LABORATORY ON INTERNATIONAL
LAW AND REGULATION

ILAR Working Paper

#9

August 2011

THE BEHAVIORAL PSYCHOLOGY OF ELITE DECISION MAKING: IMPLICATIONS FOR POLITICAL SCIENCE

EMILIE M. HAFNER-BURTON, ALEX HUGHES AND DAVID G. VICTOR

School of International Relations
and Pacific Studies
University of California, San Diego

Note: This paper is also posted on SSRN at http://ssrn.com/abstract=1917037

About the Laboratory on International Law and Regulation (ILAR)

The Laboratory on International Law and Regulation (ILAR) is an international, interdisciplinary laboratory that explores when and why international laws actually work. Among scholars, this question has triggered a lively debate that ILAR is engaging with better theories and evidence. ILAR research examines a wide array of issues from environment and energy to human rights, trade and security issues. The ILAR team looks at these issues from the international perspective and also through comparisons across countries.

The Laboratory is part of School of International Relations and Pacific Studies at University of California, San Diego. ILAR gratefully acknowledges anchor funding from the nonpartisan Electric Power Research Institute, BP, plc, the Norwegian Research Foundation and from UC San Diego's School of International Relations and Pacific Studies.

Laboratory on International Law and Regulation
School of International Relations and Pacific Studies
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0519
http://ilar.ucsd.edu

The Behavioral Psychology of Elite Decision Making: Implications for Political Science

Emilie M. Hafner-Burton, Alex Hughes and David G. Victor

DRAFT, 25 August 2011

Social and cognitive scientists have long known that people are neither perfectly rational nor uniformly skilled. Cognitive abilities, social environments and other factors shape how people process information and make decisions in the real world. Long ago, such insights into human behavior—anchored in concepts such as "bounded rationality" and the "loss aversion" of prospect theory—seeped into political science. [1]

Much of the evidence about human behavior and real-world decision-making has come from experimental studies on university students and other masses that are readily available to university professors in large numbers. Such studies have immediate relevance for understanding some kinds of political behavior, such as voting, that involves analogous populations.[2] Yet most matters of public policy hinge on decisions by elites, such as politicians and bureaucrats who run national governments and international organizations. They make decisions to craft and adopt legislation, to wage war, offer foreign aid, or join international treaties. These policy makers may consider the views of constituents, including university students who vote, but elites undoubtedly have a greater imprint on international relations than the average college student.

[1] For *Bounded Rationality*, see Simon 1955; Deutsch 1967; Axelrod 1981; Beer et al. 1995, Dernardo 1995; Goemans 2000; Popkin and Dimcock 2000; Alvarez and Brehm 2002; Mercer 2005; Tingley 2011. For *Prospect Theory*, see Kahneman and Tversky 1979; McDermott 1992; Farnham 1992; Richardson 1992; Taliaferro 1994; Weyland 1996; Levy, 1997; Farnham 2004; McDermott, 2004. [add cites also to stuff like Jervis on misperception; Allison on the same—both related broadly to heruistics.??]

[2] Cite something eg on voting; and then mention that in addition to voting there are many other political activities for which mass populations participate directly—such as the formation of opinions about leaders or the "audience costs" that leaders experience when they alter prominent policy choices. This citation and the previous one are catchalls for a sample of relevant experimental work in political science.

What if elites think and behave differently from the people that have been the main subjects for empirical research and theory on human behavior?

Over centuries, philosophers have pondered the question of whether elites and the masses differ in their abilities to process information and make strategic decisions. Thomas Hobbes saw 17th century masses as uneducated and imprudent, but unequally so. Those with a natural intelligence could be selected and trained to develop an acquired skill. Although those with fewer natural talents could also build skills as well, these people were limited in their potential.[3] Edmund Burke saw this same gulf in skills but was more pessimistic about the abilities of the less talented to learn skills. Indeed, Burke argued talented elite leaders had an obligation to exercise influence over the unskilled and uneducated.[4] Contemporary scholars have not dwelled so much on the natural skills of political decision-makers—though surely there are variations in intelligence and training—as much as whether leaders are drawn from the same distribution of

