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## APPLICATIONS OF PROSPECT THEORY TO POLITICAL SCIENCE

**ABSTRACT.** Prospect theory is an alternative theory of choice under conditions of risk, and deviates from expected utility theory by positing that people evaluate choices with respect to gains and losses from a reference point. They tend to overweight losses with respect to comparable gains and engage in risk-averse behavior with respect to gains and risk-acceptant behavior with respect to losses. They also respond to probabilities in a non-linear manner. I begin with an overview of prospect theory and some of the evidence upon which it is based, and then consider some of the implications of the theory for American politics, international relations, and the law. I end with a brief discussion of some of the conceptual and methodological problems confronting the application of prospect theory to the study of politics.

Rational choice theories based on expected-utility models of decision-making have come to play an increasingly important role in political science over the last two decades, to the point that the debate between rational choice theorists and their critics now constitutes one of the central themes in the theoretical literature on American, comparative, and international politics. While cultural and constructivist critics of rational choice question its choice-theoretic foundations, behavioral decision theorists accept those basic foundations but question whether expected utility provides an adequate descriptive theory of how people actually make choices under conditions of risk and uncertainty.

Although the debate among contending theories of risky choice has yet to be resolved by social psychologists and experimental economists (Battalio et al. 1990; Sopher and Gigliotti 1993; Camerer 1995; Kagel and Roth 1995; Kahneman and Tversky 2000), the behavioral alternative to expected utility that has received by far the most attention in political science is prospect theory (Kahneman and Tversky 1979). Prospect theory deviates from expected-utility theory by positing that the way people frame a problem around a reference point has a critical influence on their choices, and that people tend to overweight losses with respect to comparable gains, engage in risk-averse behavior with respect to gains and risk-acceptant behavior with respect to losses, and respond to probabilities in a non-linear manner. Prospect theory has been particularly influential in the field of international relations, but scholars in other fields of political science have also begun to apply some of the theory's key concepts.<sup>1</sup>



*Synthese* 135: 215–241, 2003.

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In this essay I survey a wide range of applications of prospect theory to political science. Most of these applications involve the implications of reference dependence, loss aversion, and the S-shaped value function, but I will also suggest a few applications of probability weighting, which has generally been neglected by political scientists.<sup>2</sup> After providing a brief overview of prospect theory, I focus primarily on applications of prospect theory to American politics, international relations, and the law.

### 1. OVERVIEW OF PROSPECT THEORY

Prospect theory attempts to integrate the observed violations of expected utility into an alternative theory of risky choice. Unlike expected-utility theory, which is built on axiomatic foundations, prospect theory is inductive in its origins. Most of the evidence of anomalies in expected utility is based on experimental studies in social psychology and experimental economics, but laboratory findings have been reinforced by field studies in finance, insurance, consumer economics, and other fields (Kahneman and Tversky 2000).

People deviate from the predictions of expected-utility theory in a number of ways. Most fundamental is the fact that people are more sensitive to changes in assets than to net asset levels, to *gains* and *losses* from a *reference point* rather than to levels of wealth and welfare. This *reference dependence* runs contrary to the postulate of a utility function defined over levels of assets, and it constitutes the central analytic assumption of prospect theory.

The theoretical importance of reference dependence derives from substantial evidence of asymmetries in the way in which people evaluate outcomes above and below the reference point. First, people tend overvalue losses relative to comparable gains. This is *loss aversion*, and it is reflected in Jimmy Connors' statement that "I hate to lose more than I like to win" (Levy 1992, 175). Closely related to loss aversion is the *endowment effect* (Thaler 1980, 43–47) – individuals tend to value what they have more than comparable things that they do not have, quite independently of any enduring emotional attachment to the good. As a result, people often refuse to sell an item for a price at which they would not have considered purchasing that item in the first place, and selling prices tend to exceed buying prices, often by a magnitude of two to one or even higher (Camerer 1995, 665–670; Kahneman et al. 1990, 1325–1326; Cohen and Knetsch 2000, 429). This disparity between buying prices and selling prices may be an important source of inefficiencies and stickiness in financial markets (Borges and Knetsch 1998).

One implication of loss aversion and the endowment effect is that actual losses hurt more than foregone gains. This is reflected in one columnist's comparison of the effects of severe inflation and recession: "Hyperinflation . . . is worse than a deep recession. Hyperinflation robs you of what you have now (savings), whereas a recession robs you of what you might have had (higher standards of living if the economy had grown)" (Zakaria 2001). Another implication is that gaining something and then losing it does not leave the individual in the same place in terms of the psychological value of one's assets. As Daryl Hannah's character in the movie *Wall Street* says, "You may find out one day that when you've had money and lost it, it's much worse than never having had it at all".

The world of finance provides ample illustrations of reference dependence and loss aversion. For stock analysts and mutual fund managers, the criterion for success is not just making money, but beating the S&P or the relevant index in one's fund category. Because of the overvaluation of losses relative to comparable gains, however, the rewards from surpassing a target index are not as great as the costs of falling short of it. This helps to explain why many actively managed funds secretly mimic their target index: "Many fund managers have stopped swinging for the fences. Because they know the penalties for severely underperforming an index are now much greater than the rewards for strongly outperforming it" (*New York Times* 10/10/99, 28).

A second asymmetry between losses and gains involves *risk orientation* – people tend to be risk averse in choices among gains but risk-acceptant with respect to losses.<sup>3</sup> The strong aversion to losses, particularly "dead" losses that are perceived as certain (as opposed to those that are merely probabilistic), induces people to take risks in the hope of avoiding loss, even though the result may be an even greater loss and even though the expected value of the gamble may be considerably worse than the value of the certain loss. Risk aversion for gains and risk seeking for losses is reflected in the S-shaped value function in prospect theory.

The asymmetry of gains and losses around a reference point means that the way people identify the reference point, and hence how they *frame* a choice problem, can have a critical effect on their choices. A change in reference point can result in a change in preferences (*preference reversal*) even if the values and probabilities associated with outcomes remain the same (Kahneman and Tversky 1979, 2000). Choices about medical treatment programs, for example, are influenced by whether the effectiveness of the program is presented as a 90% success rate or a 10% failure rate. Choices about economic policies differ if the unemployment rate is stated as 10% than if the percentage of the workforce employed is stated as 90%.<sup>4</sup>

Preference reversals induced by changes in frames rather than by changes in subjective utilities or probabilities are difficult to reconcile with expected-utility theory or indeed rational choice more generally. One of the most basic principles of rational choice is that of invariance, which assumes that logically identical choice problems should yield identical results (Tversky and Kahneman 1986, S252–S257; Levy 1997, 92–93).<sup>5</sup> It should not make a difference whether the glass is half empty or half full.

