the threshold. In this expanded theory, individuals making decisions related to the appropriateness of the level of the decision threshold consider not only what they were able to identify happened recently in terms of outcomes (*perception of outcomes*) but also what they can remember about the outcomes over a longer period of time (*memory of perceived outcomes*). Incorporating memory into the calculation of new decision thresholds is consistent with reinforcement learning theories (Camerer et al., 1999; Erev et al., 1995) and with the psychology

of attention and memory (Atkinson and Shiffrin, 1968; Goldstein, 2005; Goldstein and Hogarth, 1997), which describes the link as being present and, in some cases, critical to explaining the changes observed. This new conceptualization that includes a memory component allows the theory to capture several different types of actors, from those having an extremely poor memory (individual or organizational) to those having an excellent memory, who would not ever forget any perceived outcome. It is conceivable that, under conditions of perfect memory (nothing is forgotten over time), the value of new information related to perceived outcomes decreases, since one individual outcome is so small when compared with an accumulation of outcomes. On the other hand, under conditions of no memory whatsoever (i.e., some kind of amnesia), the information used to determine the level of decision threshold would be the immediate information exclusively, creating a potentially unstable system (reactive only to current outcomes). Depending on cultural and educational elements, it could be assumed that in general, the government will have a larger accumulated memory of outcomes than the public will, since the government most likely has institutional support for maintaining a database of perceived outcomes and more resources than the public has for retrieving, analyzing, and using relevant information.

The memory of perceived outcomes also partially determines the perception of outcomes, since it provides a path for identifying and interpreting outcomes over time. Loop L5p and L5g reveal that the process of perception not only is a function of actual outcomes but also is influenced by the existence of prior memory of outcomes. According to cognitive psychologists, a chunk of memory is “a collection of elements that are strongly associated with one another but are weakly associated with elements in other chunks” (Goldstein, 2005, p. 157). Memory of outcomes provides chunks that allow retrieval of information and identification of new information, which influence the type of outcomes that are perceived over time. This feedback loop (L5p and L5p) creates a reinforcing pattern, since perceived outcomes feed memory, which, in turn, provides a framework for further the identification of relevant information related to outcomes.

Perceived outcomes, over time, influence the level of expectations of outcomes through a process identified in the sociological literature as normalization of deviance (Rasmussen, 1997; Sterman, 1994; Vaughan, 1996, 1998, 1999) and in the dynamic modeling literature as sliding goals (Forrester, 1961; Sterman, 2000). Expectations of future outcomes might evolve independently of the experience of people when the conviction is that expected results are actually attainable (even in light of evidence to the contrary). However, in general, individuals tend to adjust expectations and goals to the level of outcomes they have experienced. In addition, the expectation of

outcomes also provides critical information and guides the perception process. In our model, Loop 6p and 6g in Figure 6 capture this influence. Our conceptualization is consistent with the cognitive psychology of perception, which describes expectations (and existing knowledge) as top-down influences on perception and describes incoming data (information related to current outcomes) as bottom-up influences on perception and says that together, they shape the final state of perception (see chapter three in Goldstein, 2005). This modified characterization of perceived outcomes recognizes that the highly active and constructive process of perception often “fills in” on the basis of experience and expectations, as described in the cognitive psychology literature (Goldstein, 2005; Goldstein et al., 1997; Hammond, 2000).

In the same way that memory of outcomes constitutes an additional source of information for determining the decision threshold, it influences the determination of expectations since it represents accumulated outcomes experienced over time. Expectations of outcomes, in turn, influence the memory of outcomes by providing a sense of importance and a path for what to maintain in memory and what to discard. Loop 7p and 7g captures this feedback process. Lastly, Loop 8p and 8g in Figure 6 capture the mechanism that provides additional inertia to the path identification and dependence of perception, memory, and expectations. As outcomes are perceived, the expectation of future outcomes is influenced, and as the expectation changes, the memory of perceived outcomes is reshaped. As what is kept in memory changes, and as new perceptions are influenced by these changes, more influence on expectations is exerted, which closes a reinforcing mechanism that can provide inertia for growing or declining expectations over time. This process, although subtle in most cases, can be extremely powerful in explaining the process by which expectations and perception get locked in certain conditions over time.

The expanded government-public model provides a richer conceptualization of the determinants of perception of outcomes and the learning processes associated with finding adequate levels of decision thresholds. However, it still does not explain the links to public trust in its effects. To address these links, we propose the unilateral-trust-in-government model shown in Figure 7.

