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Prospect Theory and the Cuban Missile Crisis

Mark L. Haas

University of Virginia

This article tests the predictions of expected-utility and prospect theories against the most important dimensions of the Cuban missile crisis. Largely through use of the most recently released information on the crisis from the American and Soviet governments, I attempt to ascertain the anticipated benefits, costs, and probabilities of success associated with each of the major policy choices that the key leaders in both superpowers perceived before each of the major decisions throughout the crisis was made. Using this information and the logic of extensive-form game-theoretic models of choice, I construct a baseline for expected-utility theory that helps us to understand when prospect or expected-utility theory provides the better explanation for a particular decision. Prospect theory predicts that when individuals perceive themselves to be experiencing losses at the time they make a decision, and when their probability estimates associated with their principal policy options are in the moderate to high range, they will tend to make excessively risky, non–value maximizing choices. I find that the evidence for the Cuban missile crisis supports this prediction for the most important decisions made by both Khrushchev and Kennedy.

The Cuban missile crisis remains one of the most studied events in history. For over thirty-five years scholars have used various dimensions of this event to test theories of, inter alia, decision-making, deterrence, compellence, crisis management, inadvertent escalation, and intelligence gathering.[1] Despite the great number of studies of this event, recent releases of heretofore classified information (most notably the full transcripts of President Kennedy's secretly taped meetings of American officials' deliberations during the crisis and key documents from the Soviet government on this subject) means that only relatively recently has some of the most important information about the crisis come to light.[2] As a

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[1] On the Cuban missile crisis and decision-making, see, e.g., Allison, 1971; Allison and Zelikow, 1999; on deterrence and compellence, see George and Smoke, 1974; George, 1994; on crisis management and inadvertent escalation, see Posen, 1991; Sagan, 1993; on intelligence gathering, see Blight and Welch, 1998.

[2] For the transcripts of the Kennedy tapes, see May and Zelikow, 1997. For Soviet documents and other primary source evidence on the crisis, see Lebow and Stein, 1994; Woodrow Wilson International Center for Scholars, 1995 and 1996/1997; Fursenko and Naftali, 1997; Gaddis, 1997. For related primary source documents, see Chang and Kornbluh, 1992; U.S. Department of State, 1996.

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result, new and more accurate interpretations of the Cuban missile crisis can still be made, and new lessons can continue to be learned from its study.

This article seeks to make two primary contributions to the analysis of probably the most dangerous period in history. First, largely through use of the most recently released information on the crisis, I attempt to ascertain the anticipated benefits, costs, and probabilities of success associated with each of the major policy choices that the key leaders in both superpowers perceived before each of the major decisions throughout the crisis was made. Second, I use this information to try to determine if the most important decisions made by Kennedy and Khrushchev were "rational" in the sense of maximizing expected value, and if not, whether these individuals' choices tend to conform to prospect theory's prediction that people—when they perceive themselves to be experiencing losses at the time they make a decision and when their probability estimates associated with their principal policy options are in the moderate to high range—will be inclined to engage in risk-acceptant, though not value-maximizing, behavior.[3]

I find that when these two conditions of losses and moderate-to-high probability estimates were met during the crisis, Kennedy and Khrushchev did tend to make excessively risky, non–value maximizing choices. When, however, these leaders' probability estimates associated with key outcomes approached certainty, their behavior became much more cautious and, as a result, much more comprehensible to theories based on the maximization of expected value. This change in behavior occurred despite the fact that Kennedy and Khrushchev continued to operate in loss-frames throughout the period in question. These findings support prospect theory's core claims that people's attitudes toward risk are a product of *both* their frames of reference (i.e., if they are operating in the domain of losses or gains at the time they make a decision) and their estimated probabilities associated with various options since individuals tend to give different weights to different levels of probability in the generation of their value calculations.

My analysis is divided into the following sections. First, I examine the logic of deterrence theory based on extensive-form game-theoretic models of choice. My principal objectives in this section are to examine under what conditions, according to theories based on the maximization of expected value, it is rational for challengers to try to change the status quo, for defenders to choose to acquiesce to such challenges as opposed to fighting or threatening to fight, and for challengers to back down from their initiative once a deterrent threat has been issued. Developing a baseline for expected-utility theory is a key methodological step if we are to discern successfully if expected-utility or prospect theory provides the better explanation for a particular policy choice. Second, I examine the principal tenets of prospect theory and discuss how these principles can be applied to an analysis of decision-making in international relations. In the third section, I test the predictions of prospect theory and analyses based on the maximization of expected value against the historical evidence of the key decisions of the Cuban missile crisis. I conclude with an analysis of the implications generated by my principal findings.

[3] Ascertaining actors' perceptions of the anticipated costs, benefits, and probabilities of success associated with each considered policy choice is critical for a fair test of expected-utility theory. As two of the leading proponents of this approach put it, actors make decisions based on "the choice *they believe* maximizes expected utility" (Bueno de Mesquita and Lalman, 1992:36, emphasis added). Many other studies have examined the potential costs and benefits of the key decisions of the Cuban missile crisis (see, e.g., Allison, 1971; Allison and Zelikow, 1999). However, none, to my knowledge, has examined as formally as I have done here these variables in combination with the estimated probabilities of success for each considered option according to the principal actors' own accounts as revealed in the most recently released information from the Soviet and American governments.

Extensive-Form Games and Deterrence Theory

The three most important questions of the Cuban missile crisis—Why did Khrushchev decide to send offensive missiles to Cuba? Why did Kennedy respond to this action in the manner he did? Why did Khrushchev decide to capitulate to American pressure by returning the missiles to Soviet territory?—are in reality more specific versions of the most fundamental questions of any international crisis: Why did leaders of a particular state choose to challenge the status quo? Why did defenders of the status quo respond to this challenge in a hostile manner instead of accepting the challenger's gambit (in which case there would have been no crisis)? Why did the challenger respond to a defender's deterrent threat in the manner it did (e.g., by backing down or continuing its revisionist policies)? (Morrow, 1994:51–52). The situations confronting actors upon which these questions are based are modeled as an extensive-form game in Figure 1.[4]

According to expected-utility theory, we can predict how each actor should react at each decision node in this model if we know both his utility function and what probabilities for success he assigns to each possible outcome. In short, actors should choose the path in the decision tree depicted in Figure 1 that yields the highest expected value, which is calculated by multiplying the utility of each possible outcome by the probability that it will occur if chosen, and then summing across all possible outcomes (Morrow, 1994:16; Levy, 1997:88).[5]

This central tenet of expected-utility theory generates the following insights into answering the three general questions, intrinsic to any international crisis, that were articulated at the beginning of this section. First, actors with revisionist aims should not challenge the status quo when the utility derived from this position if no action is taken is greater than the sum of the anticipated costs of a conflict with the defender (which result when the defender either issues various deterrent/compellent threats to the challenger or immediately engages in military hostilities) and the anticipated benefits of a successful challenge.[6] In other words, when decision-makers believe that challenging the status quo will result in a worse position than the one they think they will occupy if no action is taken, no challenge to the defending state should be issued. Expressed formally, states should stay at the status quo when:

$$u_c(Q) > p[u_c(T)] + q[u_c(M)] + (1 - p - q)[u_c(S)],^{7}$$

where u_c is the utility of the challenger, Q is the status quo (which is the position challengers believe they will occupy if no action designed to change their situation is taken), T represents the deterrent (or compellent) threats issued by the defender, p is the probability that such threats will be issued, M is immediate military strikes by the defender, q is the probability that this will occur, and S is a successful challenge to the status quo.

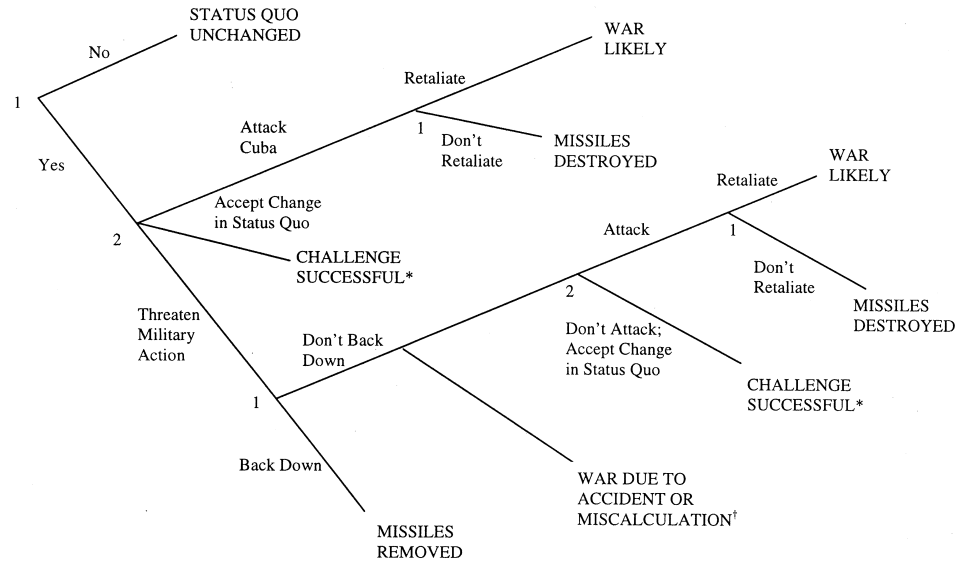
The decision-making calculus for defender states is also straightforward according to the logic of expected-utility theory. As indicated by the extensive-form model in Figure 1, leaders of a status quo power can make one of two general

[4] It is better to model the Cuban missile crisis as an extensive-form game as opposed to the tabular strategic-form varieties because the former do a better job than the latter in capturing the sequential nature of decision-making in the crisis. This aspect of policy selection was critical because it allowed leaders in both superpowers to react to and learn from the others' policies. Because in strategic-form games players choose their strategies simultaneously, this type of model obscures this crucial dynamic (Morrow, 1994:70, 121; 1997:21).

[5] This statement assumes that individuals are neutral in their attitudes toward risk. I relax this assumption later in this article.

[6] Throughout this article, when I refer to the "anticipated" costs or the "anticipated" benefits of an action, I am referring to the product of the *possible* costs or benefits of an action *and* the estimated probabilities of experiencing these possibilities. I use the word "anticipated" to capture this product simply and to make my prose less cumbersome.

[7] This and subsequent expected-utility formulae are derived from Morrow, 1994, especially chs. 2, 3, 7.



* How successful the challenger is in changing the status quo depends on whether or not the defender totally acquiesces to the challenger's demands or if a negotiated solution is reached in which only some of the challenger's demands are met.

† Notice that the outcome "War Due to Accident or Miscalculation" is placed after Player 1 does not back down to Player 2's threats of military action but before Player 2 decides to attack or capitulate. This placement reflects the fact that this outcome is a product of high levels of tension resulting from both sides' decision neither to back down nor deliberately initiate military strikes. Also notice that this outcome is not placed at a decision node. This indicates that war by accident or miscalculation is not a product of rational deliberation in the traditional sense, but is instead due to inadvertence and the high levels of stress intrinsic to any international crisis.

‡ This model is, of course, a simplification of reality. Each of the principal actors involved in the Cuban missile crisis could have made other choices than the ones depicted. For example, instead of either backing down or not to Kennedy's threats of military action, Khrushchev could have issued counterthreats involving third countries (e.g., over Berlin or Turkey). Similarly, if Khrushchev decided not to back down under American pressure, Kennedy had the choice of (re)issuing various military threats instead of accepting a change in the status quo or actually attacking. Moreover, each of the outcomes listed generated other sets of results that are not depicted. Thus if Kennedy did not respond to the discovery of the missiles in a firm manner, his authority at home and possibly within NATO most likely would have been weakened. A failed challenge would have led to analogous results for Khrushchev. The primary purpose of models like this one are not to depict every possible choice available to actors and every effect generated by various outcomes (which would make the model extremely complicated to the point where its heuristic value would likely be lost in the details), but to "capture the general characteristics of a situation" (Morrow, 1994:52) in order to help us understand the complexities of the decision-making process. A more comprehensive examination of outcomes in various arenas and the choices available to Kennedy and Khrushchev is found in the text of this essay.