Many simple choice problems are so well-structured – experimentally or naturally – that the reference point is for all practical purposes determined by the situation, leaving little variation in the way individuals identify the reference point in a given choice problem.<sup>6</sup> In static situations that involve a well-defined status quo, for example, the status quo often serves as the reference point. But this is not always true. Expectation levels, aspiration levels, social norms, social comparisons, and recent losses can also influence the location of an actor's reference point.

Individuals are particularly likely to utilize reference points other than their current position in dynamic situations in which there is no stable status quo to serve as an obvious focal point. If an actor is faced with a sequence of successive choices rather than a single choice, for example, it is not clear whether she will define her reference point in terms of her asset position at the beginning of the series of choices or with respect to her current asset position at the end of the sequence. Most research suggests that the answer depends on whether the end of the sequence brings gains or losses. More specifically, there is substantial experimental evidence that people “renormalize” their reference points after making gains much more quickly than they do after incurring losses. This has been labeled the *instant endowment effect* (Kahneman et al. 1990, 1342).

An important implication of the instant endowment effect is that after a series of gains an individual will renormalize her reference point around the new status quo, regard any subsequent setback as a loss rather than as a foregone gain, overweight that loss, and engage in risk-seeking behavior to maintain her new asset position against that loss. After a series of losses, however, an individual will not adjust to the new status quo but rather continue to use the status quo *ex ante* as her reference point. She will perceive any chance of “improving” her position to a point that still falls short of the original reference point as reducing a loss rather than making a gain, and she will engage in risk-seeking behavior to eliminate that loss and return to the reference point.

This helps to explain the influence of “sunk costs”. In contrast to standard microeconomic theory, in which people ignore sunk costs and make decisions on the margin, prospect theory predicts that people will not

renormalize their reference points after suffering losses. Instead, they will treat the new status quo as a loss that is certain in the absence of further action, and adopt risk-seeking behavior in an attempt to eliminate that loss, sometimes at considerable risk of incurring even greater losses (Arkes and Blumer 1985; Schabroeck and Davis 1994). The gambler on a losing streak who ups the ante in a desperate attempt to wipe out her losses is one example. This pattern is consistent with evidence that people who bet on horses tend to shift their bets towards longshots late in the day, presumably to eliminate their losses and return to their break-even reference point (Ali 1977; Camerer 2000, 296). The sunk cost effect is also demonstrated by Thaler (1980, 47), who found (in a hypothetical experiment) that people are more likely to drive through a snowstorm to go to a basketball game if they had paid for the tickets than if they had been given the tickets.

While most applications of prospect theory to political science have focused on loss aversion, framing, and the reflection effect, another important observed anomaly in expected-utility theory is that individuals tend to respond to probabilities in a non-linear fashion. People overweight outcomes that are certain relative to outcomes which are merely probable (the *certainty effect*).<sup>7</sup> They also tend to overweight small probabilities and to underweight moderate and high probabilities.<sup>8</sup> This implies that people tend to give more weight to the utility of a possible outcome than to its probability of occurrence as long as probabilities are not small. If probabilities are extremely small, however, people are quite unpredictable in their behavior. Some people buy insurance against rare catastrophes, for example, while others do not (Kahneman and Tversky 1979; Camerer 1995, 620–622).

Risk orientation is determined by the combination of the S-shaped value function and the probability weighting function and not by the value function alone. While the result is usually risk aversion for gains and risk acceptance for losses, the overweighting of small probabilities can sometimes lead to a reversal of risk propensities, depending on the precise shapes of the two functions (Kahneman and Tversky 1979; Levy 1992, 183–184). This occurs in gambling (risk acceptance for gains), the purchase of insurance (in which a certain loss in the form of an insurance premium is preferred to the risk of a much larger loss), and the observed tendency for longshots to receive a disproportionately large amount of money bet at racetracks (Camerer 2000, 295–296).

Prospect theory integrates these observed violations of expected-utility into a single theory of choice. Kahneman and Tversky (1979) distinguish two phases in the choice process. In the *editing phase* the actor identifies the reference point, the available options, the possible outcomes, and the

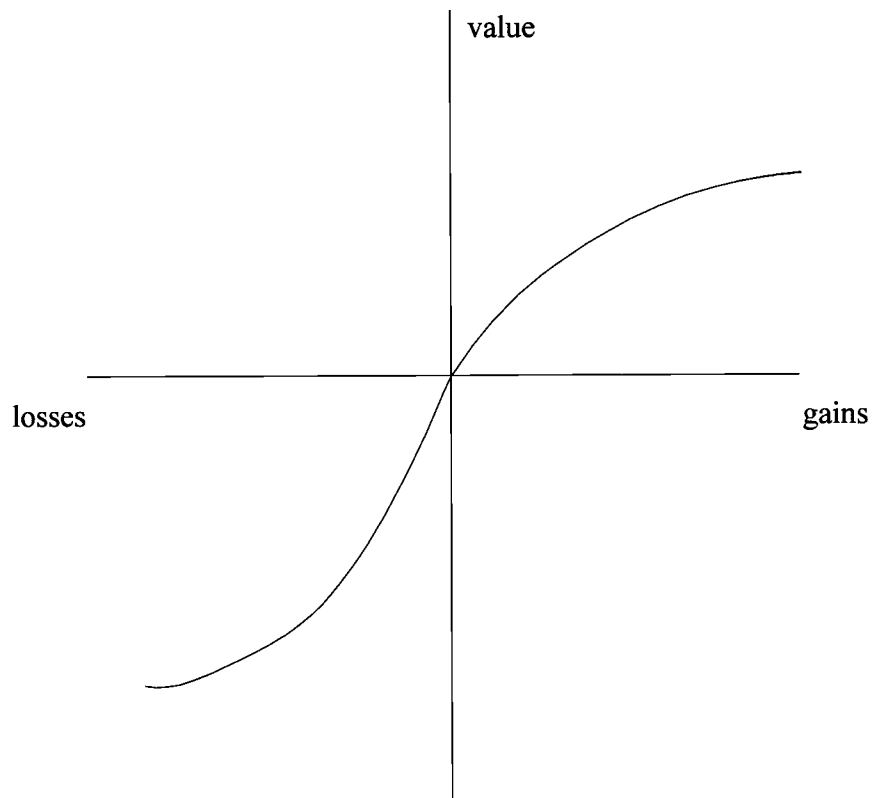


Figure 1. Value function.

value and probability of each of these outcomes. In the *evaluation phase* she combines the values of possible outcomes with their transformed probabilities by maximizing over the product of the *value function* (Figure 1) and the *probability weighting function* (Figure 2).<sup>9</sup>

Let us now turn to applications of these basic prospect theory concepts to American politics, international relations, and the law.