[3] Hobbes Leviathan, Chapter VIII: "*VIRTUE generally, in all sorts of subjects, is somewhat that is valued for eminence; and consisteth in comparison. For if all things were equally in all men, nothing would be prized… These virtues are of two sorts; natural and acquired. By natural, I mean not that which a man hath from his birth: for that is nothing else but sense; wherein men differ so little one from another, and from brute beasts, as it is not to be reckoned amongst virtues. But I mean that wit which is gotten by use only, and experience, without method, culture, or instruction. This natural wit consisteth principally in two things: celerity of imagining (that is, swift succession of one thought to another); and steady direction to some approved end. On the contrary, a slow imagination maketh that defect or fault of the mind which is commonly called dullness, stupidity, and sometimes by other names that signify slowness of motion, or difficulty to be moved."* On the capacity for less talented individuals to build skills see Hobbes Leviathan, Chapter XIII: "*NATURE hath made men so equal in the faculties of body and mind as that, though there be found one man sometimes manifestly stronger in body or of quicker mind than another, yet when all is reckoned together the difference between man and man is not so considerable as that one man can thereupon claim to himself any benefit to which another may not pretend as well as he. For as to the strength of body, the weakest has strength enough to kill the strongest, either by secret machination or by confederacy with others that are in the same danger with himself."*

[4] Burke Reflections on the Revolution in France, 1790: "*The occupation of a hairdresser or of a working tallow-chandler cannot be a matter of honor to any person- to say nothing of a number of other more servile employments. Such descriptions of men ought not to suffer oppression from the state; but the state suffers oppression if such as they, either individually or collectively, are permitted to rule. In this you think you are combating prejudice, but you are at war with nature. . . ."*

attributes as the everyman.[5] Empirical research on this question has been scant, but a series of studies over the last two decades suggest that elites, indeed, are different. [6]

This article examines the current state of knowledge about elite behavior and considers its implications for the field of political science—notably the fields of comparative politics and international relations, which have made relatively scant use of experimental research compared with scholarship in American politics [7] or a few specialized areas that are uniquely well suited for experimental studies, such as management of common pool resources.[8] We present, first, literature in behavioral economics and cognitive psychology on human reasoning and decision-making. We start with the classics and pay particular attention to those behavioral theories that have gained most attention in international relations – such as Herbert Simon's optimization under cognitive constraints and the prospect theory of Kahneman and Tversky.[9] We then focus on some new ideas emerging in the same tradition that have not yet attracted much attention in political science yet could have large implications. Examples include growing sophistication in understanding how players in strategic games assess the skills of the other players in the same game. This new work also makes it possible to measure the ability of different individuals to assess dominant strategies in games and to iterate rounds of play.[10] These behavioral theories have been developed and tested mainly by studying populations of undergraduate students.

[5] Herrnstein 1994
[6] Chi 2009. For *Best Solutions* see de Groot, 1965; Klein 1993. For *Pattern Detection* see Lesgold et al. 1988; Chi, Feltovich, & Glaser 1981. For *Monitoring & Self-Awareness* see Chi 1978; Chi, Glaser & Rees 1982; Alevy 2007. For *Strategy & Heuristic Choice* see Larkin, McDermott, Simon & Simon 1980; Patel & Kaufman 1995.
[7] For exceptions, see a recent review of experimental research see [cite ISQ issue]. Cite also Tomz (2007) and the extension by Trager and Vavrek (2011) as well as Tingley (2011). If there are a few key pieces of experimental nature in comparative cite those here too.
[8] Cite Ostrom / Walker 2005 book on experiments.
[9] Kahneman 1979
[10] For *level-k reasoning*, see Stahl & Wilson 1994; Camerer 2003; Camerer, Ho & Chong 2003; 2004. For *d-times iterated reasoning,* see Stahl & Wilson 1994; 1995; Costa-Gomes, Crawford, & Broseta 2001.

Next, we examine the evidence for whether elites behave similarly to undergraduate populations, and we suggest that elites are different in many ways. Experience leads elites to be less averse to losses, in part because elites have higher levels of trust and generally are more prone to cooperate.[11] Research also suggests that elites and the masses alike manage huge amounts of information that are typical of bounded rationality through the use of heuristics; however, elites generally use heuristics that perform better. When elites discover that they have used the wrong heuristics they are more prone to change their strategy when compared with the masses.[12] There is also suggestive evidence that elites are more aware of how to bargain strategically when they are interacting with other elites or with non-elites. Elites appear to be better at managing iterated strategic games; they are also typically better able to judge the skills and anticipate the decisions of other players in strategic games.[13]