FIG. 1. Player 1 is the challenger (Khrushchev); Player 2 is the defender (Kennedy). The initial question confronting Player 1 is whether or not to challenge the status quo by placing offensive missiles in Cuba. Outcomes of each pathway are denoted by capital letters. (For a similar model, see Wagner, 1989:180.)‡

choices in response to another state's challenge: either they can accept a change in the status quo or they can dispute this challenge in some manner (e.g., by issuing deterrent or compellent threats to the revisionist state or by engaging immediately in military hostilities).[8] The defender should choose not to dispute militarily the challenger's gambit when the utility of acquiescing to a change in

[8] Defenders can acquiesce to a challenger's gambit either by capitulating to the latter's demands or actions, or by paying the challenger off through a negotiated settlement to the dispute. In either case, the status quo is changed, though in the former scenario the challenger will invariably have more of its preferences realized.

the status quo is greater than the anticipated costs of a challenger pressing on with its objectives despite the defender's warnings or hostile actions plus the anticipated benefits of a challenger capitulating to the defender's threats or military hostilities. In other words, a state should accede to a challenger's bid to change the status quo and should issue no deterrent threat or engage in immediate military action when:

$$u_d(A) > r[u_d(C)] + (1 - r)[u_d(B)],$$

where u_d is the utility of the defender, A is the defender's acceptance of a change in the status quo, C is a continuation of a challenger's revisionist policies despite the defender's attempts to maintain the status quo (which results either when the challenger does not back down from a deterrent threat or when it retaliates to military strikes by the defender), B represents the challenger backing down from the defender's hostile actions, and r is the estimated probability that the challenger will continue with its revisionist objectives. It is worth highlighting that an important cost potentially generated by the challenger continuing with its revisionist policies despite the defender's deterrent/compellent threats is that this crisis situation could lead to military conflict due to accident, miscalculation, or inadvertence. The chances of conflict resulting from these factors will invariably increase the longer high levels of military tension and fear between states continue. As we shall see, leaders' fear of conflict by accident or miscalculation was a potent one in both superpowers during the Cuban missile crisis.

Included in the defender's utility calculations are not only the intrinsic benefits and costs associated with, respectively, either maintaining or retreating from the status quo, but also reputational issues that go beyond these case-specific qualities. One of the central tenets of deterrence theory is that defender states' ability to deter challenges to the status quo in one area is interdependent with their ability to do so in others. Credibility is the variable that links commitments across time and space. According to deterrence theorists, when leaders fail to meet a challenge to their position in one area, their reputation concerning their ability and will to protect other commitments will suffer. More challenges to defenders' positions are likely to come about as a result (Schelling, 1966:55–59; Huth, 1997:83–84). Thus, an important cost that must be factored into defenders' utility functions concerning a successful challenge to their position in any given instance is the potential losses in credibility which may increase the chances of these states having to face other challenges in other areas.

In policy terms, this last analysis means that defenders may have incentives to respond to a challenge in a more vigorous manner than the intrinsic worth of an issue would seem to dictate. Indeed, rationalist theories of international relations teach us that one of the most effective ways of maintaining and even augmenting a state's reputation for honoring its commitments is to respond in a *more* aggressive manner than the situation seems to warrant. Such overreaction creates, in the lexicon of contemporary international relations theory, a "costly signal" that demonstrates states' resolve to preserve their position in the international system (Fearon, 1993: ch. 3; Huth, 1997:87, 88).[9]

The final central insight derived from an analysis of the decision-tree depicted in Figure 1 is that a challenger state should prefer to end its revisionist policies in the face of a defender's deterrent threats when the utility of backing down is greater than the sum of the anticipated benefits for the challenger of succeeding

[9] A costly signal is a diplomatic or policy initiative designed to convey intent that actors would very likely find too risky or damaging to make if they were bluffing about their policy aims.

in its attempt to change the status quo and the anticipated costs of military hostilities with the defender. These hostilities result primarily from either the defender carrying through with its deterrent threats or from accident or miscalculation brought about by continued high levels of military tension between these states. Thus, a challenger should capitulate when:

$$u_c(B) > s[u_c(H)] + (1 - s)[u_c(S)],$$

where H represents military hostilities with the defender (due to either of the pathways discussed above) and s is the estimated probability that they will occur (all other variables are the same as in previous paragraphs).[10]

An important assumption of the above analysis is that individuals are neutral in their attitudes toward risk.[11] Because risk-neutral actors assign "neither utility nor disutility to the taking of risks" (Bueno de Mesquita, 1981:546), this assumption allows us to understand individuals' value calculations without introducing the complicating factor of varying risk propensities. This result is important analytically because it allows us to create a baseline against which the predictions of prospect theory (or other theories that predict "excessive" risk-taking or caution) can be compared. Without a baseline demonstrating how risk-neutral decision-makers should act, it would be difficult to determine when individuals are behaving in either a risk-acceptant or risk-averse manner. The importance of the distinction among risk-acceptant, risk-averse, and risk-neutral actors will become more apparent shortly when I relax the assumption of risk neutrality and incorporate actors' varying attitudes toward risk into the analysis.

Applied to the Cuban missile crisis, the above expected-value calculations generate the following predictions. First, as I demonstrate in subsequent analysis, it is clear that Khrushchev was experiencing significant domestic and international losses at the time he made his decision to send missiles to Cuba. This fact in all likelihood generated a low utility value associated with maintaining the policies that led to his current position. He therefore faced strong incentives to try to change the status quo. Nevertheless, if the utility value—low as it may have been—that was associated with the status quo was greater than the sum of the anticipated costs that would be generated by a hostile American response to the placement of offensive missiles in Cuba (in the form of either deterrent/compellent threats or immediate military hostilities) and the anticipated benefits of a successful attempt to change the status quo, theories based on the maximization of expected value would predict that the Soviet leader should not have opted for this policy to alleviate his current predicament.

An analogous situation existed for Kennedy after the missiles were discovered in Cuba. As will be seen, this discovery generated significant international and domestic costs for the president—a fact that made his utility associated with accepting Khrushchev's challenge quite low. Nevertheless, if this value was greater than the sum of the anticipated benefits associated with having Khrushchev retreat from his gamble as a result of American pressure and the anticipated costs of Khrushchev continuing with his challenge in the face of American threats (which include the potential costs of war resulting from accident or miscalculation), expected-utility theory would predict that Kennedy should have

[10] If the challenger is already engaged in military hostilities with the defender, the former should decide to retaliate if the sum of the anticipated benefits of retaliation and the anticipated costs of this choice (which will primarily result from the defender's response to this retaliation) is greater than the costs of absorbing the defender's hostilities.

[11] My language in this section expresses this assumption. Throughout the above analysis, I refer to the fact that leaders will choose the option that generates the highest expected *value*, as opposed to the highest expected utility. Expected-value calculations are associated with the assumption that actors are neutral in their attitudes toward risk, while expected-*utility* calculations assume that individuals are risk-acceptant or risk-averse.

accepted a change in the status quo despite the harm this outcome generated for him.

Finally, there can be no doubt that Khrushchev's utility generated by capitulating to Kennedy's threats over the Cuban missiles had a very low value. Yet if the sum of the anticipated benefits of defying Kennedy and ultimately succeeding with the Cuban initiative and the anticipated costs of either Kennedy making good on his threats or war resulting from accident or miscalculation was less than the damage done by capitulation, removing the missiles was a value-maximizing choice.

Prospect Theory and Decision-Making

Prospect theory is an inductively derived approach to decision-making that was designed to incorporate systematic violations of expected-utility theory as observed in controlled experiments into a single, integrated theory of choice under conditions of risk.[12] Prospect theory is widely recognized by both expected-utility theorists (cf. Huth et al., 1992; Morrow, 1994:46–49) and those more disposed to psychological approaches (Levy, 1992a:179; McDermott, 1998: ch. 2) as the most comprehensive and best known alternative to expected-utility models of decision-making.

Prospect theory's central assertion, which is in clear contrast to the core claim of theories based on the maximization of expected value, is that the value of a possible outcome is not determined by multiplying the utility of this outcome by its estimated probability of occurrence. Instead, the expected value of a policy is a product of the probability of occurrence *adjusted by a probability weighting function* and the utility of this outcome *filtered through a value function*. Expressed algebraically, prospect theory asserts that the expected value of an outcome, V, is given by

$$V = w(p_i) * v(x_i),$$

where p is the perceived probability of outcome x, w(p) is the probability weighting function, and v(x) is the value function (Levy, 1992a:181). In what follows, I examine the key elements of this equation and demonstrate how they differ from core tenets of expected-utility theory.

As informed by experimental findings, prospect theory's value function has three key characteristics. First, it is defined in relation to a reference point. Changes above this point are conceived as gains, changes below this point are understood as losses. If the reference point shifts, the value function shifts accordingly. Prospect theory's need for a reference point at the heart of its analysis reflects the finding that individuals tend to be more sensitive to relative changes in utility than to changes in net asset levels. In other words, contrary to a key assumption of expected-utility theory that individuals will define their utility functions in terms of levels of assets, people in reality tend to be more concerned with gains and losses relative to a reference point. This finding is known as "reference dependence."

[12] For excellent summaries of the theoretical implications of the experimental evidence of prospect theory, see Levy, 1992a, 1992b, 1997; Jervis, 1992; Stein, 1992. Although the claims of prospect theory were originally based on the significant and robust evidence of controlled experiments, the empirical support for these assertions is a growing body. For case study analyses that test this theory, see, e.g., Farnham, 1992; McDermott, 1992, 1998; McInerney, 1992; Richardson, 1992; Weyland, 1996; Taliaferro, 1998.

A second dimension of prospect theory's value function is that it is generally concave in the domain of gains and convex in the domain of losses.[13] This aspect of the function reflects a key finding of prospect theory: that individuals possess varying attitudes toward risk depending on domain. People tend to take great risks to avoid a loss (especially if it is believed to be a certain one if no action is taken), while they are often willing to accept a small, sure gain instead of running risks to procure a larger one.[14] The curvature of the utility function captures this variation in risk-seeking propensities. When a utility function is concave, the utility for outcomes increases at a decreasing rate as outcomes are more preferred. In this situation, people will be less willing to take risks to bring about more desirable outcomes since the value associated with these results is increasing more and more slowly. When utility functions are convex, utilities increase at an increasing rate as outcomes are more preferred. This should make risk-seeking more prevalent since the payoff of a successful gamble is increasingly larger.

The final key dimension of the value function described by prospect theory is that it is steeper for losses than for gains (i.e., the marginal utility of gains decreases faster than the marginal disutility of losses). This reflects individuals' tendency to be loss averse. People tend to be more desirous of avoiding loss than achieving a comparable gain. Loss aversion should exacerbate the tendency of risk-seeking in the domain of losses because utilities under this condition will increase at an even faster rate as outcomes are more preferred. A typical S-shaped value function that incorporates the above features is shown in Figure 2.[15]

The need for a probability weighting function (the other half of prospect theory's value equation) grew out of the discovery that people tend to demonstrate a nonlinear response to probabilities. In other words, there tends not to be a proportional relationship between individuals' probability estimates associated with various outcomes and their choices. Instead, probabilities affect outcomes in a weighted manner. The most important dimensions of the probability weighting function for our purposes are the tendencies for people to: (1) underweight the impact of moderate and high probabilities in the decision-making process;[16] and (2) overweight probabilities that are either certain (a tendency called the

[13] By "domain of losses" (which I use interchangeably with "loss-frame"), I am simply referring to a condition in which individuals believe themselves to be suffering losses, either current or anticipated, in relation to their most important possessions, values, or objectives. Accurately identifying actors' frames of reference (i.e., whether an individual is in the domain of losses or gains) is a prerequisite for testing the predictions of prospect theory. Although realizing such identification is inherently difficult, the scholar is aided in this process by the fact that "political leaders often speak explicitly in terms of gains and losses" (Levy, 1992b:291). Significantly, the key decision-makers in both the U.S. and Soviet Union at the times when the most important choices involved with the Cuban missile crisis were made often used precisely this kind of language to describe their positions.