## 2. APPLICATIONS TO AMERICAN POLITICS

There is both experimental and empirical evidence to show that loss aversion, framing effects, and preference reversals based on variable risk orientation apply to political decisions as well as to decisions involving monetary outcomes. The importance of the reference point is suggested by an experiment in which Quattrone and Tversky (1988, 722) give 89 subjects a choice between two candidates with two different economic

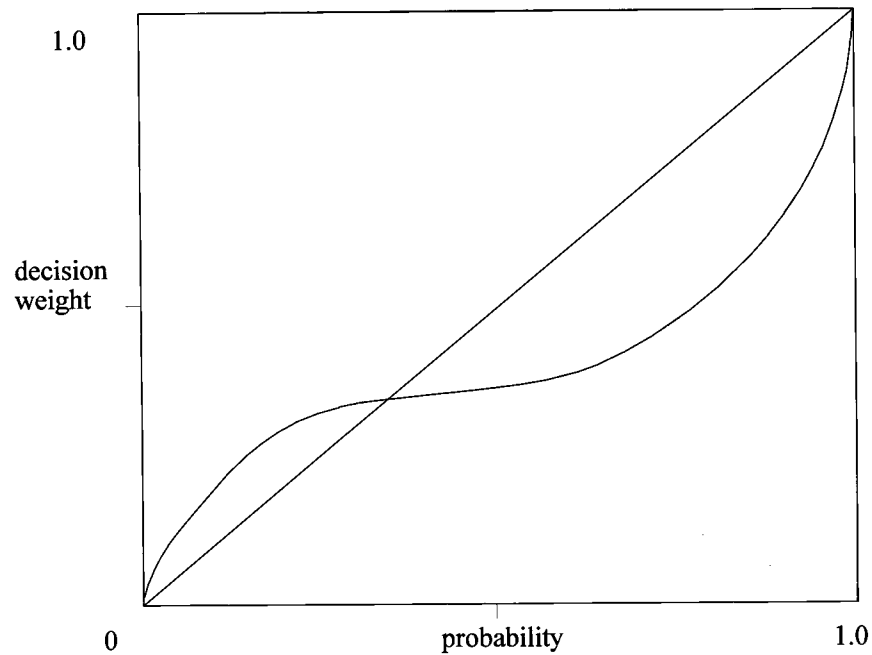


Figure 2. Probability weighting function.

policies, along with predictions by two economists about the likely effect of their policies on the standard of living index (SLI). The SLI for candidate Brown is estimated to be \$65,000 by economist 1 and \$43,000 by economist two, while the SLI for candidate Green is estimated to be \$51,000 by economist one and \$53,000 by economist 2. Note that the average prediction is \$54,000 for Brown and \$52,000 for Green. The greater variability in the estimates for Brown suggest that Brown is the riskier choice. The two economists also provide predictions (\$43,000 and \$45,000, respectively) for the average SLI for four other countries.

In a second problem all of the information is identical except for the economists' predictions of the SLI in four other countries are \$63,000 and \$65,000. Green gets 72% of the vote in problem 1 but only 50% in problem 2. The most plausible explanation is that Green wins in problem 1 because he is the risk averse choice in the domain of gains (given the low reference point induced by the economists' SLI predictions for other countries) despite the slightly higher average prediction for Brown. The likely explanation for the decline in Green's vote in problem two is that the higher reference point induced by the average SLI of other countries leads to a loss frame and more risk-seeking behavior.<sup>10</sup>

One implication of loss aversion and the endowment effect is that there is a greater tendency toward status quo choices than expected-utility theory would predict. If an individual frames a choice problem around the existing status quo, she will treat the costs of moving away from the status quo as a loss and the benefits of moving away from the status quo as a gain, overweight the former relative to the latter, and consequently demonstrate a tendency towards remaining at the status quo. This *status quo bias* has been observed in both experimental research and field studies of consumer and investment behavior (Samuelson and Zeckhauser 1988; Knetsch and Sinden 1984; Hartman et al. 1991).<sup>11</sup>

Quattrone and Tversky (1988, 725) provide an example of the status quo bias in a hypothetical voting problem. They give 91 “voters” the choice between candidate Frank, who aims to maintain current levels of inflation (42%) and unemployment (15%), and candidate Carl, who plans to decrease the rate of inflation by 19% while increasing the rate of unemployment by 7%. In a second problem the current inflation rate is 23% and unemployment is 22%. Frank proposes to increase inflation by 19% while decreasing unemployment by 7%. The outcomes of the choices in the two problems are identical (42% inflation and 15% unemployment for Frank, and 23% inflation and 22% unemployment for Carl), but Frank gets 65% of the vote in problem one and 35% of the vote in problem two. The only difference is that the status quo coincides with Frank’s position in problem one and with Carl’s position in problem two.

A non-experimental example of the status quo bias comes from the different responses to basically the same automobile insurance legislation in New Jersey and Pennsylvania. Automobile owners were given a choice between a less expensive policy that placed limits on rights to recover damages, and a more expensive policy that permitted more extensive claims. The only difference between the two states was that in New Jersey people received the “reduced rights” policy unless they explicitly request the full rights policy, whereas in Pennsylvania the default option was the “full rights” policy. The effort to choose one or the other policy was minimal and the stakes high enough to encourage a thoughtful choice, yet the different responses in the two states was striking: over 70% of those in New Jersey took the “reduced rights” policy (the status quo option), but fewer than 25% of automobile owners in Pennsylvania have done so (Cohen and Knetsch 2000, 431–432). In both states, a strong majority selected the default option. This reflects the status quo bias and runs contrary to the Coase Theorem, which states that in the absence of transaction costs and wealth effects, people will make mutually advantageous exchanges, so that



“final allocations of entitlements are assumed to be independent of initial entitlements” (Coase 1960).