Because “trust is based, at least in part, on a simple performance evaluation” (Keele, 2007, p. 243), our unilateral-trust-in-government model links the public’s memory of perceived outcomes (experience of performance) to its trust in government (see Figure 7). Positive performance increases trust because it is evidence of the ability to perform, and poor performance decreases trust because it is evidence of the inability to perform. In addition, in our unilateral-trust-in-government model, we conceptualize the public’s trust in government as a function of the level of

the public's expectations of outcomes (expectations). We agree with Rousseau, Sitkin, Burt, and Camerer (1998, p. 395) in that "trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another," and we use this link to capture the effect that expectations, when paired with the memory of perceived outcomes, have on trust formation (Chanley, 2002; Goold, 2002; Ho et al., 2005; Lewicki, McAllister, and Bies, 1998; Mishler and Rose, 1997). With this characterization of trust, we recognize that outcomes alone are not sufficient to explain changes in trust over time, as found in Keele's (2005) work on party control and trust in government and in Gershtenson, Ladewig, and Plane's (2006) work on changes in political environment, among others. Keele (2005) found that although outcomes observed are important predictors of trust, they are not sufficient to explain trust variations over time, especially when positive outcomes are consistently experienced. Moreover, Barnes and Gill (2000), for example, discard performance (perceived outcomes) as a determinant of trust in government but present citizens' rising expectations as a likely explanation for decreasing trust in periods when government performance seems to improve. We conceptualize trust as a function of both experience and expectations. By using this multivariate approach, we allowed for the possibility of having different levels of expectations and different levels of experience of performance interact in the determination of trust. Furthermore, as we use the construct *memory of perceived outcomes* to capture the experience of performance in our model, we can account for a possible case in which actual government performance was positive, but, as a result of problems in the perception process and/or memory loss, the assessment of experience of performance was bad. These interacting processes can potentially help explain times of high levels of performance and prevalent low trust in government, as described in the literature (Hetherington, 1998; Keele, 2005, 2007; Mishler et al., 1997; Pinker, 2007).

The link between expectations and trust, however, has also been challenged in the literature. Cook and Gronke (2005b, pp. 800-801) found that, "Americans would not expect that the government will do the right thing, but neither would they anticipate that government will do the wrong thing either. Instead, Americans would be willing to suspend their presumptions and to watch the workings of politics and judge institutions and political actors accordingly." Cook and Gronke (2005b), in their investigation of skepticism and its effect on trust in government, provide a rationale that, if true, would support the link between perception of outcomes (experience of performance) and trust in government but would make the link between expectations and *public's trust in government* weak or nonexistent. It is our belief that although some researchers have found

this link to be weak, the link exists, and it will manifest differently according to cultural and contextual elements and variations.