[14] An example from the experimental evidence of the creators of prospect theory, Kahneman and Tversky, illustrates nicely the importance of framing effects and how people treat gains and losses differently in making their decisions (1979:268). In a choice between a sure gain of $3,000 and an 80 percent chance of winning $4,000 (with a 20 percent chance of winning nothing), Kahneman and Tversky's subjects by a four-to-one margin preferred the former choice even though the latter had a higher expected value (the former has an expected value of $3,000 \times 1.0 = 3,000$; the latter has an expected value of $4,000 \times .8 = 3,200$). The same problem framed in terms of losses led to very different preferences. By an eleven-to-one margin, individuals preferred an 80 percent chance of losing $4,000 (and a 20 percent chance of losing nothing) to a sure loss of $3,000. Once again, this violates the predictions of expected-utility theory since the expected value of the former choice ($-4,000 \times .8 = -3,200$) was lower than that of the latter ($-3,000 \times 1.0 = -3,000$).

[15] The above analysis reveals how, as viewed by prospect theory, people treat gains and losses very differently. In addition to loss aversion and varying attitudes toward risk depending on domain, people also vary in the rate at which they renormalize gains and losses into their frames of reference. After a positive acquisition, individuals tend to accommodate themselves very rapidly to this gain, thereafter treating this new position as their reference point from which decisions are made (a phenomenon known as the "instant endowment effect"). Significantly, losses are not so quickly renormalized into individuals' world views. Instead, people are likely to continue to conceive of their reference point as the position held before they experienced the loss.

[16] The beginning point for moderate probabilities is usually estimated to be in the .10 to .15 range (Levy, 1997:92).

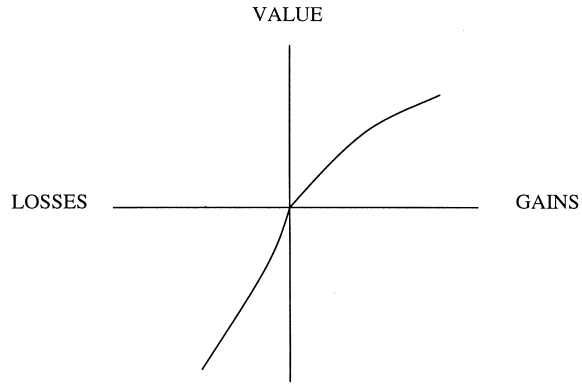


FIG. 2. A Hypothetical Value Function (*Source:* Levy, 1992a:181)

certainty effect) or *nearly* certain (the pseudocertainty effect) on their value calculations (McDermott, 1998:30, 33; Levy, 2000:198).[17]

Individuals' attitudes toward risk are a function of both the S-shaped value function and the probability weighting function. Often these two variables work in tandem to encourage risk-avoidance or risk-taking depending on domain. Above the reference point in individuals' value functions, the underweighting of medium to high probabilities works together with the concave nature of this portion of the value function to reduce the attractiveness of positive gambles relative to sure gains, thereby encouraging risk-aversion. In the domain of losses, the underweighting of moderate to high probabilities "reduces the weights given to risky negative prospects, makes them less unattractive, and thus encourages risk-seeking" (Levy, 1992a:183).

There are times, however, when the impact of the probability weighting function is at odds with the effects created by the curvature of people's value functions. For example, when individuals' probability estimates approach certainty, people tend to overweight these estimates on the decision-making process. In this case, the probability weighting function encourages risk-*avoidance* in the domain of losses and risk-*seeking* in the domain of gains since the overweighting of probabilities increases the downside of negative gambles and augments the value of positive ones, respectively. Thus when probability estimates approach certainty, we may see outcomes that are opposite to those traditionally associated with prospect theory.[18]

With regard to the Cuban missile crisis, prospect theory predicts that when Kennedy and Khrushchev were operating in the domain of losses, and when the estimated probability of success associated with their principal policy choices was in the moderate to high range (i.e., above the .10 to .15 range but below the point where these estimates approach certainty), both leaders would opt for strategies that were *not* most likely to result in the highest expected value possible as determined by these individuals' estimations of the costs, benefits, and prob-

[17] Individuals also tend to overweight low probabilities (below the .10 to .15 range). When probabilities are extremely low, however (i.e., when they approach impossibility), people are highly unpredictable in their behavior. Sometimes they overweight and sometimes they underweight these probabilities on their value calculations (Levy, 2000:198).

[18] In the example just described, prospect theory runs the risk of becoming unfalsifiable since it predicts both risk-acceptance and risk-avoidance in both loss and gain frames depending on whether or not individuals' probability estimates approach certainty or if they are below this area and instead are in the moderate-to-high range. To control for this problem in this situation, I code individuals' probability estimates as approaching certainty only when they repeatedly use language that conveys such a belief, for example, by asserting that an outcome is either "certain," "guaranteed," or "inevitable," or that it is "almost" or "virtually" so.

abilities of success associated with each considered policy option. Instead, prospect theory predicts that both statesmen would tend to make excessively risky, non–value maximizing choices in order either to recoup experienced losses or to prevent anticipated ones. When, however, Kennedy's and Khrushchev's probability estimates associated with key outcomes approached certainty, prospect theory would predict that these leaders should have been more likely to switch from risk-acceptant choices to behavior much more comprehensible to a value-maximizing framework even though their losses continued. As will be seen, the evidence supports both of these predictions. (For a summary of findings, see Table 1.)

The core elements of prospect theory's value calculations that I have described in the previous pages contradict key tenets of expected-utility theory. Not all of these assertions, however—most notably the claim that people define their utility in terms of changes in relation to a reference point rather than in terms of net asset levels—necessarily challenge international relations theories founded on an expected-utility framework. Neorealists, for example, assert that leaders are driven by considerations of relative capabilities since states' relative placement in the international distribution of power is the key determinant of their security. By showing that individuals tend to be driven by gains and losses relative to a reference point rather than by absolute asset levels, the empirical findings that drive prospect theory add a psychological support to neorealist claims. In this instance, the differences between prospect theory and applications of expected-utility theory to international politics are not that pronounced (indeed, in this area they may be complementary).[19]

The remaining empirical findings that drive prospect theory, however, offer a more profound challenge to expected-utility models of decision-making. First, the finding that individuals demonstrate a nonlinear response to probabilities clearly differs from expected-utility theory expectations. People's tendency to underweight moderate and high probabilities means that in these situations their utility calculations will grant more weight to the utility of a possible outcome than to its probability of occurring (the reverse happens when probabilities are overweighted). In contrast, because to expected-utility theory, individuals possess linear probability functions, utility and probability estimates are given equal weight in the generation of people's expected-utility values.

Second, individuals' proclivity to be both risk-averse and risk-acceptant depending on domain generates unique challenges for expected-utility theory. To begin with, the fact that individuals' attitudes toward risk, and thus their decisions, are likely to change depending on whether the *same situation* is seen as a gain or a loss (a phenomenon known as "preference reversal") violates expected-utility theory's assumption that people will possess consistent and transitive preferences (Morrow, 1994:46–48; Levy, 1997:93; McDermott, 1998:17). In short, to expected-utility theory, logically identical situations should produce similar results regardless of the frame of reference.

Variation in individuals' attitudes toward risk depending on domain also violates a core assumption of theories grounded on the maximization of expected *value*, which, as stated, assume risk neutrality among decision-makers (i.e., these theories posit linear, as opposed to concave or convex, value functions). Prospect theory reveals the systematic inadequacy of this assumption, thereby calling into question the utility of these approaches.

This last finding, however, does not necessarily violate the claims of expected-utility theories in general. Such approaches can easily—and often do—incorporate

[19] Because a key component of many neorealist theories is the rationality assumption which posits utility maximization (Keohane, 1986:167), these theories apply an expected-utility framework to the study of international relations. I thank one of the reviewers for *International Studies Quarterly* for helping me develop this point.

TABLE 1. Summary of the Key Findings Concerning Decision-Making and the Cuban Missile Crisis

Potential Benefits of This Decision	*Potential Costs of This Decision*	*Estimated Likelihood of Success*	*Likely a Value-Maximizing Choice?*	*Conforms with Prospect Theory's Prediction of Excessive Risk-Taking in the Domain of Losses?*
1. Khrushchev's Decision to Send Missiles to Cuba				
Very High (help to restore strategic balance of power; facilitate protection of Cuba; increase likelihood of Khrushchev realizing key domestic objectives)	Very High (war with U.S. or capitulation to U.S. pressure)	Considerably lower than the estimated chances of failure (Soviet officials believed chances were high that Americans would both discover the missiles and react violently to this discovery.)	No	Yes
2. Kennedy's Decision to Implement the Blockade				
Very High (restoration of American credibility; halt movement of missiles to Cuba)	Very High (likely war with USSR if Soviets would not capitulate to U.S. pressure)	Higher than all other alternatives for avoiding war while still protecting U.S. interests	Yes	N/A* since Kennedy's probability estimates resulting from the non-blockade options were approaching certainty
3. Kennedy's Decision to Continue to Threaten the Soviets Once the Blockade Had Been Established				
High (removal of missiles), but significantly lower than when crisis started since the costliness and success of the blockade had substantially increased U.S. credibility	Very High (war with USSR due to either deliberate choice or accident-miscalculation)	Becoming smaller since Kennedy thought Khrushchev was unlikely to capitulate to U.S. threats and the likelihood of war resulting from accident-miscalculation was growing each day the crisis continued	No	Yes
4. Khrushchev's Decision to Return the Missiles to the USSR				
Very High (avoidance of war with the U.S.)	High (look humiliated in the eyes of the world)	Very High (source of conflict with U.S. removed)	Yes	N/A* since Khrushchev believed if he did not remove the missiles when he did, military conflict over Cuba was virtually certain
5. Khrushchev's Decision to Bluff Kennedy from October 22 to October 28 in Order to Get a Better Deal Before the Missiles Were Removed				
Moderate (no-invasion pledge of Cuba; public trade of Turkish and Cuban missiles)	Very High (war with U.S.)	Becoming increasingly low since Khrushchev thought war with U.S. due to deliberate choice or accident-miscalculation was becoming more likely each day the crisis continued	No	Yes

*By "N/A" (not-applicable), I mean that the conditions necessary for an unambiguous test of the dominant predictions of prospect theory (risk-acceptance in the domain of losses and risk-aversion in the domain of gains) were not met in this instance since the probability estimates for various prominent outcomes (according to the key decision-makers' own accounts) approached certainty. As stated, when this happens individuals tend to overweight their probability estimates on their value calculations, which may impel risk-takers to become cautious and risk-avoiders to become gamblers.

different risk propensities into their analyses by varying the curvature of individuals' utility functions. Thus, consistent with previous analysis, risk aversion is captured by concave utility functions and risk acceptance is represented by convex utility functions. It would seem that once the assumption of risk neutrality is abandoned, key claims of prospect theory can be incorporated into an expected-utility framework. Given this fact, it may appear that the insights of prospect theory can be subsumed within explanations based on the maximization of expected utility (as opposed to value).