The concept of the status quo bias, widely used in applications of behavioral decision theories, is a little misleading, for it is valid only if the reference point happens to coincide with the status quo. If someone frames a choice problem around an expectation or aspiration level that is preferred to the status quo, or if she has suffered a loss and frames around the status quo *ex ante*, then the status quo will be inferior to the reference point and thus treated as a loss, and there will be a tendency (greater than predicted by expected utility theory) to move away from the status quo and toward the reference point.

Thus the status quo bias is misspecified. Instead, there is a *reference point bias* (Levy 1997). The reference point bias subsumes the status quo bias whenever the reference point is defined as the status quo, and under those conditions it will be stabilizing and reinforce the status quo. If the reference point is preferred to the status quo, however, the reference point bias is destabilizing because it induces risky behavior to avoid the losses inherent in the status quo, particularly if those losses are the certain outcome of a particular strategy.

Loss aversion, framing, and the status quo bias help to explain several common patterns in American electoral behavior. The status quo bias is reflected in the conventional wisdom among both scholars and journalists that political candidates make greater efforts to avoid alienating key constituencies than to strengthen support among those groups. The psychological benefits of the latter are outweighed by the psychological costs of the former (assuming the basic effects are comparable), and it is easier to maintain political support among a group than to recover that support once it is lost. There is also evidence that the effects of economic prosperity and recession is asymmetric – support for incumbent presidents is more negatively affected by poor economic conditions than positively affected by economic prosperity (Bloom and Price 1975). This is related to the “negativity bias”, which is closely related to loss aversion.<sup>12</sup> A number of studies of American electoral behavior demonstrate that negative attitudes towards candidates have a greater impact on voting and related behavior such as turnout than do positive attitudes (Kernell 1977; Lau 1985).

There is also considerable evidence that favorable economic conditions tend to benefit incumbent presidents and congressional candidates of the same party, whereas unfavorable economic conditions tend to favor the challengers (Erikson 1990; MacKuen et al. 1992). It is often said, for example, that poor economic conditions in the 1980 elections favored Reagan

over the incumbent Carter and that the deteriorating economy in 1992 cost George H.W. Bush the election.

The observed correlation between economic conditions and the incumbent's electoral fortunes is the empirical core of the theory of retrospective voting (Fiorina 1981), but this theory can be supplemented by incorporating concepts and propositions from prospect theory. Let us assume that voters believe that they know the incumbent and her policies better than those of the challenger, and that there is considerably more uncertainty regarding the future consequences of the challenger's policies than those of the incumbent (Shepsle 1972; Dacey 1979). Then if economic conditions are good (and expected to continue to be good), voters will frame their choice in the domain of gains, make the risk averse choice, and vote for the incumbent. If conditions are bad, voters will see themselves in the domain of losses and vote for the riskier challenger (Quattrone and Tversky 1988, 723–724).

This prospect theory perspective, which is based voters' varying risk-orientation for gains and for losses, differs from explanations based on a standard cost-benefit analysis, in which voters select the candidate whose policies carry the greatest expected value. In fact, the implication of the prospect theory hypothesis is that challengers whose policies are slightly preferred over the incumbent's (in terms of their most likely or average effects) will be rejected when current conditions are favorable, and that challengers whose policies are perceived to be somewhat inferior to the incumbent's will be elected when conditions are unfavorable.

While this analysis assumes that voters' reference points are determined by relatively "objective" economic conditions, in fact political leaders go to great lengths in an attempt to influence how voters frame their voting decisions. It is frequently argued, for example, that even before his inauguration as president in January 2001 George W. Bush attempted to lower peoples' expectations of the performance of the economy under his administration by arguing that the economy had already begun to deteriorate rapidly under the Clinton Administration. The underlying assumption is that evaluations of the economy, and of the political leader assumed to be responsible for it, are shaped less by the absolute condition of the economy than by its condition relative to peoples' expectations.<sup>13</sup>

Another example of the attempted manipulation of reference points, or "strategic framing" (Levy 2000), can be found in American presidential primaries, in which the candidates' "spin doctors" make great efforts to dampen expectations about their candidate's performance in the primaries and at the same time raise expectations about the performance of her leading rivals. The leading candidate and his campaign tries to influence the

media and electorate to regard any plurality as a victory. The challengers argue that for the leader anything short of a majority, perhaps even a strong majority, is a loss, whereas for themselves even a second place finish is a victory.<sup>14</sup>

Students of social welfare have also begun to incorporate loss aversion into their theoretical explanations. Pierson (1996), for example, argues that the processes of the retrenchment of the welfare state are different from the processes that governed its expansion, largely because of the “profound difference between extending benefits to large numbers of people and taking benefits away”. Retrenchment benefits some groups of voters and harms others, but the political costs associated with those who are harmed generally exceed the political benefits derived from those who benefit. This asymmetry is explained in part by the theory of collective action (Olson 1965) – retrenchment imposes tangible losses on groups of voters with concentrated interests and promises more uncertain gains to those with diffuse interests, and it is the former who have greater incentives to mobilize politically. The asymmetry for voters is magnified by the psychological dynamics of loss aversion. As a result, whereas political leaders sought to take credit for the expansion of the welfare state, “retrenchment is generally an exercise in blame avoidance rather than credit claiming” (Pierson 1996, 145; Weaver 1986), because avoiding losses is more important than making gains.

The importance of reference dependence and aspiration levels is also evident in theories of violence based on relative deprivation and the revolution of rising expectations in comparative politics. The argument is that the likelihood of violence is greatest not under conditions of greatest suffering, but instead when the level of material benefits or rate of improvement falls behind expectations (Davies 1962; Gurr 1970). People frame their choice problems around reference points based on aspiration levels defined by their rising expectations, see any point short of that as a loss regardless of recent improvements, and are willing to take excessively risky actions to reach that aspiration level. The situation is not symmetrical, however, and falling expectations do not have a comparable effect because people are much slower to renormalize their reference points after losses than after gains.

### 3. APPLICATIONS TO INTERNATIONAL RELATIONS

Many of these same patterns are evident in international relations. The status quo bias is reflected in the common observation that states appear to make greater efforts to preserve the status quo against a threatened loss

than to improve their position by a comparable amount. They are sometimes willing to fight to defend the same territory that they would not have been willing to fight to acquire in the first place. This is illustrated by Ross' (1984, 247) argument that Soviet leaders were willing to engage in the "use of decisive and perhaps risky action far more readily for *defending* as opposed to *extending* Soviet gains". More generally, loss aversion and a status quo bias are key assumptions, though often implicit ones, of neorealism, which is still the leading (but not unchallenged) theory of international politics. As Schweller (1996, 99–106) suggests, neorealism assumes a world of "satisfied, status-quo state[s]" who "value what they possess more than what they covet . . . rational states do not seek relative gains so much as avoid relative losses."