Finally, we consider the implications of the evidence on elite behavior for political science. Practically every theory of political behavior relies, in one way or another, on actions by elites. To illustrate what's at stake we show how new understanding of elite behavior could affect the core assumptions in two widely known theories. One is the theory, extensively used in comparative politics of "veto players"—that is, policy makers who have the potential to block ("veto") chains of decisions.[14] This theory helps explain change and evolution in policies over time as well as outcomes, such as levels of foreign investment, that depend on the predictability and efficiency of national policy processes. Most veto players are policy elites, and one implication of the new cognitive science is that elites may be less prone to use uncooperative forms of decision making—such as vetoes—when they know that their decisions affect other

[11] Plott and Zeiler 2005; Haigh and List 2006
[12] Glaser and Chi 1988; Zimmerman and Campillo 2003; Feltovich, Prietula and Ericsson 2006, p. 55; Zimmerman 2006
[13] [what cite goes here?]
[14] Romer and Rosenthal, 1978; Tsebelis, 1990

elites. The other illustrative theories we explore relate to crisis bargaining.[15] [explain the core idea and add the punch line.]

//H1// The Science of Strategic Decision Making

The questions surrounding how people process information and make decisions are durable ones in western political thought, but since the 1950s they have been the subject of systematic scientific research rooted in cognitive psychology. The relevant literature is large and growing, but here we focus on studies that are particularly relevant for understanding how individuals perceive of and reason through strategic choices that arise in a variety of political settings—notably settings where elites make most of the critical decisions. [16] The research we examine dates to the classics, notably Herbert Simon's "bounded rationality" and continues through Kahneman and Tversky's "prospect theory." While those ideas are now widely known in the social sciences the more recent additions are less familiar yet potentially very important for bringing cognitive psychology into the social sciences.

//H2// The Classics: Bounded Rationality and Prospect Theory

Simon worked in the 1950s during an era when cognitive psychology was rapidly overtaking behaviorism as the dominant theoretical paradigm for scholarship on decision-making. Behaviorism focused on how external stimuli affected animal behavior and posited that

[15] (Morrow, 1989; ADD ONE OR TWO OTHER CITES)

[16] By focusing on individuals, we are of course not surveying the full range of experiment-based research emerging from cognitive psychology and economics. There's a large range of other research we don't examine because it has not (yet) focused much on differences between individuals. That work includes studies on, for example, on coordination and ultimatum games; auctions; self-government; and [Sex/Gender, Beauty and Power.] [we need to work on this footnote and the main text that points to it so that it is clear what's in and out. And for what's out we need a crisp footnote that points to key works or reviews and explains why it is out.]

mental states and processes were unobservable and therefore largely unknowable.[17] By contrast, cognitive psychology was anchored in the hypothesis that an understanding of brain structures (today called "neurophysiology") and mental states made it possible to develop a science of testable hypotheses about how particular individuals make decisions[18] Since elites, when compared with the masses, might operate in different information environments or process information in different mental states, the insights from cognitive psychology lay a foundation for theories about how elites and masses might differ.

Simon formulated his theory of bounded rationality in two parts—focusing first on the cognitive capabilities of the decision maker while holding constant the environment and then on the information environment itself.[19] Together, Simon said, "the task is to replace the global rationality of economic man with a kind of rational behavior that is compatible with the access to information and the computational capacities that are actually possessed by organisms, including man, in the kinds of environments in which such organisms exist."[20] Simon's work serves as the point of departure for scholarship seeking to uncover the causes of strategic behavior, rather than just assuming that individuals are strategic and well-informed about the range of strategic choices.

Simon's most broadly recognized claim is that in complex information environments humans do not make choices through optimization. The core of Simon's revision is the concept of *satisficing*, a behavioral alternative to optimization through which individuals employ simple utility structures to capture the important contours of a decision.[21] To satisfice is to derive a

[17] Behaviorism is closely associated with operant conditioning. See for example Skinner 1953; Pavlov 1927 (2003 edition).
[18] Simon 1955; 1956
[19] On the former, Simon 1955; the latter Simon 1956.
[20] Simon, 195X, p. 99.
[21] Simon 1956, p. 129.

heuristic decision rule—a rule of thumb for making decisions—that, with satisfactory probability, ensures the continued success of the decision-maker. A second, related claim challenges classical notions of rationality in which decision makers evaluate all options before making choices; instead, Simon claimed, individuals examined alternative options and made choices in sequential order.[22] Sequential decision-making helps lower cognitive costs while raising the odds that decisions will be adequate. The concepts of heuristic-based and sequential decision-making are now widely known within political science, including comparative politics and international relations, where scholars have long known that individual decisions in complex, costly information environments are often sub-optimal and frequently path dependent.[23] Building on these ideas, an array of related constraints upon rationality paradigms have also emerged.[24]

As a pragmatic field of study, bounded rationality and its associated progeny have developed in fits and starts. Looking over the first two decades of research, James March writing in the 1970s lamented the lack of a "single, widely accepted, precise behavioral theory of choice."[25] Another three decades later the situation isn't much different.[26] Cognitive

[22] Simon, 1955, p. 110. Famously, Arrow and McKelvey demonstrate that given a decision process of this form, the mechanism determining the order of procedure can reasonably determine the final outcome of the choice, a conclusion that applies also to broad classes of bargaining games. Arrow, 1963; McKelvey, 2007.