It must be remembered, however, that prospect theory does not predict that some people will be risk-acceptant and that others will be risk-averse, but that the *same* individuals will demonstrate both proclivities depending on domain. This finding is not easily explained within an expected-utility framework.[20] Although it is conceivable that an expected-utility theory could be constructed that mirrored the one described by prospect theory (i.e., one based on utility functions that are concave in the domain of gains and convex in the domain of losses, and with a steeper slope on the loss side[21]), the problems of preference reversal based on framing effects and the nonlinear response to probabilities still apply. Expected-utility theory cannot explain why risk acceptance or aversion obtains depending on whether or not a situation is viewed in terms of gains or losses when all other key variables remain constant (Morrow, 1994:46; Levy, 1997:92; McDermott, 1998:25–27). Moreover, to prospect theory, individuals' policies are a product of not only their frames of reference and the curvature of their utility functions, but the probability weighting function as well. As seen for moderate and high probabilities, the probability weighting function tends to exacerbate the effects of these other two variables. Thus actors perceiving moderate-to-high probabilities of realizing various outcomes should be more risk-averse in the domain of gains and more risk-acceptant in the domain of losses. Yet when the estimated probabilities approach certainty, or when they are below the .10 to .15 range, the opposite patterns may obtain. Risk-seekers may become cautious and risk-avoiders may become gamblers, and both sets of individuals may opt for these policies even if their utility functions call for contrary behavior. Expected-utility theories of all varieties have trouble explaining these shifts since they posit a linear response to probability assessments.

In terms of theory testing, when the evidence shows that individuals (when they operate in loss-frames) consistently engage in excessively risky behavior (with "excessive" defined in relation to people's value calculations), this finding, by definition, calls into question the adequacy of those expected-utility theories that are based on the maximization of expected value. When the same individuals switch from risk-acceptant to cautious behavior when either their domain changes or their probability estimates are in the ranges in which people are likely to overweight the impact of these estimates on their value calculations, expected-utility theories that claim that decision-makers possess convex utility functions are also hard-pressed to account satisfactorily for outcomes. Both these sets of decisions, however, conform with the predictions of prospect theory. As we shall see, the key decisions of the Cuban missile crisis follow both these patterns of behavior.

Before beginning an analysis of the central events of the Cuban missile crisis, a final caveat is in order. Despite the great amount of primary source informa-

[20] As Levy expresses this point, "Expected-utility theory can easily explain [risk-acceptance] *or* [risk-aversion], but it cannot easily account for both [risk-aversion and risk-acceptance] by a single individual." To do so "would add significantly to the complexity of the explanation, involve a significant loss in parsimony, and possibly introduce a tautological element into a theory of behavior" (1992a:173, emphasis in original).

[21] The most obvious way of devising such a utility function would be to posit the status quo as individuals' reference point.

tion concerning the events of the crisis, a perfect test of either expected-utility or prospect theory is very difficult, if not impossible, to make. Such a test would require complete information concerning actors' preference structures, probability estimates, and frames of references in terms of gains and losses. Outside of a quasi-experimental setting, in which the values of these variables can be either assigned or manipulated in such a way that they become known, this is an extremely difficult, if not impossible, task. Because this study uses *qualitative* estimates of individuals' probability estimates and utility functions, and because the historical record does not provide perfect information for these variables for all of the policy options available to Kennedy and Khrushchev, this article does not claim that its analysis of the relative explanatory power of expected-utility and prospect theories for the events of the Cuban missile crisis is final and definitive, but only that it is a fair one given the information that is currently available.

Decision-Making in the Cuban Missile Crisis[22]

1. Why Did Khrushchev Send Missiles to Cuba?

The key international and domestic reasons impelling Khrushchev to send missiles to Cuba are generally agreed upon, so my recounting of these factors will be very brief.[23] The sixteen months between Kennedy's inauguration in January 1961 and Khrushchev's decision to send missiles to Cuba (which was most likely made in April or May of 1962) had not been good ones for the Soviet Union in general and Khrushchev in particular. This period witnessed the largest peacetime military buildup in U.S. history, the discovery and public disclosure by the Kennedy administration that the infamous "missile gap" (i.e., the belief—which was largely the result of Khrushchev's incessant boasting on this subject—that America's strategic arsenal was significantly inferior to the USSR's) was mythical, the continued inability of Khrushchev to increase Soviet citizens' standard of living, the growing belief among Soviet statesmen that an American attack on communist Cuba was very likely, and a growing public bid for leadership of the international communist movement by China.

Such international and domestic considerations generate two sets of implications that are critical for our purposes. First, at the time Khrushchev made the decision to send missiles to Cuba, he was operating in the domain of losses. Changes in the objective and subjective balance of power, the humiliating way in which Kennedy revealed the missile gap myth, the likely loss of Cuba in the near future, increasing challenges within the international communist movement, and increasing threats to Khrushchev's domestic-political goals all point inescapably to this conclusion. Second, sending offensive nuclear missiles to Cuba could very likely alleviate many of these problems. If successful in this gambit, Khrushchev would both shift the strategic balance of power in the Soviet Union's favor and provide, he hoped, a powerful deterrent to an American invasion of Cuba.[24] Moreover, increasing the Soviet Union's strategic power, especially in such a quick and relatively inexpensive manner, would allow Khrushchev to devote more resources to consumer investment without which his domestic agenda of increasing the standard of living for Soviet citizens would be very difficult to realize.

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[22] A chronology listing the crisis's most important events for our purposes is found in the Appendix.

[23] On Khrushchev's international and domestic positions and policies in the period leading up to his decision to send missiles to Cuba, see Ulam, 1974; Beschloss, 1991; Lebow and Stein, 1994; Richter, 1994; Fursenko and Naftali, 1997.

[24] The "Cuba defense" hypothesis has been downplayed by many scholars in their analysis of Khrushchev's motives for sending missiles to Cuba (see, e.g., Allison, 1971; Allison and Zelikow, 1999), but an examination of Soviet documents reveals that this was an important factor in driving Khrushchev's decision (cf. Lebow and Stein, 1994:28, 29, 388; Fursenko and Naftali, 1997:78; May and Zelikow, 1997:672, 710; Garthoff, 1998:24).

Thus the benefits of a successful deployment of nuclear missiles to Cuba for the Soviet Union in general and for Khrushchev in particular were great. The potential costs of action were also high. The worst-case scenario for Khrushchev would have been that Kennedy would not accept the missiles, and as a result the president would force Khrushchev to choose between war with the United States and removal of the weapons. The costs of war with the strongest power on earth, and one that possessed roughly a seventeen-to-one advantage over the Soviet Union in strategic nuclear weapons, would be too terrifying for any rational leader to comprehend. The costs of retreat, though obviously of orders of magnitude lower than the costs of war, were also high. If Khrushchev were forced to back down, he would look weak before both domestic and international audiences, a fact that would most likely significantly diminish the chances of realizing his most important objectives in both these arenas.

It is therefore safe to say that the potential benefits and costs of deploying missiles to Cuba were significant.[25] Whether or not this decision was a value-maximizing choice turns on Khrushchev's estimated probabilities of success for this venture. If he thought the mission was likely to be successful and that Kennedy would end up accepting (albeit grudgingly) the change in the status quo, then the anticipated benefits of deployment would in all likelihood outweigh the anticipated costs. In this scenario, the decision to send missiles to Cuba was a value-maximizing one. If, however, Khrushchev believed that the mission was likely to fail, then the anticipated benefits of this decision would very likely not have been greater than the anticipated costs. In this case, Khrushchev's decision was a risk-acceptant, non–value maximizing choice that is plausibly explained by the insights of prospect theory.

Analysis of Khrushchev's *ex ante* estimation of the success of his Caribbean venture is driven by two questions. First, what were the estimated chances that the missiles could remain hidden from American intelligence before they became operational? This question was central to Khrushchev's understanding of the chances of success to the mission because he believed that if the missiles became operational before they were discovered by the Americans, Kennedy would have no choice but to accept them (Khrushchev, 1970:493–494; Lebow and Stein, 1994:78). Second, what was the anticipated response by Kennedy if the missiles were discovered? If Soviet leaders believed that Kennedy would accept the missiles if they were discovered even *before* they became operational, then secrecy would become a moot point and American detection of the weapons would not result in a confrontation.

There is much evidence suggesting that Khrushchev believed there was a very good chance both that American officials would discover the missiles on Cuba before they were ready to fire and that Kennedy would respond to the weapons in a hostile and aggressive manner. To begin with, the scale and nature of the operation worked against a clandestine operation. Secret deployment of the missiles required sending undetected (among other pieces of equipment): 24 launchers with 36 medium-range ballistic missiles (MRBMs), 16 launchers for 24 intermediate-range ballistic missiles (IRBMs), nuclear warheads for all the missiles, 40 MIG aircraft, 33 IL-28 light bombers, and over 40,000 men (Lebow and Stein, 1994:76, 83). This was the largest amphibious deployment in Soviet history, and it took place 7,000 miles from Soviet ports and only ninety miles from the American coastline. The scale, novelty, and geographical specifics of the operation thus all pointed to discovery by the Americans—significantly; even Khrushchev realized this. He had insisted that such a large-scale deployment of men and matériel would significantly

[25] It is important to note that although the potential benefits for Khrushchev of sending missiles to Cuba were great, most scholars who have had access to Soviet documents assert that he was motivated by defensive, not offensive motives. In other words, Khrushchev hoped to restore the position the Soviet Union had held before Kennedy came to office, as opposed to improving on this standing (cf. Lebow and Stein, 1994:61–62; Blight and Welch, 1998:4; Fischer, 1998:161; Garthoff, 1998:24).

jeopardize the success of the mission (Allyn et al., 1992:152; Lebow and Stein, 1994:76, 414 (fn. 74)). Despite his misgivings, Khrushchev capitulated to the Ministry of Defense's insistence that the operation be of the dimensions it was. The fact that Khrushchev acquiesced to the military's demands does not, however, eliminate the fact that he believed the chances were good that the Americans would detect the large quantity of men and matériel being sent to Cuba.

Even if the stream of Soviet ships to Cuba remained unobserved, what were the chances of the Americans discovering the missiles on the island before the weapons were operational? Once again, the historical record reveals that the probability of this occurring—*according to Khrushchev's own estimates*—were high. Several sets of evidence point to this conclusion. To begin with, since the beginning of 1962 the Soviet government had known that U-2 spy planes flew regularly over Cuba (Fursenko and Naftali, 1997:191). Moreover, because the Soviet Union had shot down and captured one of these planes in 1960, Soviet leaders knew of the great clarity of the pictures made by the cameras on board. Khrushchev himself had examined the pictures and had reached this conclusion (Lebow and Stein, 1994:83, 57). That Khrushchev was highly concerned about the U-2s in effecting the Cuban mission is confirmed by the facts that he took pains to make sure that surface-to-air missiles (SAMs) were installed on Cuba before construction on the missiles began (Fursenko and Naftali, 1997:193; Allison and Zelikow, 1999:207, 214) and that he tried to convince Kennedy, putatively as a way of improving superpower relations, to stop U-2 overflights of Soviet ships in international waters (Fursenko and Naftali, 1997:193; Allison and Zelikow, 1999:214).