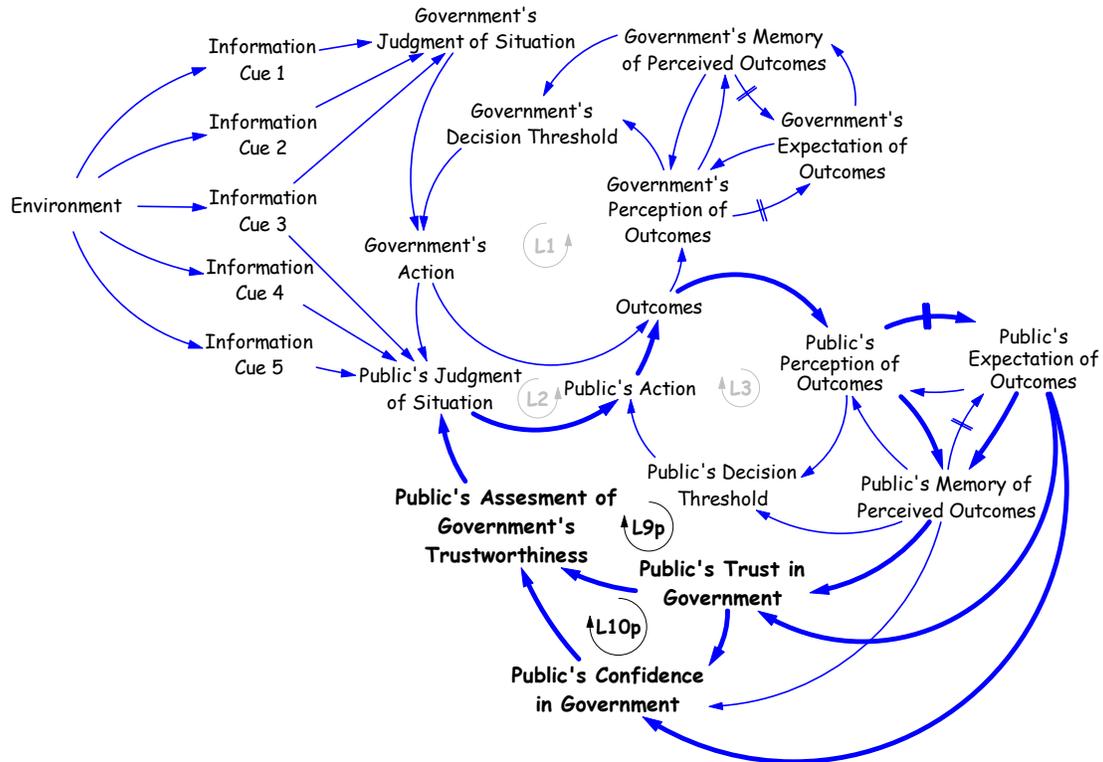


Figure 7 Unilateral-Trust-in-Government Model

In our unilateral-trust-in-government model, following evidence found in the literature (Cook et al., 2005b; Earle and Cvetkovich, 1998; Earle et al., 2006; Simonson, 1999; Smith, 2005; Tolbert et al., 2006) and empirical evidence from our experimental work (see Baldwin et al., 2006), we introduce the construct *public's confidence in government*. Smith (2005), citing Lyons and Mehta (1996), distinguishes between trust and confidence by relating trust to an expectation of behavior and confidence to an expectation of abilities. In this work, we subscribe to a similar distinction by saying that trust in government is related to the belief that the government will act in the right way (behavior) and that confidence in government is related to the belief that the government will be able to engage in actions that will produce the right outcomes (abilities). In our model, the public's confidence in government is a function of experience (memory of perceived outcomes), expectations (expectations of outcomes), and the current level of trust in government. Trust is a requirement for confidence, since "trust is needed when there is no basis for confidence" (Seligman, 1998, p. 393). Trust is needed to get the process of building confidence started, when no prior evidence is available or remembered; also, it is needed when perception of outcomes is difficult or hard to maintain. The conceptualization of public confidence in government that is

used in our model is consistent with Earle and Siegrist’s (2006) trust and confidence cooperation model and supported by empirical evidence presented by them and by Baldwin, Ramaprasad, and Samsa (2006). Earle and Siegrist (2006) found statistically significant strong effects of trust on confidence levels in their experimental investigation of trust and confidence on cooperation (for details of the experimental study and results, see Earle et al., 2006).

Finally, in our unilateral-trust-in-government model, we introduce the construct *public’s assessment of government’s trustworthiness*. We define the government’s trustworthiness as a function of trust in government and confidence in government. Our conceptualization is consistent with La Porte and Metlay’s (1996) model of institutional trustworthiness. This conceptualization gives us the ability to have different levels of trust combined with different levels of confidence influence the assessment of trustworthiness and, ultimately, influence the public’s judgment of the situation that determines public action and outcomes.

In this theory, although when we combine high and low levels of trust and confidence four possible combinations arise as shown in Table 1, we believe that individuals may fall only in one of three of these combinations as in the presence of low trust, it is not feasible to have high confidence, since the level of trust caps the possible level of confidence. The low-trust/high-confidence sector in Table 1, therefore, is labeled *not feasible*.

Level of Confidence in Government	Level of Trust in Government	
	High	Low
High	<i>High Trustworthiness</i> --Optimists-- Compliant Response	<i>Not Feasible</i>
Low	<i>Mid-level Trustworthiness</i> --Skeptics-- Mixed Response	<i>Low Trustworthiness</i> --Pessimists-- Noncompliant Response

Table 1 Trust-Confidence Interaction

The combination of low trust with low confidence produces a low trustworthiness scenario. Individuals who experience this combination will, in general, behave in a noncompliant way since their expectations and experience lead them to think that the actions recommended (or mandated) by the government are not adequate or will not be carried out successfully by government agents. We refer to these individuals as *pessimists*. In our experimental work, we have identified baseline confidence levels in a population of U.S. citizens (for details of the experiments carried out, see Baldwin et al., 2006) in the government’s ability to prevent terrorist attacks in the United States in the future. We ask the subjects to tell us their confidence in the government’s ability to prevent attacks one day, one week, one month, three months, one year,

five years, and ten years into the future. A group of subjects has revealed a clear downward tendency in their confidence as the time horizon of interest grows (see Figure 8). As part of our experimental work, we interview the subjects after the data elicitation process to explore the reasons behind their assessments. In general, members of the pessimist group express their expectation that the government will not be able to successfully carry out the necessary actions to prevent the attacks. In addition, they express their doubts about whether the government will actually even be interested in preventing these attacks at all. These responses guide our thinking that individuals in this category have low levels of trust in government paired with low levels of confidence in government.