Political leaders might also be led to status quo choices because of reputational interests or domestic political pressures, but the values of these other variables might be shaped by loss aversion. Political leaders may be more concerned to prevent a decline in their country's reputation or credibility than to increase it by a comparable amount, or more worried about the costs of falling dominoes than hopeful about the gains from inducing other states to align with them (Jervis 1991). They may also believe that the decline in public support in response to strategic or economic losses will exceed any domestic political benefits they might receive for strategic or economic gains.

There is some empirical support for these hypotheses. Nincic (1997) analyzes a set of 18 American military interventions, categorizes the justifications offered by presidents as either "promotive" or "protective" of American interests, and finds that increases in presidential popularity are six percentage points greater for interventions framed as protective than for those framed as promotive. He also finds that the U.S. Congress is more supportive of protective than promotive interventions. Nincic (1997) concludes that "the U.S. public and Congress are more willing to reward the president for foreign policy actions intended to preserve or restore a situation that had already been attained than for those meant to pursue a new gain or to create a new outcome".<sup>15</sup>

Earlier I emphasized the potentially destabilizing effects of the reference point bias if the reference point is preferred to the status quo. This is illustrated by the consequences of a war involving a change in territorial boundaries. A state that loses territory will generally continue to identify its reference point with the status quo *ex ante*, see the current status quo as a certain loss, and adopt risk-seeking strategies to recover those losses. At the same time, the state gaining the territory will usually renormalize its reference point (the instant endowment effect), adjust to the new status

quo, and engage in risk-seeking strategies to defend it against loss. Thus both actors will engage in more risk-seeking behavior than predicted by expected-utility theory.

A good example comes from the Arab–Israeli wars of 1967 and 1973. The Arab losses in the 1967 wars, along with the domestic political dissatisfaction generated by those losses, contributed to the willingness of Arab political leaders to initiate a surprise attack against Israel in 1973 in a risky attempt to recover those losses. Israel, which in 1967 had not sought war or the territorial gains that it made during the war, renormalized its reference point around the new status quo and fought very hard to defend the new status quo in 1973 (Stein 1985, 1991).

International relations theorists have attempted to explain other risky strategies in terms of risk-seeking behavior in the domain of losses. McDermott (1998) explains the Carter Administration's resort to a military mission to rescue American hostages in Iran in 1979 in this way. Inaction was a certain loss, in terms of American reputational interests as well as Carter's domestic political interests, and the rescue mission was a risky strategy that had some chance, though admittedly low, of eliminating those losses. Haas (2001) interprets many of the decisions of both Khrushchev and Kennedy in the Cuban missile crisis, including Khrushchev's initial decision to install missiles in Cuba and Kennedy's response, in terms of risk-seeking behavior in the domain of losses, and attempts to show that expected-value calculations based on plausible assessments of probabilities would probably have resulted in different outcomes.

Risk-seeking choices in the domain of losses can also be induced by sunk costs, which play an important role in international politics as well as in other domains. For one thing, sunk costs can contribute to entrapment in escalating conflicts (Brockner and Rubin 1985). Once lives are lost in battle, for example, there are strong psychological and domestic political pressures on political leaders to justify those costs through a successful outcome, and this often leads to riskier strategies that often prolong the war and increase its costs. Before agreeing to scale back German war aims in 1918 after four years of costly fighting, Ludendorff argued that "If Germany makes peace without profit, then Germany has lost the war" (quoted in Jervis 1992, 190). Sunk costs also help to explain why states continue to pursue failing military interventions (a gamble which leads to either better or worse outcomes) rather than cutting their losses and negotiating a withdrawal (a certain loss), as evidenced by France in Algeria, the United States in Vietnam, the Soviet Union in Afghanistan, and Israel in Lebanon.

Framing, loss aversion, and the reflection effect also provide a plausible theoretical explanation for Schelling's (1966, 69–91) insight that

deterrence is easier than compellence – that it is easier to dissuade an actor from taking an action she has not yet taken (which involves the denial of gains), than to compel someone to stop doing something she is already doing, to undo something she has already done, or to do something new (which involves the imposition of losses). This hypothesis needs to be modified, however, because we cannot assume that targets in deterrence situations always frame their reference points around the status quo and that deterrence always involves denying gains to the adversary. If a state has recently suffered a loss, it will presumably continue to define its reference point as the status quo *ex ante*, so that deterrent threats have the consequence not of denying it gains, but preventing it from recovering its losses and returning to its reference point. Or, if state leaders perceive that their power capabilities and hence their bargaining leverage are declining relative to those of a rising adversary, they may perceive a strategy of inaction as one that leads to a dead loss, and any attempt to deter it from taking military action may be seen as reinforcing losses rather than denying it gains.<sup>16</sup> The status quo may also be unsatisfactory for domestic reasons. If the economy is poor or if leaders are otherwise concerned about their levels of popular support, they may be tempted to use military force for diversionary purposes to generate a “rally round the flag” effect. In this situation deterrence threats will be perceived as the continued imposition of losses rather than the denial of gains and will be less likely to succeed (Lebow and Stein 1987).

Thus the more general proposition about deterrence and compellence is that influence attempts based on coercion are more likely to be successful if the target sees itself in the domain of gains and is contemplating an effort to improve its position. Coercion is less likely to succeed if the target sees itself in the domain of losses and is considering how to prevent its position from deteriorating further or to recover its losses.