Finally, there were many experts and trusted advisors who informed Khrushchev and his close associates that the chances of the Americans discovering the missiles before the mission was complete were high. Major General A. A. Dementyev, the Soviet Union's chief military representative in Cuba, told the Soviet defense minister, "It will be impossible to hide these missiles from the American U-2s" (Fursenko and Naftali, 1997:191). Deputy Prime Minister Anastas Mikoyan, probably Khrushchev's most trusted advisor, warned Khrushchev that a secret deployment was unlikely, as did, among others, Foreign Minister Andrei Gromyko, Soviet Ambassador to Cuba Alexandr Alekseev, and Oleg Troyanovsky (Khrushchev's personal aide on foreign policy matters) (Lebow and Stein, 1994:73, 74, 76, 77, 83; Richter, 1994:135; May and Zelikow, 1997:674–676; Blight and Welch, 1998:182–183). Khrushchev himself seems to have been ultimately persuaded of the likelihood of an American discovery of the missiles. As he reportedly told eight of his military advisors on July 7, 1962: "So it is impossible to move these forces to Cuba secretly" (Fursenko and Naftali, 1997:192). Khrushchev continued to hold this belief throughout the period under examination. As he somberly told Troyanovsky in September 1962, while the operation was in mid-stream: "Soon hell will break loose" but it was now "too late to change anything" (White, 1997:57). To Khrushchev's foreign policy aide, the Soviet leader was acknowledging "the likelihood that the United States would detect the missiles in Cuba before their deployment was complete" (White, 1997:57).[26]

There is also evidence that strongly indicates that most Soviet decision-makers, including Khrushchev, believed that the chances of Kennedy responding to the mis-

[26] Khrushchev's behavior in this period also clearly exhibited various motivated biases that pushed him to make his fateful decision. The fact that missiles in Cuba seemed to provide a solution to many of Khrushchev's most pressing international and domestic problems very likely impelled him to engage in "wishful thinking." In short, the great need to send missiles to Cuba caused Khrushchev to ignore numerous warnings militating against this choice (Lebow, 1983; Lebow and Stein, 1994). These psychological pathologies in many ways provide a complementary analysis to prospect theory since people are most likely to suffer from them when operating in the domain of losses. It is important to reiterate, however, that these pathologies did not completely obscure Khrushchev's understanding of the great risks involved with his Cuban gambit—as evidenced by his concern about the U-2s, his worry about sending such a large number of men and matériel to Cuba, and various statements made to Soviet officials in the period in question.

siles in an aggressive fashion were high. Perhaps most supportive of this claim is the fact that Khrushchev was adamant that the mission be kept secret. If the Soviet leader were confident that Kennedy would accept—albeit in a grudging fashion—the weapons before they were operational, why did he instruct others to go to great lengths to hide the operation?[27] In other words, if secrecy and presenting Kennedy with a fait accompli were the key to the success of the operation—as Khrushchev obviously believed—he most likely did not believe that the American government would accept the missiles before they were ready to fire.[28]

Second, American officials through both public and private channels had repeatedly and clearly told their Soviet counterparts that a crisis would develop if the Soviets placed "offensive" (i.e., ground-to-ground) missiles in Cuba.[29] All indicators, including several statements by Soviet officials to their American counterparts that both recognized the importance to the Kennedy administration of sending missiles to Cuba and explicitly denied the need to pursue such a strategy, point to the fact that Soviet officials received and understood these messages (Lebow, 1983:432–434; Allison and Zelikow, 1999:78–79).

A potential counterpoint to this last claim is that American leaders made their deterrent threats to the Soviet Union well after the Soviets had already made the decision to send missiles to Cuba. In this view, at the time Khrushchev made this policy choice he did not know about the intensity of Kennedy's feelings on this issue.[30] This hypothesis cannot be sustained. In addition to the other evidence adduced in this section that tends to refute it, in July 1960, the KGB issued a report stating that the two conditions most likely to provoke a U.S. attack on Cuba would be either an invasion by the Cubans of the Guantanamo military base or an attempt by the Soviet Union to place nuclear missiles in Cuba. This position was never revised in the period of time leading to Khrushchev's fateful decision (Fursenko and Naftali, 1997:72). According to Cuban missile crisis experts Blight and Welch, this KGB report was a "quality piece of intelligence" that should have given the Soviet government a very good indication of the likely consequences of sending missiles to Cuba (1998:184).[31]

In sum, key Soviet leaders, including Khrushchev, believed that the likelihood of successfully deploying offensive missiles to Cuba was significantly lower than the likelihood of this policy failing. When this probability estimate is coupled with the fact that the benefits of a successful mission and the costs of a failed one were comparably high, the expected value associated with the decision to send missiles to Cuba was most likely lower than the value derived from the Soviet Union's position if this decision had not been made. Theories grounded on the

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[27] On the great lengths that the Soviets went to try to keep the transportation of the missiles to Cuba a secret, see Gribkov, 1994:15; Lebow and Stein, 1994:84–86; Fursenko and Naftali, 1997:192–193. The fact that Soviet leaders tried to hide the missiles from American surveillance does not refute the previously made claim that these individuals did not believe they were likely to be successful in these efforts. They simply did their best in this area despite maintaining great pessimism with regard to the final outcome.

[28] Ironically, if Khrushchev had opted for a public deployment of missiles to Cuba, it probably would have been more difficult for the Americans to oppose this outcome given its acceptability under international law and analogous deployments by the U.S. to its European allies.

[29] For a good summary of these warnings from the Americans to the Soviets, see Allison, 1971:40–42; Lebow, 1983:432–434; Allison and Zelikow, 1999:78–80.

[30] Even U.S. officials speculated on this point during the crisis (May and Zelikow, 1997:105).

[31] Khrushchev himself corroborates this claim. In his memoirs he refers to the fact that he fully understood the risks of sending missiles to Cuba. He says that it took "two or three lengthy discussions" with the Politburo to make this decision since the consequences of this choice could have meant "war with the United States" (1970:499). Moreover, in 1962 Khrushchev believed that even if Kennedy wanted to accept the missiles, the "reactionary forces" in America (including the U.S. military) would not have permitted such a development (Khrushchev, 1970:498; Blight and Welch, 1989:314; Fursenko and Naftali, 1997:197). This last fact reveals the inadequacy of analyses that claim that Khrushchev thought his gambit would be successful because he thought Kennedy a weak leader. Since Khrushchev believed that the U.S. military and other "reactionaries" would never accept Soviet missiles in Cuba, attempting to do so was most likely to lead to an international crisis *if* Kennedy were a weak statesmen.

maximization of expected value would therefore predict that this policy should not have been implemented.

Khrushchev's decision is consistent with the predictions of prospect theory. Because the Soviet leader was operating in the domain of losses in the spring of 1962 and because he believed a successful venture in Cuba would likely recoup many of his losses on all fronts (i.e., vis-à-vis the Americans, the Chinese, and his domestic critics), he was willing to take the gamble in Cuba despite his belief in the high likelihood of failure and the great costs that this failure would create.

2. Why Did Kennedy Respond to the Missiles in the Way He Did?

The discovery of ground-to-ground missiles on Cuba plunged President Kennedy deeply into a loss frame. Indeed, very few actions could have had a more deleterious effect on his frame of reference. Kennedy and his subordinates in the fall of 1962 had explicitly and repeatedly stated that the placement of offensive missiles in Cuba by the Soviet Union was unacceptable to American interests and security. Even in more typical circumstances, Khrushchev's decision to do precisely what the president had warned him not to do would most likely have had pernicious consequences for Kennedy's perceptions of his own credibility and the nature of the U.S.–Soviet relationship.

The situation surrounding the Cuban missile crisis was far from typical, however. Even before the crisis began Kennedy was obsessed with the belief that Khrushchev doubted his resolve. He felt his performance at the Vienna Summit had been weak and that Khrushchev believed him irresolute as a result of the outcome of the Bay of Pigs invasion (Lebow, 1983; Lebow and Stein, 1994). Ignoring Kennedy's explicit deterrent warnings would only exacerbate Kennedy's belief that Khrushchev thought he could be bullied.

Furthermore, the fact that the crisis of October 1962 involved Cuba and not some other country generated unique costs for Kennedy. It was no secret that Cuba was Kennedy's electoral Achilles' heel. The Republicans in their Congressional Campaign Committee had promised to make Cuba the "dominant issue of the 1962 campaign" (Allison and Zelikow, 1999:330). The last thing the president wanted in terms of the upcoming elections was to appear weak, again, on Cuba.

In addition to the above losses caused by Khrushchev's decision, these weapons also had an impact on American leaders' understanding of the strategic relationship between the two superpowers. Just as the American military buildup in 1961 had created security concerns among Soviet leaders, American decision-makers believed that the installment of nuclear missiles in Cuba damaged America's strategic interests. There was a crucial difference between the governments' views on this issue, however. Unlike Soviet estimates of the American military buildup, to the most important U.S. decision-makers on the group formed to deal with the missile crisis, the Executive Committee of the National Security Council (ExCom), the missiles had a relatively negligible impact on the military balance of power between the two superpowers. This view was probably most forcefully articulated by Secretary of Defense Robert McNamara, who claimed the missiles did not affect the strategic balance "at all" (May and Zelikow, 1997:89). Significantly, President Kennedy shared this opinion.[32] Supporting this claim is the fact that the frequently issued warnings made by U.S. officials against Soviet

[32] As Kennedy stated on the first day of the ExCom meetings: "[The Soviets] have enough [nuclear missiles] to blow us up anyhow" (May and Zelikow, 1997:92). For similar statements asserting that the missiles did not have a very important impact on the balance of power, see Lebow and Stein, 1994:424; Bundy, 1988:410, 452–453; Blight and Welch, 1989:23, 33, 90, 91, 187, 188; May and Zelikow, 1997:182, 184, 256. During the crisis Sorensen prepared a memo in which he stated: "It is generally agreed that these missiles, even when fully operational, do not significantly alter the balance of power" (Blight and Welch, 1989:347). (Presumably, Sorensen was referring to Kennedy and his closest advisors, since some hawks, especially in the military, held a different view.)

deployment of offensive missiles in Cuba were not made because such an event would change the balance of power. Instead, these warnings were made because Kennedy wanted for domestic political reasons to take a tough stand against the Soviets on an issue he felt they would not do anyhow. According to Theodore Sorensen (Special Counsel to the President), "the President drew the line precisely where he thought the Soviets were not and would not be. . . . If we had known that the Soviets were putting forty missiles in Cuba, we might under this hypothesis have drawn the line at one hundred, and said with great fanfare that we would absolutely not tolerate the presence of more than one hundred missiles in Cuba" (Blight and Welch, 1989:43).[33] The president himself said during one of the ExCom meetings: "*Last month I should have said that we don't care* [if the Soviets place offensive missiles in Cuba]. But when we said we're not going to, and then they go ahead and do it, and then we do nothing, then I would think that our risks increase" (May and Zelikow, 1997:92, emphasis added).

The above analysis does not mean that the Cuban missiles did not have important negative strategic implications from the point of view of the most important ExCom officials, but only that the source of these losses was not rooted in objective power political considerations. As indicated by the last quotation in the previous paragraph, Kennedy was acutely aware that if the Soviets successfully installed offensive missiles in Cuba despite American officials' explicit and repeated warnings about such an action, it would give the appearance—to the Soviets, America's allies, the American people, and the unaligned nations—that the Soviet Union was on the march and that the U.S. was retreating. In this view, the strategic losses generated by deployment of missiles in Cuba originated not from the objective power capacity of these weapons, *but from the loss of American credibility if the Soviet gambit were allowed to succeed despite clear American warnings.*[34] As a result of these reputational concerns, the discovery of missiles on Cuba generated greater costs than the situation, examined in isolation from America's other international commitments, warranted.

As with all defenders of the status quo, Kennedy had three broad policy options from which to choose in order to address the Cuban missile problem. He could accept a change in the status quo either by not responding to Khrushchev's gambit or by trying to reach a negotiated solution to the dilemma. He could threaten to take military action if the missiles were not removed. Or he could take military action immediately.

In the minds of most ExCom officials, the costs of not responding in a very firm, even aggressive manner to Khrushchev's attempt to change the status quo were prohibitive. To accept such an outcome without a firm response most likely implied significant—and virtually certain—losses for Kennedy in terms of domestic politics, his personal credibility, and America's standing in the world.[35] These last two areas weighed especially heavily on Kennedy's mind. On numerous occasions during the first week of the ExCom meetings (i.e., until the blockade

[33] McGeorge Bundy (National Security Advisor for Kennedy) agreed with Sorensen's analysis (cf. Beschloss, 1991:420).