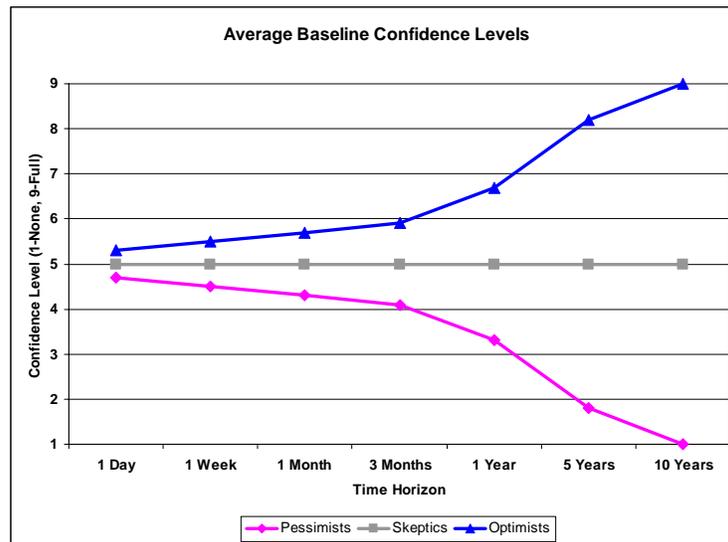


Figure 8 Tendencies of Level of Confidence in the Government’s Ability to Prevent Terrorist Attacks in the United States Found in a Sample of U.S. Citizens

Alternatively, high levels of trust and high levels of confidence produce a high trustworthiness situation. In this case, individuals will be more likely to have compliant responses when the government generates actions that require citizen participation to create the desired outcomes. We refer to these individuals as *optimists*. In our experimental work, optimists show a clear upward trend in baseline confidence in government as the time horizon of interest grows (see Figure 8). This is interpreted as evidence that this group has a definitive belief that the government will be willing and able to put in place the necessary actions to prevent future terrorist attacks. If the relative mix of the general population in a country has a high percentage of *optimists*, as identified by means c in Figures 2 and 3, the likelihood of success in government action will grow and the possibility of experiencing the desired outcomes will increase. Interestingly, as our model allows us to infer, if desired outcomes are experienced, these outcomes will be perceived,

remembered, and expected, influencing higher levels of trust, confidence, and public's assessment of government's trustworthiness that will reinforce the compliance tendency of the population: a virtuous cycle of government-population participation.

The last combination depicted in Table 1, the high-trust/low-confidence scenario, presents the possibility of generating mid-levels in the public's opinion of the government's trustworthiness, leading to mixed responses in behavior after a request/mandate from the government is issued in response to, or to prevent, a critical event.

Mixed behavioral response from the public will most likely harm the outcomes experienced; however, if there is a critical mass of individuals who are thinking about alternative behaviors more suitable for the situation at hand, it could generate a creative thrust that might create benefits (Cook et al., 2005b). In general, mixed behavioral response is not desired. Governments seek to induce homogenous responses from the public that are aligned with their designed solutions for problems and critical situations. However, although the presence of *skeptics* in the general population makes it harder to implement government initiatives, it has been argued that it also forces the government to design truly adequate solutions and promotes an inquisitive tone in population response that fosters creativity, improvement, and true democracy (Cook et al., 2005b; Mishler et al., 1997).

In our experimental work, we found a group of individuals who expressed that their base level of confidence will not be changed by the occurrence of critical events. These individuals, whom we call *skeptics*, present a flat line when their base confidence level is graphed as a function of the time horizon of interest (see figure 8). Individuals who fall in this category, when interviewed, expressed that although they truly believe that the government will do the right thing, they also believe that the results likely to be achieved are uncertain because of protecting a country against terrorist attacks is an enterprise of such high complexity. In this sense, they explain, their expectation is that sometimes the government will succeed, but not always; therefore, when something wrong happens, it will be well within their expectations and it will not change their basic level of confidence in the government. Although an invariant baseline does not necessarily represent a low level of confidence, it certainly does not reflect high levels of confidence in the government, which has led us to locate this group in the high-trust/low-confidence quadrant.