A good example of a risk-seeking decision for war under conditions that are perceived as both unsatisfactory and deteriorating is the Japanese decision to attack the United States at Pearl Harbor.<sup>17</sup> By Fall 1941 key Japanese decision-makers believed that their current position could only deteriorate. Although they recognized that there was little chance of victory in a long war with the United States, they believed that they had a 70–80% chance of an initial success that might improve their bargaining position for a favorable settlement that would avoid a long war, and that those odds would continue to decline the longer they waited. The only alternative to war would be a return to an American-dominated international system that was intolerable to Japan (Iriye 1987, 161, 173–174; Russett 1972). From a prospect theory perspective, Japanese leaders framed their

reference point around an aspiration level defined by the Co-Prosperity sphere that they hoped to implement (Levi and Whyte 1997; Taliaferro 1998), saw themselves in the domain of losses that would only deteriorate with rising American power, and gambled at long odds on a risky preventive war to consolidate their regional hegemony while the opportunity was still available.<sup>18</sup>

The effectiveness of deterrence is also affected by the overweighting of small probabilities, though this phenomenon has received little attention in the literature on international conflict. Theories of deterrence based on expected utility imply that a modest probability of the implementation of a moderately costly deterrence threat is equally effective as a small probability of the implementation of a more costly deterrence threat, as long as the expected values of the two outcomes are the same. As Neilson argues in his essay in this issue, however, the overweighting of small probabilities implies that smaller probabilities of larger punishments should be more effective. When the probability that the deterrence threat will be implemented is small, prospect theory's probability weighting function predicts higher rates of successful deterrence than do expected utility models.<sup>19</sup>

#### 4. APPLICATION TO CONCEPTIONS OF FAIRNESS AND THE LAW

Reference dependence and the asymmetry of losses and gains has important implications for conceptions of fairness. While there is considerable evidence that people often behave in accordance with the norms of fairness, even when it involves some financial cost on their part and even when their behavior is not known to others (Jolls et al. 2000, 21–26; Kahneman et al. 1986), and while economists have started to model fairness (Rabin 1998), there has been little empirical research on fairness in political science.

Fairness is usually defined with respect to some “reference transaction” (Kahneman et al. 1986, 728–730). In terms of firms and consumers, for example, the reference point is usually the market price based on standard conditions. There are strong norms, even laws, against price gouging and ticket scalping, despite the fact that exchanges at higher prices are voluntary and efficient from a purely economic standpoint. Thus people generally believe that it is unfair for businesses to respond to a sudden increase in demand by raising prices (raising the price of snow shovels after a blizzard, for example). Raising rents on an old tenant is regarded as less fair than raising rents on a new tenant (Kahneman et al. 1986). Such price increases are considered legitimate only if they are necessary to offset new costs for the seller, firm, or landlord. As Kahneman (1992,

303) argues, “a firm can fairly use its market power to protect its reference profit, but not to increase it”.

The asymmetry of losses and gains is also reflected in the tendency for people to treat errors of commission or action as more blameworthy than errors of omission or inaction (Ritov and Baron 1990; Camerer 1995, 668). The enactment of a crime is usually judged more harshly than the failure to prevent a crime from occurring. Similarly, social norms against hurting another are probably more compelling than norms to help another.

The asymmetry between losses and gains, and hence between losses and foregone gains, is also central to the law. The acknowledgment of the endowment effect and the status quo bias is most striking in the old saying that “possession is nine-tenths of the law”. There is a general presumption that an individual should be able to keep her current possessions until someone else demonstrates a better title, with the burden of proof being on the latter. Oliver Wendel Holmes (1897) mirrored the intuition of the endowment effect when he wrote that “A thing which you have enjoyed and used as your own for a long time, whether property or an opinion, takes root in your being and cannot be torn away without your resenting the act and trying to defend yourself, however you came by it. The law can ask no better justification than the deepest instincts of man” (cited in Cohen and Knetsch 2000, 432).<sup>20</sup>

A related principle builds on the distinction between losses and foregone gains. There is a presumption that the legal system should favor protection against loss over protection of profits denied. As Atiyah (1979, 428; noted in Cohen and Knetsch 2000, 427) argues in his survey of the history of the contract, “To deprive somebody of something which he merely expects to receive is a less serious wrong, deserving of less protection, than to deprive somebody of the expectation of continuing to hold something which he already *possesses*”. Thus a party that breaches a contract in order to make an unforeseen gain is more likely to be held to the original terms of the contract than if the action were taken to avoid a loss.

These considerations can also be seen in the rule of adverse possession, which deals with the conditions under which the user of someone else’s property can successfully claim ownership. Rationales for awarding titles to adverse possessors usually include reducing administrative costs of establishing rightful ownership and encouraging the productive use of assets left unused by their owners (Cohen and Knetsch 2000, 435). Posner (1986, 70) suggests another rationale: “The adverse possessor would experience the deprivation of property as a diminution in his wealth; the original owner would experience the restoration of the property as an increase in his wealth. If they have the same wealth, then probably their combined utility



will be greater if the adverse possessor is allowed to keep the property". Posner implicitly assumes that both the owner and adverse possessor define their reference points at the current status quo. Awarding title to the adverse possessor would leave each party at his reference point with no net change in utility. Awarding title to the original owner would be a gain to the owner and a loss to the adverse possessor, which, given loss aversion, would result in a net loss of utility.

In both contract and tort law judges distinguish between "loss by way of expenditure and failure to make a gain" (Kahneman et al. 1991, 204), and are much more reluctant to compensate people for unrealized profits than for losses. While acknowledging the debate as to whether motives and intentions are important considerations involving breeches of contract, Cohen and Knetsch (2000, 442–443) argue that the dominant view is that failing to perform a contract for the purposes of avoiding unanticipated expenses is treated differently than failing to perform in order to generate a windfall gain (Burrows 1987, 252, 273). The law sometime permits the recovery of expenditures associated with foregone gains, but not the foregone gains themselves. For example, in *Dominion Tape of Canada Ltd. v. L.R. McDonald & Sons Ltd.* (cited in Cohen and Knetsch 2000, 436–437), the plaintiff, whose power was cut off when bales fell from a trailer and hit a hydro pole, was successful in suing to recover wages paid to employees but not to recover lost profits.

The central importance of reference points and the status quo is also manifested in the treatment of promises. The courts have been fairly consistent in distinguishing between giving a gift and promising to do so. As Cohen and Knetsch (2000, 440) argue, "performed gifts are enforceable; unperformed promises to give gifts are not". Legal theorists advance a number rationales for the non-enforcement of promises, and one involves the distinction between losses and foregone gains: the gain to the promisee of an enforced promise is less than the monetarily equivalent loss to the promiser. As Eisenberg (1979, 3; cited in Cohen and Knetsch 2000, 441) argues, "lost expectation . . . is among the least intense of injuries" and therefore not worthy of legal remedy. The primary exception involves gratuitous promises that generate a reasonable and economically costly reliance on that promise by the promisee (Posner 1977). Promises that involve out-of-pocket costs, and not just foregone gains, are enforceable (Cohen and Knetsch 2000, 441).