[34] For statements made by ExCom officials expressing that the threat to American credibility was the greatest danger to the U.S. created by the placement by the Soviet Union of offensive missiles in Cuba, see May and Zelikow, 1997:113–114, 127, 133, 172, 175, 176, 177, 207, 229, 256; Allison and Zelikow, 1999:104, 112.

[35] Kennedy's situation thus paralleled the one Khrushchev faced before he decided to send missiles to Cuba. The fact that both leaders were in loss frames in terms of key dimensions of *both* domestic and international politics when the most important decisions of the crisis were made helps to guard against an unfalsifiable test of prospect theory. Because statesmen have multiple goals in different arenas, it is likely that these individuals will always be in a loss frame in some dimension of their various objectives. If true, then any risky decision can be attributed to actors' proclivity to be risk-acceptant in the domain of losses. By demonstrating that Khrushchev and Kennedy were experiencing losses in relation to key international and domestic objectives, the potency of this problem is significantly reduced. In this situation, we can test in a less ambiguous way the effects of losses on the decision-making process.

was established) the president asserted that if Khrushchev were allowed to install the missiles in Cuba despite his warnings, Khrushchev would be so emboldened by Kennedy's apparent weakness that it was virtually inevitable that the Soviets would take some aggressive action against Berlin (May and Zelikow, 1997:143, 144, 145, 172, 176, 207, 282). Kennedy claimed that if this occurred he would have to respond to protect America's vital interests in Europe, and this might very well necessitate the use of nuclear weapons to balance Soviet conventional superiority in the European theater. In other words, Kennedy believed that *not* responding aggressively to the installation of missiles in Cuba could lead to world war. Under this mindset, the costs of not responding in a very firm manner to Khrushchev's gambit and instead accepting a change in the status quo hardly could have seemed greater.[36]

Nonetheless, the potential costs of either threatening Khrushchev to remove the missiles or simply taking them out without warning were also believed to be enormous. This was especially true of immediate military action. Kennedy and other ExCom members frequently spoke of the "inevitability" of an attack on Berlin if America attacked Cuba—a reaction that led ultimately to war in the minds of most U.S. decision-makers.[37] If Kennedy chose only to threaten to take military action if the missiles were not removed, he believed that Khrushchev would likely issue a reciprocal threat about Berlin. In this case, Kennedy would be left with the choice of either not carrying through with the threat (which would have further damaged his credibility) or striking the missiles.

Although the possible costs associated with each of the broad policy choices available to Kennedy were enormous, the probabilities that these costs would be borne were not equal (although all were alarmingly high). As noted earlier, most ExCom members, including Kennedy, believed that military strikes against the missiles virtually assured a Soviet response in Berlin—which made war with the Soviet Union almost certain. Kennedy seemed to believe that the same outcome was almost as likely if the U.S. did not respond to Khrushchev's initiative in a firm manner and instead just accepted a change in the status quo. In the president's view, as long as Khrushchev doubted American resolve, a move against Berlin—and thus conflict between the two superpowers—was almost guaranteed. Choosing to threaten the Soviets to remove the missiles did not carry with it in American leaders' minds the same estimated probabilities of war as did the other options. Threatening the Soviets to force the removal of the missiles allowed the Kennedy administration to demonstrate its resolve (thereby alleviating the principal hazard of simply accepting a change in the status quo), while also giving Khrushchev more room to back down, as compared to the option of employing a military strike without warning.

Thus of the three broad options available to Kennedy at the start of the crisis, the one with the highest expected value—as determined by key ExCom members' own accounts—was to threaten Khrushchev to remove the missiles. This choice carried with it a lower probability of war with the Soviet Union in the pursuit of protecting American interests than either of the other two options. Kennedy's decision to couple the blockade of Cuba with an ultimatum to Khrushchev to remove the missiles or face military hostilities thus seems to be a value-maximizing choice, and therefore seems to be sufficiently explained by expected-utility theory.

Kennedy's decision to implement the blockade is, however, not necessarily contrary to what prospect theory would predict. This statement may seem sur-

[36] As Kennedy explained to the American people in his announcement of the discovery of the missiles and the implementation of the blockade: "The greatest danger of all would be to do nothing" (May and Zelikow, 1997:281).

[37] See, e.g., the quotations by ExCom members in May and Zelikow, 1997:84, 87, 115, 138, 143, 144, 176, 179, 183, 271.

prising since, as indicated by the above analysis, Kennedy was clearly operating in the domain of losses in this period, yet he did not opt for an excessively risky, non–value maximizing decision. The reason why this outcome does not necessarily violate the predictions of prospect theory is due to the value of the probabilities associated with Kennedy's principal policy options. For two of the primary options that Kennedy was considering as a response to the discovery of missiles on Cuba, accepting a change in the status quo without a military confrontation or responding immediately with military force, Kennedy and his closest advisors believed that it was *virtually certain* that the Soviet Union would respond with actions that would lead to military conflict between the superpowers. According to prospect theory, this fact has important implications for U.S. leaders' probability-weighting functions. As stated previously, when people's probability estimates approach certainty, they are very likely to switch from underweighting the effects of these estimates on their value calculations to overweighting them. When this happens, individuals are likely to become more cautious when operating in the domain of losses since the overweighting of probabilities as they approach certainty increases the weights given to risky negative prospects, thereby making them more unattractive. Thus, the fact that Kennedy's initial response to the missiles was not an excessively risky one may simply reflect the impact of the probability-weighting function on his decisions when estimated probabilities approach certainty, rather than the superior explanatory ability of a theory based on the maximization of expected value.

This possibility is supported by the fact that theories based on the maximization of expected value have difficulty explaining Kennedy's actions from the time the blockade was implemented to when Khrushchev announced he was removing the missiles from the island and returning them to Soviet soil. It is worth reiterating that in Kennedy's estimation, what made the Cuban missiles so threatening to America's security was not their impact on the distribution of power, but that they revealed a lack of resolve by American leaders, which, in turn, weakened America's international credibility.

According to virtually all contemporaneous accounts, the blockade—especially when the Soviets decided not to challenge it—served its primary purpose of demonstrating American resolve. Most ExCom members were convinced that Khrushchev would respond to the quarantine by reciprocating with, at a minimum, another blockade of Berlin. That Khrushchev made no hostile move in this area surprised the Americans (Blight and Welch, 1989:160) and created in their minds the opinion that the Soviets had been deterred by America's firm response to the discovery of the missiles.

Moreover, it must be remembered how costly a signal the blockade was in American leaders' minds. (The issue of costliness is important because the greater the risks of an action, the greater the resolve demonstrated by taking it (Fearon, 1993; Huth, 1997).) Not only were the Americans threatening to stop Soviet ships in international waters, but they supplemented the surface blockade by engaging in antisubmarine warfare (ASW) to make sure that no missiles could reach Cuba underwater. In the process, American ships damaged a Soviet sub to the point where it had to be towed back to the Soviet Union. The great danger involved with the blockade,[38] coupled with the facts that Soviet ships carrying military equipment did not cross the quarantine line and that Khrushchev decided not to respond in a parallel manner in Berlin, created in U.S. leaders' minds the view that the blockade had significantly increased America's international credibility. As Bundy puts it, the "crucial issue [of restoring U.S. credibility] was *resolved* on

[38] See Kennedy, 1969:69–71 to get a sense of how fearful ExCom members were that the blockade and ASW would lead to superpower conflict.

the afternoon that the other fellow blinked [on Wednesday, October 24]" (1988:420, 405, emphasis added).[39]

Once American credibility had been strengthened by the creation and subsequent success of the blockade, Kennedy's preference structure, according to an expected value calculus, should have changed.[40] Once Kennedy had demonstrated his resolve, the chances of Khrushchev taking action in Berlin in the near future—which was the real threat generated by the missiles in the president's mind—should have been reduced. In this new situation, the dangers of accepting the missiles and especially of reaching a negotiated way out of the crisis were not as high as they were before the crisis began. In fact, Kennedy did seem to recognize that the situation had altered after the establishment of the quarantine. No longer was he obsessed with Khrushchev taking action in Europe as a result of the latter's perception of American weakness. After the blockade was implemented, in the ExCom meetings Kennedy referred to Khrushchev seizing Berlin or engaging in other provocative actions only as *a response to U.S. actions in Cuba*, and not as a response to perceptions of American irresoluteness.

While the anticipated costs associated with the policy of accepting the missiles in Cuba or finding a negotiated way out of the crisis seemed to decrease in American leaders' views—including the president's—after the creation of the blockade, the anticipated costs associated with *not* finding a solution to the crisis were increasing.[41] With every day that the crisis continued, worries increased among many ExCom officials that conflict between the superpowers would result due to accident, miscalculation, or miscommunication. Richard Neustadt writes that Kennedy was "horrified" at the possibility that Khrushchev, in the president's words, had "the same degree of control over his [armed] forces as I have over mine" (Blight and Welch, 1989:108). Robert Kennedy said that Barbara Tuchman's book *The Guns of August* (which the president had read shortly before the crisis) weighed very heavily on his brother's mind and that the president was determined to prevent an outcome similar to that described in the book, which attributes World War I to miscalculation among the powers (Kennedy, 1969:62, 127). McNamara declared that his overwhelming worry during the crisis was the fact that "it is impossible to predict with a high degree of confidence what the effects of the use of military force will be because of the risks of accident, miscalculation, misperception, and inadvertence" (Blight and Welch, 1989:100).[42]

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[39] For other statements of how the success of the blockade increased American credibility, see Kennedy, 1969:34, 121–122; Blight and Welch, 1989:175; George, 1994:114, 117, 118, 130; May and Zelikow, 1997:113–114, 358, 384, 433, 435, 587. For Soviet views confirming this statement, see Khrushchev, 1990:172; George, 1994:117, 118, 130; Lebow and Stein, 1994:115. Importantly (as, for example, indicated by Bundy's statement cited above), American leaders believed that the blockade resulted in an increase in American credibility even though the missiles remained (for the moment) in Cuba. Khrushchev's cautious response, both at the quarantine line and in Europe, and especially the costliness of America's actions, revealed American resolve even if its decision-makers' ultimate objective—the removal of the missiles—was not immediately realized.

[40] One of the benefits of modeling expected-utility theory in an extensive-form game is that it does not treat actors' preferences as exogenous to interaction. According to James Morrow, "the bases of solutions to extensive-form games of limited information are expected utility calculations. . . . [An important characteristic of these games] is that *the challenger's belief that the defender is resolved is [not] exogenous.* Instead, this belief changes with the defender's actions in the game" (1994:204, emphasis added). Applied to the Cuban missile crisis, this analysis implies that the success of the blockade in demonstrating American resolve should have changed both Soviet estimations of American preferences and American leaders' understanding of this variable (the former claim is a central point of Wagner, 1989). U.S. statesmen seemed to recognize that Soviet estimations of American credibility had changed as a result of the blockade, but American actions were not changed to correspond with this new perception.

[41] To put the first part of this statement another way, after the success of the blockade had increased U.S. credibility, the marginal benefits associated with continuing to threaten Khrushchev were decreasing.

[42] For other expressions of American leaders' great fear of war by accident or miscalculation during the crisis and incidents that justified this fear, see Allison and Zelikow, 1999:237–240; Blight and Welch, 1989:109, 209, 213, 313, 370; Nathan, 1992:17–19; May and Zelikow, 1997:486, 490, 688.

These two trends in the benefits and costs associated with threatening Khrushchev to remove the missiles, especially when coupled with the fact that the most important ExCom officials believed that the likelihood that Khrushchev—even after the Soviet leader had decided not to challenge the blockade—would remove the missiles due to American threats was not very high,[43] mean that the anticipated costs of maintaining this policy were increasing significantly relative to the anticipated benefits of continuing with it. Therefore, Kennedy's choice to continue to threaten military action to remove the missiles after the blockade was established and subsequently respected by the Soviets, instead of pushing for a diplomatic solution to the crisis, was likely not a value-maximizing policy, given his own estimations of the costs, benefits, and probabilities of success associated with the available policy alternatives.[44] Alexander George points to the great riskiness of the president's actions after the blockade was established when he writes that "Kennedy's decision to withhold any indication of a willingness to offer concessions until late on Friday, October 26 [may have resulted] . . . in an unwanted, unexpected hardening of [Khrushchev's] determination to reject the demands of the [United States] and to consider escalation" (1994:128).