The public's assessment of the government's trustworthiness will determine, at least in part, the public's judgment of the situation, and, consequently, it will influence public's action. The

public's action, in turn, as shown in Figure 7, affects the way in which outcomes are produced and plays a critical role in the feedback mechanisms that link outcomes, expectations, and trust formation. In this sense, our model allows us to identify a feedback mechanism with the potential to explain trust and trustworthiness dynamics under a wide set of combinations of confidence and trust in a given population. Although the unilateral-trust-in-government model proposes a much richer fabric of interacting constructs than its predecessors, we determined, after continued analysis, that an important element present in the government-public interaction equation still needed to be characterized and included in the model: the government's assessment of public involvement and likelihood of compliance with directives. To addressing this concern, we propose the bilateral-trust model (government and the public) in Figure 9.

In Figure 9, we present additional structure that captures the process by which the government becomes aware of the level of public acceptance and participation in its directives. The main concern of this work has been on understanding the determinants of trust in government and how they affect public action and the generation of outcomes. This concern is especially important in the case of natural or manmade critical situations that could potentially have devastating consequences. A deeper understanding of what drives trust in government led us to realize that in the interaction between government and the public, the government is also constantly assessing if the public is trustworthy. In our model, we propose a structure related to the government's assessment of the public's trustworthiness in the same way in which we characterized the public's assessment of the government's trustworthiness, but with one important difference: the main source of information used to make such an assessment.

In the case of the public's assessment of the government's trustworthiness, the public, although aware of government action and using information about government action to judge the severity of the situation, uses information about outcomes as its primary information source to determine levels of trust and confidence in government. Alternatively, we propose that the government, given its capacity to use and deploy resources and its role of solving problems via policy creation and implementation, uses information about public action as its main source of information to assess the level of public's trustworthiness.