Similar logic applies to intracontractual promises, which involve additional promises to encourage the performance of a previously arranged contract. If a preexisting contract requires a party to deliver certain goods or perform a certain action, and if the buyer of those goods or actions then

promises to pay an additional amount to ensure their delivery, whether or not the courts will enforce the promise depends on whether the additional fee has already been paid. If the fee has not been paid, the promisee cannot successfully sue to receive payment, but once the fee is paid the payer cannot recover that payment (Cohen and Knetsch 2000, 439–440). The enforceability of the promise depends on the status quo.

Another application of reference dependence and loss aversion is to nonpecuniary damages awarded for “pain and suffering” from medical malpractice, product liability, and the like. Although there is considerable consensus on the degree of moral outrage and punishment appropriate for negligence, there is enormous variability in the amount of damages that are awarded (Sunstein et al. 2000). Among the various factors driving this enormous variation in monetary awards is how instructions are presented to the jury, and particularly how those instructions impact upon jurors’ reference points, because different reference points can lead to significant disparities in the assessment of damages.

The standard criterion, the “making whole” perspective, is how much the sufferer needs to be paid to be made whole, once the injury has already taken place. An alternative criteria, the “selling price” perspective, might be how much a healthy person would have to be paid to subject himself or herself to the injury in the first place. The reference point in the making whole perspective is the status quo after the injury, whereas the reference point for the selling price perspective is the status quo ex ante. Just as selling prices tend to be higher than buying prices because of the endowment effect and loss aversion, awards based on the “selling price” perspective tend to be much higher than those based on the “making whole” perspective. People demand more to subject themselves to serious injury than they demand to compensate themselves for an injury they have already incurred. Experimental results based on hypothetical liability cases generate differences of approximately two to one, which parallels findings regarding evaluation disparities in other domains (McCaffery et al. 2000).

While the selling price perspective is often considered unfair, and in fact is sometimes formally banned, the law is sufficiently vague and open to interpretation that lawyers are often able to maneuver around the law and exploit these evaluation disparities (McCaffery et al. 2000, 277–282). Such efforts are examples of strategic framing.

## 5. CONCLUSIONS

Let me end with a discussion of some broader issues in applications of prospect theory to political science. We should recognize, first of all, the

limited scope of the theory: prospect theory is a theory of individual choice under conditions of risk, not a general theory of politics. It is not even a complete theory of decision-making because it focuses only on explaining choices given the basic parameters of the decision problem – the reference point, the available options, their possible outcomes, and the values and probabilities associated with each. These basic parameters themselves are exogenous in the theory. These same parameters (excepting the reference point) are exogenous in expected utility theory.<sup>21</sup>

Although prospect theory includes an “editing phase” from which the reference point and other key parameters emerge, most experimental studies treat framing as exogenous and examine its effects. Kahneman and Tversky (1979, 275) structure their hypothetical choice problems in a way that “leaves no room for further editing”. In its current form prospect theory is a theory of the evaluation of prospects, not a theory of the editing of choices. It is a reference-dependent theory without a theory of the reference point (Levy 1997).

Another limitation of prospect theory for the study of politics is that it is a theory of individual choice, while most of the questions we want to understand about politics involve the choices of collective decision-making bodies (such as states or organizations). The concepts of loss aversion, framing, and preference reversal were based on evidence of individual decision-making, not group decision-making. In the absence of further empirical research we cannot automatically assume that these concepts and hypotheses apply equally well at the collective level. The idea of a collective frame around which a collective value function and collective probability weighting function are constructed to generate a collective risk orientation involves a reification of individual-level concepts that is troubling. A specification of how individual frames and probability transformations shape the political and social dynamics of group decision-making would be more useful.

Perhaps one reason why we have seen more applications of prospect theory to international relations than to other areas of political science is that the focus on the role of individual political leaders is more defensible in international relations, and particularly in decisions for war and peace, than in other areas of politics. The unitary actor assumption has long characterized the study of international conflict, particularly by realists focusing on the maximization of state power and wealth, and the application of framing, loss aversion, and variable risk orientation to such actors is not entirely unreasonable.

There has been a strong shift away from the unitary actor assumption over the last decade, however, and international relations theorists have

joined the rest of the discipline in emphasizing the role of domestic institutions, bureaucratic organizations, social groups, and public opinion in the formation of state policies. The application of prospect theory concepts to a single leader in a highly centralized authoritarian regime may still make sense in individual historical cases, but political scientists are more interested in constructing and testing theories than in explaining and understanding particular historical episodes (Levy 2001). If prospect theory is to continue to have an impact in the study of international relations, it will ultimately have to be integrated into a broader theory of foreign policy and help explain how individual preferences, frames, and risk orientations get aggregated and transformed into collective decisions. In addition, because most outcomes of interest in international politics, and many of the outcomes of interest in domestic politics, are the joint result of decisions of two or more actors (states, organizations, or levels of government), it will also be necessary to integrate prospect theory into a broader theory of strategic interaction and bargaining. These are enormously difficult tasks, as indicated by scholars' slow progress in developing "behavioral game theory" (Camerer 1997).

Methodologically, a key condition for further progress in the application of prospect theory to political science is the development of procedures for the identification of actors' reference points. This procedure must be independent of the behavior to be explained in order to avoid the circularity of inferring an actor's reference point from her behavior and then explaining that same behavior in terms of framing effects based on that reference point. Given the discipline's increasing acceptance of the norm that we must test our theories not only against the evidence, but also against the leading alternative theories (Lakatos 1970), proponents of prospect theory must develop research designs that will help empirically differentiate between (1) a prospect theory explanation based on loss aversion, framing effects, variable risk orientation, and the overweighting of small probabilities, and (2) a rational choice explanation based on a straightforward cost-benefit analysis.

Demonstrating that observed behavior better fits prospect theory than expected utility theory is much more difficult to do in natural settings than in highly structured and controlled laboratory settings, where the experimenter constructs simplified choice problems in which the values of outcomes (usually in dollars or their equivalent) and their associated probabilities are set and where there is little doubt about the reference point. It is not surprising that the most persuasive empirical validations of prospect theory in natural settings come from areas like investment and insurance behavior and consumer economics, where outcomes are easily

quantifiable. Validating prospect theory hypotheses is far more difficult for questions where some of the key variables (such as power, reputation, legitimacy) are not easily measured and scaled into something resembling a utility function; where actors' subjective probabilities (much less their weighting functions) are not easily measured (Boettcher 1995); and where reference points are elusive.<sup>22</sup>

As it stands, our confidence in prospect theory explanations of political phenomena derives more from the intuitive appeal of its key concepts of reference dependence, framing effects, loss aversion, and variable risk orientation and their validation in laboratory studies, than from any direct empirical evidence. True, the assumptions are plausible and the experimental studies are robust, but proponents of prospect theory in political science will ultimately have to find better ways of testing their hypotheses directly against the empirical evidence. At the same time, they will have to demonstrate theoretically how this theory of individual choice can be transformed into a theory of collective choice and strategic interaction.