[23] [cites here to Jervis—hypotheses and also perception/misperception book and cites to Allison] Building on Simon, many other scholars have pointed to organizational and "lock-in" forces that also lead to path dependence. See, for example: Nisbett and Ross 1980; Walt 1987; 1996; Levy 1997. For a review of the subject, see Goldgeiger and Tetlock 2001.

[24] *Limited Rationality* emphasizes how groups and individuals simplify decision processes. Ssee for example March and Simon, 1958; Lindblom, 1959; Radner, 1975a, 1975b; Chi, 1981; Kahneman, 1982; Zaller, 1992; Sargent, 1993, Payne, 1993; Nelson 1998; Chen 1999; Guthrie 2000. *Contextual Rationality* emphasizes how choice is embedded in a complex of social and cognitive claims on the attention of the decision maker. See for example Long, 1958; Schelling, 1971; Cohen, March and Olsen, 1972; Wiener, 1976; Sproull, Weiner, and Wolf, 1978, Caraco, 1981; Neale, 1985; Quattrone and Tversky 1988; Zaller, 1992; Stahl and Wilson, 1995; Thompson, 1995; Kramer and Messick, 1995.

[25] James March 1978 Cite page number.

[26] Reviewing the field, Barros (2010) argues that the relative success of Simon's bounded rationality lay in its lack of specificity vis-à-vis the more explicitly developed procedural rationality. However, it is our impression that much of the lack of theoretical precision within the named bounded rationality framework can be attributed to the rapid

psychology and behavioral economics have continued to produce new theories of choice—to which we turn in the next section—but few have diffused into political science. The one major exception is Kahneman and Tversky's prospect theory, which holds as its core idea that decision makers do not manage risk consistently.[27] Several good reviews of prospect theory have been addressed to political science audiences, notably international relations.[28] Thus here we focus just on the central tenets, which are derived from experimental research. The central insights of prospect theory are based on the observation that people *value* gains and losses by assessing changes from the status quo. Individuals dislike negative movements from the status quo much more than they cherish an identical gain.[29] In addition to this loss aversion, individuals also respond to uncertainty in different ways depending on whether decisions are in the domain of gains or losses. When compared with actuarial values, decision makers place heavy emphasis on certain gains while under-valuing certain losses.[30] Because the status quo is the reference point, even small changes tend to be over-weighted relative to large ones.

For social scientists who use experimental methods, prospect theory has offered a rich platform for research with fun, counter-intuitive experiments. In an experiment with undergraduate students, Knetsch finds that the simple act of placing a chocolate bar or mug on the desk of a student for an hour-long lecture is sufficient to induce strong endowment effects. After the lecture, ninety percent wanted to keep their "endowment." When instead Knetsch did

---

establishment of mature, individually recognizable theories of choice. Several of the concepts presented in the next section are examples.

[27] Kahneman and Tversky 1979

[28] See e.g. Goldgeiger and Tetlock (2001) and McDermott (2004)

[29] On loss aversion, status quo and endowment effects see generally Kahneman, Knetsch and Thaler, 1991; Andreoni and Sprenger, 2010. On scholarship in psychology and experimental economics devoted to determining the minimum levels of attachment needed to motivate Loss Averse behavior see also Knetsch, 1989; Harbaugh, Krause and Vesterlund, 2001; Samuelson and Zeckhauser 1988.