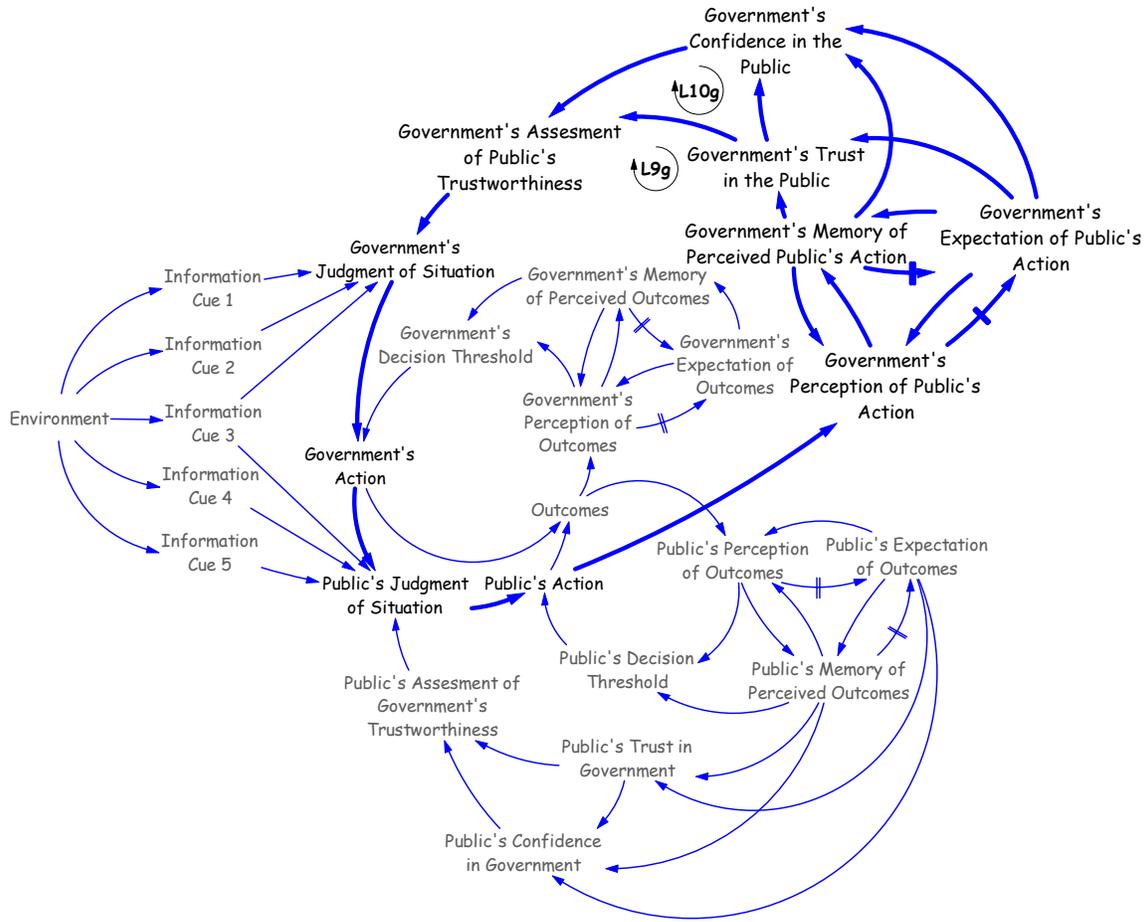


Figure 9 Bilateral-Trust Model (Government and the Public)

In our bilateral-trust model, public action is perceived by the government and then accumulated in memory of perceived public action. The government, given its size and resources, is able to create institutional memory to keep track of what actions the public responds to when directives are issued. In addition, it is in the government's best interest to clearly identify what the response of the public to policy initiatives is, since this influences what outcomes are achieved and acts as a barometer of the public's approval and of their assessment of government performance (Cejudo, 2007; King et al., 1998; Yang et al., 2006). In addition, we propose that, as in the case of the public, the government forms expectations of what the public response should be, and these expectations act as filters for perceiving and accumulating relevant information related to the public's action at the same time that these same perceptions and accumulated information (memory) influence the formation of the government's expectations of public action. This seemingly simple set of interacting constructs — perception, memory of perception, and expectations — creates a complex set of potential dynamic behaviors.

Once public action has been perceived, filtered, accumulated, and turned into expectations, the government is in a position to assess its level of trust in the public; that is, the belief it has regarding whether the public will do the right thing when a critical situation emerges. The government uses information about trust in the public to assess the level of public's trustworthiness, incorporating this last construct in its evaluation of the situation at hand and thus closing a critical feedback mechanism that helps determine the government's course of action (see Loop L9g in Figure 9). In addition, mirroring the structure that captures how confidence in the government is characterized, information about the government's trust in the public, its memory of the perceived public's action, and its expectation of the public's action is used to assess its confidence in the public. Information about the government's confidence in the public, paired with information about its trust in the public, is used to fully determine the government's assessment of the public's trustworthiness that will ultimately influence the government's judgment of the critical situation when it emerges. Our conceptualization of the trustworthiness of the public is consistent with La Porte and Metlay's (1996) model of institutional trustworthiness. In this way, our bilateral-trust model depicts a multi-agent trust theory in which the trust that the public places in the government is linked to the trust that the government places in the public through several feedback mechanisms that cause the two constructs to co-evolve and determine each other over time. In this sense, this theory is a formal version of the popular wisdom (attributed to Alexis de Tocqueville, a French political thinker and author of *Democracy in America* in 1835) — which says that “in a Democracy, the people get the government they deserve” — but with a caveat: The people get the government they assemble over time via their actions and their assessment of its trustworthiness.

The bilateral-trust model presents our latest thinking about the set of interacting drivers of trust in government. This model, with 28 variables, captures a highly complex system of interacting constructs. Although the number of feedback mechanisms that a variable in a model belongs to is not the best measure of dynamic complexity, we use this metric as a proxy to identify the increasing interconnectedness of the models presented in this paper and their increasing complexity. Assuming that the structure of the model in question accurately and parsimoniously captures the main features, given the purpose of the modeling effort, of the structure of the system, this metric only represents the potential, not the actual, dynamic complexity of the model. Table 2 shows a comparison of the models discussed in this paper (a map of the full bilateral-trust model is presented in Figure 10 in Appendix I of this document).

As shown in Table 2, the government-centric model is the simplest one discussed, having 11 variables and only 1 feedback mechanism. The government-public model adds 4 more variables to the theory, thereby forming 2 additional feedback mechanisms. In this model, the construct *outcomes* is determined now by the interaction of 3 feedback mechanisms and not just by 1, as in the case of the government centric model. To expand our government-centric theory to a more elaborate government-public theory, we increased the number of variables used by 36% and increased the dynamic complexity captured⁴ by 300%. The expanded government-public model adds 4 variables to the theory and allows for an additional threefold increase in dynamic complexity captured in the determination of the *outcomes* construct. In this expanded theory, 9 interacting feedback mechanisms are responsible for determining the dynamic behavior of this construct. Having more feedback mechanisms intervene in determining the behavior of a variable allows for a richer, more realistic theory of its behavior. However, it also makes it more difficult to understand the sources of the behavior and to analyze likely points of intervention to change the behavior to a preferred alternative.