Kennedy's willingness to take excessive risks to restore the status quo ante is even more strongly revealed once Khrushchev offered to remove the missiles in exchange for American concessions. On Friday, October 26, Khrushchev indicated in a letter to the president that he would remove the missiles in exchange for a pledge by Kennedy not to invade Cuba. This deal allowed Kennedy to achieve his chief end—the removal of the missiles largely due to America's forceful response to their discovery—while costing him only a public commitment to eschew certain actions that he was unlikely to do anyhow.[45] This exchange was clearly a value-maximizing one for the president. Yet, surprisingly, the ExCom did not accept the offer right away. Instead Kennedy gave the letter to the State Department for further analysis and decided to reevaluate Khrushchev's message in the next day's meeting. As Mark White puts it, "most striking was the administration's failure to embrace Khrushchev's offer immediately and to dash off a letter of acceptance" (1996:211). Although delaying to make an important international decision in normal times is often prudent, needless to say these were not normal times. ExCom leaders continued to be highly fearful of inadvertent conflict due to miscalculation or accident. On the morning of the twenty-seventh, the ExCom was even informed that the Soviet officials in the United States were burning their documents, which indicated that war might be approaching. Given the benefits of accepting Khrushchev's offer, the relatively small costs of doing so, and the fact that the Americans believed the anticipated costs of not resolving the crisis were increasing every day the high state of tension continued,

[43] For evidence corroborating this last claim, see Kennedy, 1969:109; Bundy, 1988:437; Nathan, 1992:17; Lebow and Stein, 1994:118–119; Allison and Zelikow, 1999:357. Indeed, from the beginning of the crisis key ExCom members, including the president and his brother, had said that the missiles would come out only by trading or invading (Blight and Welch, 1989:103; White, 1996:183; May and Zelikow, 1997:165, 464, 466).

[44] Analysis of domestic politics does not change this judgment. Not only were the anticipated domestic costs associated with Kennedy's major policy options in important ways indeterminate (i.e., Kennedy was acutely aware that no matter what he decided, he would be attacked by the Republicans (cf. Paterson and Brophy, 1986:102; Lebow, 1992:168; Lebow and Stein, 1994:109; May and Zelikow, 1997:539)), but public opinion (as revealed by polling data) seemed to be pushing him toward a diplomatic compromise and away from continued threats against the USSR (Lebow and Stein, 1994:380, 381). Thus, although domestic politics can help explain Kennedy's initial decision not to accept the Soviet missiles in Cuba without some sort of confrontation with the USSR, it cannot explain his continued unwillingness to push for a negotiated settlement of the crisis. (For related criticisms of the claim that Kennedy's decisions after the establishment of the blockade were driven to a great degree by domestic-political considerations, see Hampson, 1984/85:142; Bundy, 1988:686; Welch and Blight, 1987/88:25.)

[45] For evidence pointing to the fact that Kennedy was unlikely to invade Cuba unless he was severely provoked, see Allyn et al., 1992:9, 19; Fursenko and Naftali, 1997:157.

Kennedy's decision not to accept the deal immediately must be viewed as a highly risky, non–value maximizing choice.

The penalty for Kennedy's delay was revealed mid-morning, Saturday the twenty-seventh. At that time, Khrushchev stated publicly that he would remove the missiles in exchange for a no-invasion pledge of Cuba and a promise to remove the American nuclear missiles from Turkey.[46] Of the three broad options available to Kennedy to respond to Khrushchev's offer of October 27—accept the proposal, reject it and instead engage in military strikes against Cuba, or threaten to engage in military strikes in the hopes of getting a better deal—Kennedy chose the last. While he was willing by this point in time to offer a no-invasion pledge and even a private exchange of missiles to end the crisis, he was not willing to accept a public trade of missiles in Turkey for those in Cuba. He therefore threatened military action as long as the latter condition was part of Khrushchev's terms for an exchange. As Robert Kennedy told Soviet Ambassador Anatoly Dobrynin on the afternoon of Saturday, October 27: "If [the Soviets] did not remove those bases, we would remove them" (Kennedy, 1969:108).

In order for this decision to be a value-maximizing one, the expected value associated with threatening to strike Cuba had to be greater than the expected value of accepting the public trade of missiles in Cuba for those in Turkey as a means of ending the crisis. It is doubtful that this was the case. The principal international cost to Kennedy of a public trade of the missiles was a potential weakening of the NATO alliance, since it may have appeared to the Europeans that in publicly exchanging the missiles America was sacrificing European security for U.S. interests. This was an important cost to America given U.S. security interests in Europe and the importance to the Kennedy administration of preserving and augmenting its reputation for maintaining America's international commitments. Yet several American officials seemed to think that the harm in this area, especially relative to the anticipated costs of other options, was manageable. They asserted that NATO was strong enough to withstand the removal of obsolete and vulnerable missiles in Turkey, especially given the fact that the United States would replace the weapons with more powerful and less vulnerable Polaris missiles on submarines.[47]

Moreover, ExCom officials believed that no matter which of the two policies they chose (either accepting Khrushchev's latest offer or continuing to threaten the Soviets to remove the missiles in hopes of getting a better deal), damage would likely be done to NATO. Kennedy understood that although NATO may have been damaged by a public trade of Turkish and Cuban missiles, the alliance most certainly would be harmed—and to a much greater degree—if conflict between the superpowers resulted over an issue that did not jeopardize European security. This is a theme to which the president would return again and again on Saturday, October 27 (May and Zelikow, 1997:418, 530, 539, 542, 545,

[46] We do not know for a fact that Kennedy's decision not to agree immediately to the terms of Khrushchev's "first letter" led to the second one. Khrushchev may have upped the ante no matter what Kennedy did. Yet it is reasonable to assume that had the two leaders mutually and formally agreed to a way to end the crisis, it would have been much more difficult for one of them to renege and try to change the terms of the agreement.

[47] See, e.g., the quotations by ExCom officials in May and Zelikow, 1997:583, 587, 591. Importantly, almost all NATO members were willing to trade the missiles to have the crisis end (Germany, Turkey, and the Netherlands were important exceptions to this view) (Bernstein, 1992:79–83, 119–120). Macmillan even told Kennedy he was willing to exchange Britain's Thor missiles for the Cuban ones (May and Zelikow, 1997:482, 485). Moreover, consideration of the interests of those allies that opposed a public trade should not have been determinative of Kennedy's decision on this issue. Turkey opposed a public *or* private trade of missiles. Since Kennedy was willing to do the latter by this point to end the crisis, clearly Turkey's wishes were not paramount to the president. Although Germany opposed the trade, Adenauer's devotion to the alliance in all likelihood would have remained steadfast, if for no other reason than he felt that he had no other place to turn than NATO to protect Germany's security (Bernstein, 1992:80). I do not mean to overly minimize the potential damage done to NATO by publicly trading the Turkish missiles, yet the facts remain that key American leaders thought the costs were manageable, that they would be borne no matter what they did, and that *almost all NATO countries themselves desired the deal.*

548). The anticipated gains to be had by not accepting Khrushchev's latest offer were further limited by the fact that Kennedy believed that the attempt to ignore the terms of Khrushchev's second letter and instead respond to the terms of the first was likely to be unsuccessful (Bundy, 1988:431, 430; Bernstein, 1992:88–89; May and Zelikow, 1997:544, 545, 536). Furthermore, it must be remembered that the president and other ExCom officials were growing increasingly fearful that military conflict between the superpowers would result due to accident, miscalculation, and an increasing inability of both sets of civilian leaders to maintain control of events the longer the crisis continued. Saturday the twenty-seventh had already seen perhaps the most dangerous moments of the period due to such problems. Around noon, an American pilot flying over Cuba was shot down and killed. Although Kennedy decided not to respond militarily to this attack, he had decided that next time he would have to make some sort of military response despite fears that this would very likely lead to a spiral of escalation that would ultimately result in direct superpower conflict (Bernstein, 1992:92; May and Zelikow, 1997:573–574). A couple of hours earlier, an American U-2 based in Alaska mistakenly crossed into Soviet airspace. Soviet fighters scrambled to intercept the plane, and American fighters—armed with air-to-air nuclear warheads and discretion to use them as a result of steps taken during the crisis—were sent to escort the U-2 back to U.S. territory. This near conflict was of great concern to both Soviet and U.S. decision-makers (Allison and Zelikow, 1999:240–241).

In sum, given Kennedy's beliefs that America's attempts to agree to the terms of Khrushchev's first letter only were likely to be unsuccessful, that prolonging the crisis—even by a day—was dangerous due to the fact that events were becoming more difficult to control, and that damage done to NATO was likely to result no matter what Kennedy did, his decision not to accept immediately Khrushchev's offer in the Soviet leader's "second letter" was a highly risky choice that did not conform (in terms of value maximization) with the president's own estimations of the costs, benefits, and probabilities of his available options. Instead, it conforms with prospect theory's prediction that individuals will take excessive risks to recoup losses.[48]

3. Why Did Khrushchev Decide to Return the Missiles to the Soviet Union?

Just as Khrushchev's decision to place offensive missiles in Cuba plunged Kennedy into the domain of losses, the events of the week of October 21, 1962, had a similar effect on his Soviet counterpart. It is clear that Khrushchev placed great hopes in the success of the Cuban venture as a solution to many of his most important international and domestic problems. The discovery of the missiles before they were made operational and Kennedy's subsequent reaction not only dashed Khrushchev's hopes of alleviating these problems but also created new quandaries for him. Given Kennedy's ultimatum, Khrushchev had to choose between a humiliating retreat or an increasing risk of confrontation with the world's strongest power.[49]

[48] Notice that this judgment obtains regardless of whether or not Kennedy intended to follow through with his ultimatum to Khrushchev that strikes against Cuba were going to begin very shortly unless the missiles were removed. Even if the president were not going to initiate military strikes on Monday or Tuesday the twenty-ninth and thirtieth (as many scholars believe he would have done), and instead intended to tighten the quarantine or perhaps even arrange a public exchange of Turkish and Cuban missiles, bluffing was a very risky strategy given Kennedy's growing fear that accidental war was becoming more likely each day the crisis was prolonged.

[49] Although, as seen, Khrushchev most likely thought the likelihood of the mission failing was high, this does not mean that the American discovery of the missiles and Kennedy's subsequent reaction to them did not create losses for the Soviet leader. There is a big difference between thinking one is likely to be in a crisis and actually being in one. Moreover, Khrushchev was most likely surprised by the condemnation of his policies made by the unaligned nations in the Organization of American States, the United Nations, and Africa (Bundy, 1988:440). Thus world public opinion, and not just that of America and its allies, opposed Khrushchev over this issue.

Many scholars describe Khrushchev's reaction to the American blockade as a value-maximizing one. There is much to this argument. In a choice between capitulating to U.S. pressure and risking conflict with a state that was greatly superior to the USSR in terms of strategic nuclear capabilities, Khrushchev chose the former. As he explained to the Presidium on the eve of the resolution of the crisis, "in order to save the world we must retreat" (Fursenko and Naftali, 1997:284). Because Khrushchev believed both that the probability of war with the United States was virtually inevitable unless he capitulated and that the costs of this outcome were so enormous that they dwarfed any possible benefit to be gained from further challenging Kennedy's resolve, he chose to back down. This seems to be a clear case of a decision driven by expected-value calculations.