[30] When faced with a prospect of winning 1,000 with a 50% probability or winning 500 with certainty, 84% of respondents choose 500 with certainty. Conversely, when faced with a prospect of losing 1,000 with a 50% probability or losing 500 with certainty, 69% of respondent choose the risky prospect. Kahneman and Tversky, 1979, p. 273.

not endow the students with goods by placing them on their desks, but instead asked them to choose at the end of the lecture, preferences were roughly a 50-50 split between preferences for mugs or candy bars.[31] Seeking to identify possible neural-correlates of the endowment effect (i.e. brain region activations correlated with stimulus), Knutson et al. monitored subjects' brain-activation under buying, selling and choosing conditions.[32] They found that buying and selling conditions "are processed by distinct neural circuits that may exert different effects on subsequent choice."[33] These data suggest that the assignment of risk in decisions that involve gains and losses—the core idea of prospect theory—may be wired into the brain.[34]

//H2// New research on decision making

While the classics of bounded rationality and prospect theory are widely known in international relations, the loosely connected fields of cognitive psychology, neurophysiology, and experimental economics have elaborated and tested new theories that move far beyond the classics. These new branches of research include studies that focus more squarely on the factors that affect individual behavior in strategic situations—developments that make this research of special relevance to international relations, a field that has put a special emphasis on strategic interaction. Yet little of this work is known within the community of political scientists working in IR. This work also may help explain some patterns of interest in comparative politics—such as variations in national political decision-making—although so far these insights have not been applied for that purpose.

Here we focus on three branches of the new scholarship on decision-making. All three

[31] Knetsch (1989)
[32] Knutson et al. 2007; 2008.
[33] Knutson et al. (2008) add page number
[34] [note from Alex: I'll fill this experiment in if we decide to keep the reference in the paragraph.]

concern how individuals process information and hold relevance not only for empirical studies in IR but also formal modeling. We begin by looking at literatures from behavioral economics that explain differential ("d") awareness in iterated games. This work suggests that individuals vary in their abilities to identify dominant strategies in iterated games and in the time horizons over which they calculate the payoffs in those games. Next we present a distinct body of research at the intersection of behavioral economics and psychology—known as "k-level awareness"—which suggests that individuals vary in their perceptions of their opponents in strategic games. And third we review literature from cognitive psychology about how individuals may vary in the ways they process information. Many of the features in these information processing models are pertinent to understanding the differences in behavior between novice and experienced actors in political decision making.

//H3// Decision making in iterated games: d-times Backward Induction and Iterated Dominance

Since the late 1990s a body of experimental research has amassed to s suggest that individuals vary in the sophistication with which they approach strategic games.[35] Here we focus on those variations as they apply to iterated games; later we look at how individuals vary in how they assess the decisions that other players in the game are likely to adopt. These experimental literatures firmly lead to the conclusion that people vary in how they perceive of the game they are playing and reason through the choices.

Individuals differ on the number of rounds they consider when presented a decision situation – known in the behavioral economics literature as "d-times backward induction". The

[35] [add a big cluster cite here on all the relevant work]

score "d," which is measurable in experimental settings, reflects the number of rounds of iterated choices over which the individual reasons before making his own choice for the first round; it thus holds the meaning of "differential" backward induction. The scholarship has centered on three explanations for variation in people's "d" scores.

One classic explanation is rooted in variations in time preferences.[36] Some individuals may be cognizant of the full gamut of game rounds, but have time-preferences such that rounds beyond some event-horizon are functionally zero. Drug addicts, for example, may be aware of the harms of drug abuse even at time zero when they begin their habit, but a short time horizon discounts those choices. Similarly, countries considering signing an agreement to limit emissions may be fully cognizant of the long-term benefits of reducing carbon- emissions, but may so discount the present-value benefits of those future benefits that those future streams are functionally non-existent.

A second perspective is rooted in differences in perception about the structure of a game. For example, one player may imagine the emissions reduction game to be iterated annually ten times—as in a typical long-term treaty—while others think that rounds of iteration are much shorter before the game is restructured. In effect, the two players' revealed preferences suggest they are playing different games. [37]

A third perspective focuses on the variations in individuals' abilities to comprehend and apply concepts of iterated dominance.[38] Subjects who can more efficiently process structural information about the game are better able to perceive of the whole game. A measure of these

[36] Notaby see Laibson 1997. See also Ainslie and Haslam 1992; Laibson 1996; Rubenstein 2003; Thaler and Sunstein 2008. Also, hyperbolic discounting is frequently presented in treatment of addictive behavior.
[37] Reny 1988; McKelvey and Palfrey 1992; Aumann 1995; Fey, McKelvey and Palfrey 1996; Ben-Porath 1997; Binmore et al. 2002; Johnson et al. 2002; Costa-Gomes and Crawford 2006; Gneezy, Rustichini, and Vostroknutov 2007; Levitt, List and Sadoff 2010
[38] Costa-Gomes, Crawford and Broseta 2001; Costa-Gomes and Crawford 2006

structural perception skills, "d-times iterated dominance" is the ability of an agent to repeatedly eliminate strictly dominated strategies. A few studies suggest that as individuals gain experience with a game form that they are better able to perceive the broader game and thus choose strategies that perform well. These skills appear to be related to the choice of decision-making heuristics and to differences in how people process information—topics we address in more detail below. Experienced individuals may view combinations of decisions—such as which strategies to choose or avoid in an iterated game—as a single choice of which heuristic to apply. Experienced individuals appear to make better heuristic choices.[39]