	Government-Centric Model	Government-Public Model	Government-Public Expanded Model	Unilateral Trust in Government Model	Bilateral Trust in Government Model
Number of Variables in the Model	11	15	19	22	28
Government's Judgment of the Situation	0	0	0	0	192
Government's Action	1	2	6	6	198
Public's Judgment of the Situation	NA	1	3	15	171
Public's Action	NA	2	6	18	210
Outcomes	1	3	9	21	201
Public's Trust in Government	NA	NA	NA	8	104
Public's Confidence in Government	NA	NA	NA	8	104
Public's Assessment of Government's Trustworthiness	NA	NA	NA	12	156
Government's Trust in the Public	NA	NA	NA	NA	128
Government's Confidence in the Public	NA	NA	NA	NA	128
Government's Assessment of Public's Trustworthiness	NA	NA	NA	NA	192

Table 2 Model Comparison

⁴ As measured by the maximum number of feedback mechanisms defining a construct in the theory. We know that this metric is not the best one to capture dynamic complexity (if there is one at all), but we present the metric to help identify the level of complexity that each of the models potentially has. To understand the dynamic complexity of a given model better, a fully mathematically characterized model needs to be formulated, and, through simulation, its dominant structure should be assessed. The dominant structure is the one that actually drives dynamic behavior over time in a complex system, it (the dominant structure) being a subset of the complete structure and necessarily smaller. In the case presented here, even when the bilateral-trust model has more than 200 feedback mechanisms influencing the *public's action* construct, for example, it could be that only one of those mechanisms actually drives the behavior of the variable during simulation studies. To know more about simulating models of complex systems and about dominant feedback structure in system dynamics models, see these five sources, among others: Sterman, J. D. 2000. *Business Dynamics: Systems Thinking and Modeling for a Complex World* (First ed.). Boston MA: Irwin McGraw-Hill.; Richardson, G. P., & Pugh, A. L., III. 1981. *Introduction to System Dynamics Modeling with DYNAMO*. Cambridge MA: Productivity Press.; Mojtahedzadeh, M., Andersen, D., & Richardson, G. P. 2004. Using Digest to implement the pathway participation method for detecting influential system structure. *System Dynamics Review*, 20(1): 1-20.; and Richardson, G. P. 1986. Dominant structure. *System Dynamics Review*, 2(1): 68-75.

The unilateral-trust-in-government model, by incorporating 3 additional variables (16%), creates the possibility of increasing the maximum number of interacting feedback mechanisms by 233%, thereby capturing more extensively the rich fabric of interactions that determines trust in government and the outcomes experienced in complex systems. Finally, the bilateral-trust-in-government model, our final theory, presents a network of interactions in which the *public's action* construct is determined by the interaction of 210 feedback mechanisms, the *outcomes* construct by 201 feedback mechanisms, and the *government's action* construct by 198 feedback mechanisms, dramatically increasing the dynamic complexity captured with the model.

Conclusions and Future Research

Studying trust in government led us to identify a complex set of interactions linking government action, citizen participation, memory, expectations, outcomes observed, and performance. In the literature, many other factors are identified as being linked to trust development and additional alternative explanations will surely arise. Keele (2005, p. 883), for instance, found evidence that “while government performance is an important predictor of trust, partisans recognize that when their party controls the Congress or the presidency, the government is more trustworthy,” and that “trust is an evaluation of politicians and their management of the economy” (Keele, 2007, p. 251). To further understand the dynamics of trust in government, additional hypotheses should be explored and tested. Examples of hypotheses to be tested include the role of political and public administration factors (Cejudo, 2007; Hetherington, 1998; Keele, 2005, 2007; Langer, 2002; Miller, 1974; Mishler et al., 1997; Ruscio, 1996); use of e-government technology (specifically, the use of government Web portals) to increase trust and confidence in the government (Tolbert et al., 2006); increased citizen participation (King et al., 1998); use of e-government technology to achieve this increase (Holzer, Melitski, Rho, and Schwester, 2004); use of mass media as a vehicle for bringing adequate information cues to the public and making them available and attractive (Simonson, 1999); exploitation of weak ties in knowledge transfer (Levin and Cross, 2004); role of trust in perceived risk and benefits of uncertain events, hazardous situations, and public action (Siegrist and Cvetkovich, 2000; Siegrist, Cvetkovich, and Roth, 2000); and role of risk communication in the development of trust (Earle et al., 1998).