This analysis, however, ignores an important component of Khrushchev's behavior in the days leading up to the end of the crisis. For the week subsequent to Kennedy's ultimatum and the establishment of the blockade, Khrushchev chose neither capitulation nor an outright challenge to the American position. Instead, he adopted a third course in which he tried to bluff the Americans—by appearing to be willing to defy the blockade—in order to get more concessions from Kennedy in exchange for the ultimate withdrawal of the missiles. As Lebow and Stein aptly put this point:

> Khrushchev pursued a two-pronged strategy. By appearing tough and uncompromising [e.g., by promising to run, in Khrushchev's words, the "illegal" and "piratical" blockade, by increasing the pace of construction on the missiles in Cuba, and by increasing the alert status of Soviet and Warsaw Pact military forces] he tried to extract concessions from Kennedy in return for withdrawing the missiles. At home, he sought to convince the Presidium colleagues that failure to remove the missiles would provoke an American invasion of Cuba. (1994:116).[50]

This strategy of bluffing Kennedy in order to get a better deal for the removal of the missiles from Cuba before Khrushchev ultimately caved to American pressure was a very risky one. Even before the crisis began, Khrushchev had believed that Kennedy, and especially the American military, wanted to invade Cuba. The continued presence of missiles on the island—and particularly the fact that they were coming closer to being operational owing to Khrushchev's decision to accelerate work in this area—would provide an excellent excuse for such an attack. The anticipated costs of this outcome were made significantly higher by the facts that many Soviet leaders believed the United States would attack the Soviet Union at the same time as Cuba (Lebow and Stein, 1994:137) and that Soviet forces on Cuba, unbeknownst to the Americans, were armed with tactical nuclear weapons. The latter would have made a military clash on the island a particularly incendiary one. Moreover, and very important, Khrushchev—just as with Kennedy—was acutely aware that conflict between the superpowers due to accident or miscalculation was becoming more likely each day that the high state of tension continued. This is a theme that Khrushchev repeatedly referred to throughout this period (Blight and Welch, 1989:313, 349; May and Zelikow, 1997:490, 688).

Given the enormity of the costs if Khrushchev were unsuccessful in his attempt to bluff Kennedy in relation to the benefits of success (e.g., a no-invasion pledge of Cuba by Kennedy and a public trade of the missiles in Cuba for the ones in Turkey)—coupled with the beliefs held by many Soviet leaders, including Khrushchev, that there was a good chance that any day Kennedy would decide to attack

[50] On the great difficulty of succeeding with this strategy given the circumstances, see Lebow and Stein, 1994:118.

Cuba (and possibly the Soviet Union) and that conflict resulting from accident or miscalculation was becoming more likely each day the high state of tension existed—it is likely that Khrushchev's decision to prolong the crisis by trying to bluff his way to greater concessions was not a value-maximizing one.[51] Instead, it was likely a risk-acceptant strategy designed to recoup some of the previous week's losses. Thus, although Khrushchev's ultimate decision to remove the missiles from Cuba appears to be a value-maximizing one, the strategy adopted before this decision was finally reached appears not to have been. Although Khrushchev was not willing to take excessive risks to try to recoup all his losses, he was willing to do so in an attempt to recoup some of them. Prospect theory therefore does add insight to important dimensions of the resolution of the crisis from the Soviet perspective.[52]

Conclusion

This article has tested the predictions of expected-utility and prospect theories against the most important decisions of the Cuban missile crisis. In order to make this test, I used the latest studies that examined the Soviet archives on this subject and the plethora of information from the American side (most prominently the ExCom tapes) to estimate what the key actors believed the likely costs, benefits, and probabilities of success associated with each of the major policy choices at each stage of the crisis to be.

Consistent with prospect theory's predictions, when Kennedy and Khrushchev operated in the domain of losses *and* their probability estimates for the principal outcomes were in the moderate-to-high range, these leaders tended to engage in excessively risky, non–value maximizing behavior. When, however, their probability estimates for prominent outcomes approached certainty, they were much more cautious. This latter tendency conforms with prospect theory's claim that when people's probability estimates approach certainty, there is a tendency to switch from underweighting to overweighting of these estimates on individuals' value functions. When this happens, people may become much less risk-acceptant when experiencing losses.

These findings are particularly problematic for value-maximizing theories since Kennedy and Khrushchev repeatedly engaged in excessively risky behavior when the downside of their gambles was nuclear conflict between the superpowers. Importantly, prospect theory seems to provide a superior explanation for the key events of the Cuban missile crisis even in relation to those theories based on the maximization of expected *utility* that assert convex utility functions for actors. Specifically, Kennedy and Khrushchev switched from excessively risky to more value maximizing behavior at precisely the time that prospect theory predicts,

[51] Khrushchev's decision to up the ante in his "second letter" to Kennedy and demand the removal of the Turkish missiles in addition to a pledge by Kennedy not to invade Cuba in order for the Soviets to remove their missiles from Cuba seems especially puzzling. Khrushchev himself said that trading the Turkish missiles was merely "of a symbolic nature" since the weapons were obsolete and scheduled to be replaced (1974:512). Thus the potential benefits of prolonging the crisis hardly seem worth the potential costs of doing so, especially given Khrushchev's fears of the likelihood of an American attack. As Ambassador Dobrynin put it, even though Khrushchev thought an American air strike on Cuba was likely "at any moment . . . [he decided to make] a desperate, last-minute attempt to obtain a deal to swap his missiles in Cuba for the American missiles in Turkey" (1995:86).

[52] Khrushchev shifted from risk-acceptant to much more cautious behavior when he became convinced that it was virtually certain an American attack on Cuba was about to begin. The Soviet leader thought an attack on Cuba, as a result of deliberate choice or accident, was increasingly likely as the week of October 21 progressed. Only on the twenty-seventh, as a result of reports from Castro and Soviet intelligence, did he think that an attack was (as Castro's report put it) "practically imminent" (Lebow and Stein, 1994:138–140; Garthoff, 1988:57; Khrushchev, 1990:178; Allyn et al., 1992:90; White, 1996:227, 1997:142). This change in policy conforms with prospect theory's predictions since according to it when individuals' probability estimates for particular options approach certainty, those individuals are likely to overweight these outcomes in their value calculations. This process pushes people to behave more cautiously when operating in loss frames.

that is, when their probability estimates approached (but did not necessarily reach) certainty. In other words, the evidence conforms with the a priori predictions of prospect theory concerning the conditions under which particular outcomes are likely to obtain. Utility-maximizing theories do not make these types of predictions, but only assert that *at some point* individuals' probability estimates may make certain gambles so unlikely to succeed that even highly risk acceptant actors will not take them. Because prospect theory specifies the conditions under which particular outcomes are likely to result, it runs a smaller risk of becoming an unfalsifiable theory.

Moreover, it is significant that many of the most prominent rationalist accounts of decision-making indicate that American and Soviet decisions in this period should have been risk-*averse*.[53] For these same types of theories to claim convex utility functions to explain Khrushchev's and Kennedy's behavior would be an ad hoc change that would, in effect, make these approaches unfalsifiable.[54]

Perhaps the most important policy implication generated by the tendency to engage in risk-acceptant behavior while suffering losses (assuming probabilities in the moderate-to-high range) results from the fact that this proclivity calls into question the key assumption that grounds most theories of deterrence—that people will behave "rationally" in terms of basing their decisions on expected value calculations. If leaders have a tendency to adopt excessively risky policies after experiencing losses, actions that according to deterrence theory are most likely to inhibit challenges to the status quo (such as maintaining military superiority in relation to one's adversary or issuing deterrent threats to one's opponent) may end up making these challenges more likely. This ironic outcome results from the fact that the same policies designed to have a deterrent effect on others' policies also tend to create losses for these individuals, which, in turn, are likely to provoke risk-taking behavior. Thus an important implication of the findings of this article is that because individuals may be inclined to engage in "irrational," risk-acceptant behavior when in the domain of losses, leaders should not be nearly as confident in the likely success of deterrent and compellent threats as deterrence theory asserts simply because the balance of power or balance of interests is in their state's favor.

Appendix: A Chronology of the Key Events of the Cuban Missile Crisis

- Tuesday, October 16 (8:45 a.m.). President Kennedy is informed that MRBM missiles sites are under construction in Cuba.
- Tuesday, October 16 (6:30 p.m.). The first ExCom meeting is convened.

[53] Leading proponents of expected-utility theory have coded states' risk propensities by examining their alliance portfolios. To these approaches, "nations that choose alliance profiles that produce a relatively large amount of security are judged to be risk-averse" (Morrow, 1987:424; Bueno de Mesquita and Lalman, 1992:293). Given the Soviet Union's and especially America's numerous alliance commitments throughout the Cold War, by this criterion both states should have inclined toward risk-aversion. Given this essay's principle conclusions, it is perhaps paradoxical that its findings may help quantitative expected-utility models in their study of international relations by offering a way of improving the construct validity for measuring states' attitudes toward risk. Instead of using such factors as alliance portfolios to measure risk propensity, this study suggests that domain is potentially a much more reliable indicator of this latter variable. Domain can be measured by such quantifiable indices as changes in the international distribution of power (cf. Huth et al., 1992), public opinion polls, shifts in party strength, and the like.

[54] Perhaps the best way to determine if prospect theory or expected-utility analyses that assert that actors possess convex utility functions provides the better explanation for decisions in the Cuban missile crisis would be to see if Kennedy's and Khrushchev's policies changed when they switched from loss to gain frames when all other key variables are held constant. (This test refers to reversals in individuals' preferences based on framing effects, which, as stated, are very difficult to explain within an expected-utility framework.) However, because throughout the crisis both Kennedy and Khrushchev were clearly operating in the domain of losses for both domestic and international reasons, the conditions necessary to test this hypothesis are not met in this case.

- Monday, October 22 (7 p.m.). The president announces to the nation the discovery of the missiles and his intent to impose a "strict quarantine" of Cuba, which would go into effect Wednesday morning, October 24.
- Wednesday, October 24 (early morning). Soviet ships en route to Cuba either stop or reverse their course.
- Wednesday, October 24 (early afternoon). The alert level of the Strategic Air Command (SAC) is raised to Defcon 2, the highest level of alert short of war.
- Friday, October 26 (7:45 a.m.). American military personnel stop and board a Lebanese freighter under charter to the Soviet Union.
- Friday, October 26 (6 p.m.). Kennedy receives a private letter from Khrushchev in which the Soviet leader indicates he would be willing to remove the missiles in Cuba in exchange for a pledge by Kennedy not to invade Cuba.
- Saturday, October 27 (early morning). The president and his brother are told that Soviet officials in New York are burning their documents, which may indicate that the latter believe that war is imminent.
- Saturday, October 27 (10:17 a.m.). A new letter arrives from Khrushchev offering to remove the Cuban missiles in exchange for a pledge by the president not to invade Cuba and a public trade of Jupiter missiles in Turkey.
- Saturday, October 27 (10–11 a.m.). An American U-2 stationed in Alaska mistakenly flies into Soviet airspace. Soviet fighters scramble to intercept the plane, but American fighters (armed with air-to-air nuclear weapons) escort the U-2 back to U.S. territory.
- Saturday, October 27 (around noon). An American U-2 is shot down over Cuba and the pilot is killed.
- Saturday, October 27 (7:45 p.m.). Robert Kennedy meets with Dobrynin. The former offers a no-invasion pledge of Cuba and a *private* trade of the Turkish missiles in exchange for the Soviets removing their missiles from Cuba. Kennedy tells Dobrynin that if the Soviets do not remove the Cuban missiles "by tomorrow" the U.S. "would remove them."
- Saturday, October 27 (late evening, Washington time). Khrushchev receives a series of reports from Castro and Soviet intelligence sources that indicates that an American attack on Cuba is imminent.
- Sunday, October 28 (9 a.m., Washington time). Radio Moscow broadcasts a message to Kennedy stating that the Soviets had ordered the missiles removed from Cuba and that they accepted the president's promise not to attack the island.

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