//H3// K-level Awareness

The second strand of new research, known as "K-level awareness", addresses individual-level differences in the projection of rationality of the other agent. Although the idea that perceptions of others are an important part of strategic decision making was originally raised by Keynes in his famous "beauty contest" game,[40] the idea has been modernized and rooted in experimental research by a host of recent scholars.[41] Keynes's formulation had a group of subjects seated at a table perusing a series of six photographs of college students. Their task was to select two photographs from the six that the *majority* of the group will identify as the most beautiful. In reasoning through the problem, each subject faces many possible strategies. One may know nothing about the composition of the other subjects in the group and choose

[39] Across a number of classes of games, subjects playing the game on first impression typically are able to apply between 1 and 3 rounds of iterated dominance; that is, they are able to eliminate strictly-dominated strategies between one and three times (Costa-Gomes, Crawford, Brosetta 2001), in repeated play games, and games where subjects are trained prior to the first round, subjects were better able to reason to equilibrium. Measured, differently -- the proportion of subjects playing equilibrium strategies – only 22% of respondents play an equilibrium strategy upon first impression (Costa-Gomes, Crawford and Broseta, 2001), but as many as 68% play equilibrium strategies in multi-round games (Stahl and Wilson, 1995).

[40] Keynes 1936

[41] Crawford (2003, 2007, 2008) and further theorized and experimentally treated by Camerer, Ho and Chong (2003, 2004). Similarly, a class of theories surround the projection of beliefs onto strategic partners from introspection – reasoning about others through examining how oneself reasons—these are known as *noisy introspection*. Stahl and Wilson 1994; 1995

photographs at random. A less naïve strategy would simply choose the two photographs that the subject thinks are most attractive on the belief that all other choosers have the same preferences. A still more sophisticated approach is to reason that each of the other members of the group is also aware of the dynamic formation of group preferences. In Keynes' formulation the optimal strategy depends critically on beliefs about modes of reasoning of the other players. If all players are fully rational, and know that all other players are equally rational, then the beauty contest game becomes a focal-outcomes game.[42]

In a flurry of articles starting in the 1990s economists undertook the first serious treatment of the reasoning underlying the original beauty contest game.[43] Stahl and Wilson asked individual subjects within a pool of subjects to select the number between 0 and 100 that would be closest to some multiplier of the average number selected by everyone else in the pool of subjects. A level-0 player chooses a number at random without considering what others will do. If the multiplier is one-half then a level-1 player assumes that his peers are all level-0 randomizers who, on average choose 50. The level-1 player therefore selects 25 (one-half of 50). A level-2 player thinks one more round of logic further. He assumes that his peers are L_1 responders who each select 25, and therefore selects 12.5 (one quarter of 50). And so on.[44] Players with high k-level reasoning are able to evaluate how other players are likely to reason and also think that other players are also responding in comparable ways. Although a bit cumbersome to explain, this assumption is an important aspect of the high level of rationality that is often assumed in international relations models. Full rationality does not just assume that

[42] Schelling 1967
[43] Nagel 1993; Stahl and Wilson 1994; 1995
[44] As formalized by Crawford (2003, 2007, 2008) and Camerer, Ho and Chong (2003, 2004) individual agents have cognitive capacities to play *rules*. Level-k theory anchors itself on a non-strategic Level-0 (L_0) individual who plays strategies at random – and builds by imbuing increasing levels (L_1, L_2 … L_k) with the ability to best respond to the levels beneath it. Therefore a L_1 best responds to a L_0, a L_2 to a L_1, and so on.

participants have well-ordered preferences but also, more onerously, assumes all participants have high k-levels, a phenomenon also known as Common Knowledge Rationality (CKR).[45]

Experimental measurement of k-levels in undergraduate populations has revealed high variations. Stahl and Wilson found that approximately 24% of the undergraduate subjects in their study were L_1, which suggests the subjects believe others are choosing numbers at random; 49% were L_2 (i.e. chose 13 because they believed all others were best responding to a random distribution of numbers and 25), 27% played the equilibrium associated with CKR.,[46] Put differently, only about one-quarter of this population behaved in ways that are consistent with standard assumptions of full rationality.