It is our belief that although the model presented here is incomplete and inaccurate in many respects, it presents an organized view of a series of determinants of trust in government and can be used to identify likely consequences of changes to trust and confidence in government. We

also believe that by systematically exploring the links identified in this model, more understanding of the complex set of interactions that determine the dynamics of trust in government can be developed.

We know that public participation and the role of trust in this participation are highly context-dependent (Lubell, 2007), but it is our belief that they exist in every context that exists. Therefore, developing an understanding of the role of trust in generating the outcomes experienced seems to be warranted and worth investigating in more detail.

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Appendix I

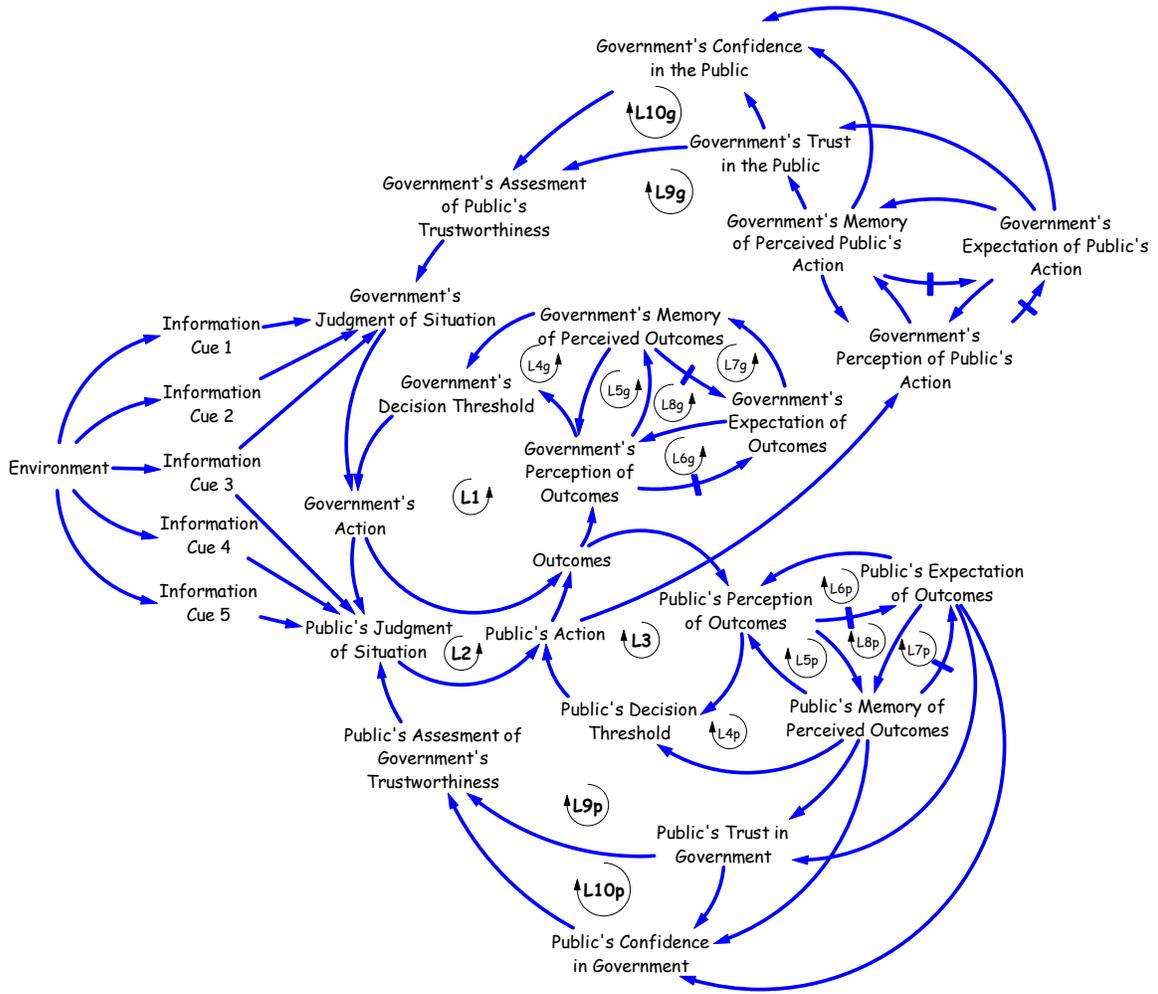


Figure 10 Full Bilateral-Trust Model (Government and the Public)