#### NOTES

<sup>1</sup> On applications of prospect theory to international relations see Jervis (1992), Levy (1992, 1997, 2000), Stein and Pauly (1992), Farnham (1994), McDermott (1998), Taliaferro (1998), Davis (2000), and Haas (2001). There have been fewer applications of prospect theory to the field of comparative politics, but see Weyland (1996).

<sup>2</sup> As Neilson argues in his essay in this issue, most application of prospect theory in political science and sociology focus on reference dependence, while most applications in economics focus on probability transformations.

<sup>3</sup> Loss aversion and risk orientation are analytically distinct. Loss aversion is reflected in the greater steepness of the value function on the loss side, whereas risk orientation is captured by the change in the curvature of the value function (more specifically, in its second derivative) around the reference point. Loss aversion and the endowment effect shape riskless choice as well as risky choice (Tversky and Kahneman 1991).

<sup>4</sup> Peoples' greater sensitivity toward unemployment rates than employment rates reflects the *ratio-difference principle*: the impact of a unit change is a function of the ratio of the change to the baseline. An increase in unemployment from 5% to 10% has a greater impact than a reduction in the percentage of people employed from 95% to 90% (Quattrone and Tversky 1988, 727–730).

<sup>5</sup> Although invariance is not a formal axiom of expected-utility theory, it is an "invisible background assumption" of the theory (Camerer 1995, 652). Arrow (1982, 6) refers to invariance as "extensionality" and describes it as a "fundamental element of rationality". Ferejohn and Satz (1995, 80) concede that cases in which "choices are based on preferences but preferences can depend on the situation" do not fit "classical" conceptions of rationality, but suggest "weaker forms of rationality" that do not satisfy the independence hypothesis, such as regret models (Loomes and Sugden 1982).

<sup>6</sup> Kahneman and Tversky (1979, 275) explicitly restrict themselves to choice problems “where it is reasonable to assume either that the original formulation of the prospects leaves no room for further editing, or that the edited prospects can be specified without ambiguity”.

<sup>7</sup> This helps to explain Allais’ (1953) demonstration that the difference between probabilities of 0.99 and 1.00 has a greater impact on preferences than the difference between 0.10 and 0.11. It also helps to explain why people in a hypothetical game of Russian roulette are willing to pay far more to reduce the number of bullets in a revolver from 1 to 0 than from 4 to 3, even though the change in expected value is the same (Quattrone and Tversky 1988, 730).

<sup>8</sup> The most recent evidence suggests that the crossover point between overweighting and underweighting is somewhere between  $p = 0.25$  and  $p = 0.50$  (Neilson, this issue). Earlier estimates placed the crossover point somewhat lower, and earlier graphical representations of the probability weighting function are consequently misleading.

<sup>9</sup> In *Cumulative Prospect Theory*, Tversky and Kahneman (1992) modify their original probability function to make it more mathematically tractable and more consistent with recent evidence. See Neilson (this issue) for a good discussion.

<sup>10</sup> It is surprising that Brown did not get more votes in problem two, given the combined effects of risk seeking for losses and his slightly higher average SLI prediction.

<sup>11</sup> The status quo bias may derive from an *inaction bias* (Camerer 1995). If the default action differs from the current status quo, there is a tendency to choose the default option.

<sup>12</sup> Whereas loss aversion refers to overweighting of negative values, the negativity bias refers to the overweighting of negative information.

<sup>13</sup> The effect of expectations and the references points induced by them is also demonstrated in the presidential debates before the 2000 American election. The public gave George W. Bush relatively high marks in the first debate, and this is often interpreted in terms of the public’s low expectations of Bush before the debate, expectations that were encouraged by the Bush campaign.

<sup>14</sup> On the role of framing effects in the public’s support of peace negotiations see Geva et al. (1996). On strategic framing in international bargaining see Levy (2000).

<sup>15</sup> For a critique of Nincic’s (1997) research design, including possible selection effects and endogeneity problems, see Levy (2000, 219–220).

<sup>16</sup> Military action in response to relative decline and fears of its consequences reflects a strategy of “preventive war” (Levy 1987). Incentives for preventive war are reinforced by expectations that inaction will lead to a certain loss, which generates risk seeking, as long as war is perceived as the risky strategy (Levy 2000).

<sup>17</sup> Technically, war and peace are outcomes resulting from a series of joint decisions by two or more actors, so it is a simplification to speak of the “Japanese decision” for war.

<sup>18</sup> At the same time, the United States never accepted Japanese expansion into China, insisted on a return to the status quo ex ante in Asia, feared the erosion of its global position by a rising and expansionist regional power, and implemented highly coercive economic sanctions against Japan, which only increased Japanese dissatisfaction with the status quo (Iriye 1987).

<sup>19</sup> It is interesting to compare this with the analysis of crime and punishment by Dacey (this issue), which is based only on the S-shaped value function. Dacey questions the standard argument going back to Becker (1968) – that an increase in the probability of conviction does more to deter criminals than an equal percentage increase in the magnitude of pun-

ishment, and argues that this proposition is valid if and only if the level of punishment is already large.

<sup>20</sup> The instant endowment effect suggests that the reluctance to part with something develops very soon after it is acquired. An extended time of possession increases emotional attachment, which is different.

<sup>21</sup> In his latest work Tversky had begun to question the assumption of exogenous preferences. He argued that people do not possess a set of pre-defined preferences for every contingency, that people construct preferences in the process of making a choice or judgment, and that these preferences are influenced by the context of choice and also by the procedures involved in making choices (Tversky and Thaler 1990, 210–211; Tversky and Simonson 1993). This view of “preference as a constructive, context-dependent process” raises some very fundamental questions about the foundations of utility theory based on preference.

<sup>22</sup> In this sense it is ironic that most applications of prospect theory to political science are in international relations, where typical decision problems are far more “ill-structured” (Voss and Post 1988) than many decision problems in American politics. In voting behavior, for example, choices are clear and information about the consequences of each alternative is often ample, though not perfectly free of strategic manipulation (Lau and Levy 1998).

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