Recent level-k scholarship has tried to link k-level reasoning to the physiology of the brain. Bhatt and Camerer find that when subjects play equilibrium strategies that identical brain regions are activated at the time the strategic choice is made and when the subject, later, is debriefed and describes her perceptions of the "other" decision makers in the experiment. In contrast, when subjects make choices while playing non-equilibrium strategies (i.e., low k-levels) their brains are much more activated then when they are describing beliefs about other decision makers. Creating equilibrium beliefs, the authors conclude, requires imagining how other players in the experiment make choices, which uses overlapping neural circuitry as making one's own decision.[47] Other studies look at the particular regions of the brain associated with high k-level reasoning, showing that those same regions are associated with reasoning that takes

---

[45]

[46] Stahl and Wilson 1994; 1995. In confirmatory experimentation, Costa-Gomes and Crawford repeated a similar experiment, and found an upper bound on the levels individuals reasoned: L_3. "Large numbers of L1, L2, Equilibrium, and L3 and/or Equilibrium hybrid subjects, indicates the absence of significant numbers of other types." Costa-Gomes and Crawford, p. 1767.

[47] Bhatt and Camerer 2005; Camerer 2007

a third-person perspective, in contrast with brain regions associated with self-referential reasoning.[48]

//H3// Processing of Complex Information

The third new branch of research relates to understanding how individuals process complex information. Many of these studies point to dual process modes of reasoning. The ongoing cognitive revolution in psychology has suggested a class of models, tested and elaborated through laboratory experiments, which posit that the brain operates in two distinct modes: relatively low-cost (subconscious) processing and more taxing (conscious) cognitive functions. Although several different parallel concepts have been developed, each has at its core this dual mode distinction.[49] To simplify the discussion, here we summarize just one of the models whose terminology is the most accessible—known as the "Heuristic-Systematic" dual process model. This work is important because it suggests that individuals may vary in the

[48] After separating subjects into high- and low-level k-reasoning, fMRI scans examined brain regions significantly activated in the experimental task compared to a baseline, or "default-state" processing level. In high-level subjects, activity increased in the medial prefrontal cortex (mPFC, the brain region directly behind the forehead)—a region also associated with recognition of others as human. In low-level subjects the active region shifted to the rostral anterior cingulated cortex (rACC, a brain region slightly "deeper" into the brain behind the forehead) – associated with self-recognition and self-reference. Coricelli and Nagel, 2008, p. 9164-5

[49] See *Controlled vs. Automatic Processing*: Schneider and Shiffrin 1977; Schneider and Shiffrin 1977; Bargh 1984 For System 1 vs. System 2 processing, see, Alter et al. 2007; **More cites here. There should be fist-fulls of them.** For a response which argues that the operationalization of two distinct modes misses critical detail in processing see, XXXX. Certainly, a bright-line distinction between the two modes in untenable. Jansma, Ramsey, Slagter, and Kahn 2001; Lieberman, Jarcho, and Sapute 2004 demonstrate using fMRI studies, when subjects are primed with experimental prompts known to be processed systematically, the lateral prefrontal cortex, hippocampus and medial temporal lobe, and posterior parietal cortex, all associated with effortful cognition (they are part of the C-system, where c is for refle**C**tive) is significantly more activated; in contrast, when primed with experimental prompts known to be processed heuristically, the ventromedial prefrontal cortex, nucleus accumbens, amygdala, and lateral temporal cortex, all associated with low-effort processing (they are part of the X-system, where x is for refle**X**ive) is significantly more activated.

extent to which they must make active choices instead of relying on automaticity in their brain to make those decisions. Moreover, it suggests that individuals may vary in the heuristics they select to help them make complex choices that are cognitively taxing.

"Systematic" processing is the making of decisions through close and thorough analysis of information.[50] It is most akin to our image of a rational, fully informed actor who responds to new facts with full, new analysis. It requires a full devotion of cognitive ability and capacity—resources that decision-makers devote, especially, when they face a novel environment with few constraints on resources such as time.[51] Driving a new route on an unfamiliar road at night is an example of systematic processing. By contrast, heuristic processing is the activation and application of judgment rules—heuristics—that at are learned and stored in memory and tested through experience.[52] This mode of decision-making relies on easily processed judgment cues rather than a full blown analysis; it is limited by the availability, accessibility and applicability of information that must be stored and recalled from memory.[53] When confronted with familiar situations, subjects deploy heuristic processing. Even when faced with relatively complex, novel judgments under binding time constraints these subjects also engage in this low-cost mode of processing by identifying some applicable heuristic.[54]

---

[50] *Heuristic/Analytic:* Evans 1989; 1996; Evans and Over 1996*Bohner* et al. 1995; Chen and Chaiken 1999

[51]

[52] Whereas driving on a new road at night is a systematic process, driving a familiar route – from the office to the market and then home – is likely a systematic process. Even complex traffic maneuvers are handled with minimal cognitive effort.

[53] Chen 1999, p. 83

[54] Gick and Holyoak 1989; Rothman and Hardin 1997; Hardin and Rothman 1997. Jansma, Ramsey, Slagter, and Kahn 2001; Lieberman, Jarcho, and Sapute 2004 demonstrate using fMRI studies, when subjects are primed with experimental prompts known to be processed systematically, the lateral prefrontal cortex, hippocampus and medial temporal lobe, and posterior parietal cortex, all associated with effortful cognition (they are part of the C-system, where c is for refle**C**tive) is significantly more activated; in contrast, when primed with experimental prompts known to be processed heuristically, the ventromedial prefrontal cortex, nucleus accumbens, amygdala, and lateral temporal cortex, all associated with low-effort processing (they are part of the X-system, where x is for refle**X**ive) is significantly more activated.

Increasingly, scholars working with these methods view individuals as cognitive misers who seek the highest cognitive task rewards for the lowest cognitive effort. As a result, decision makers cross-apply heuristics that are familiar in one setting to many others in lieu of explicit analysis. Novices who face unfamiliar circumstances hunt for the right heuristic; individuals with more experience can select much more quickly a reasonably well functioning heuristic.[55] For scholars in IR this strong cognitive incentive for less taxing processing may help explain how historical models become selected as heuristics—a topic that was popular long ago among historians of foreign policy—and may also explain detailed decision-making, especially during crisis where the luxury of systematic processing is unavailable.[56]

//H1// How do Elites and the Masses Differ?

Most research from cognitive physiology and behavioral economics on how individuals process information and make decisions has relied heavily on experiments with undergraduates and other non-expert populations drawn from the "masses." For these insights to be relevant in most scholarship on international relations, however, we must look to how the key concepts from this research—such as the impact of endowment effects on decisions, the use of heuristics, and the role of loss aversion—apply to the individuals who actually make key decisions in international relations. Those decisions, such as to start or terminate wars, threaten the use of force, or craft treaties are nearly always in the hands of elites who hold elected or senior bureaucratic posts.

[55] Gick and Holyoak 1989
[56] Neustadt 1988; Tetlock and Goldgeiger 2000; see also the edited volume by Sudfeld and Tetlock 1991, including: Janis and Mann 1991, p. 33-50; Sudfeld and Tetlock 1991, p. 51-70

The insights that hold for elite populations are more speculative because research on these populations is difficult to organize and the published literature is thin. It tends to rely on studies that probe decision-making in a few areas where expert knowledge and experience are valuable and where the experts may be easier to identify and enlist. Chess is frequently studied—so, too, is piloting aircraft and listening to music. Nobody has yet connected the Secretary General of the UN or the President of the United States to a brain scanner in the midst of a geopolitical crisis. While elites are hard to study because they are busy, secretive and wary of clinical poking, the existing research points to six major differences between elite and mass populations that have implications for decision making in IR.

Recent experimental work involving actual scanning of brains is consistent with the idea that the many differences between elites and masses—which we discuss below—are related to experience. Experts acquire skills to develop complex representations of tasks that allow them to make decisions in ways that are miserly with cognitive effort. They use heuristics, for example, to organize and make immediately available the complex information and experience with analogous decisions. Novices, on the other hand, lack such knowledge and ability to associate representations from one area of experience to new settings; like elites they try to impose organization and meaningful relations between experiences, but unlike elites their attempts are piecemeal and less relevant to complex decision-making tasks. [57]

For example, in a series of studies researchers put people into brain-scan machines and asked them to perform tasks that required sorting individuals into groups. Subjects who were exposed to the experimental task for the first time activated a brain region associated with math problems and algebra. In contrast, those that had experienced the same task at least once more

[57] Feltovich, Prietula and Ericsson 2006.

maintained high activity in the posterior medial cortex (PoMC)—the brain's "default" area for mental functions, located behind the ears—and did not activate the regions of the brain associated with math problems as they had in the first trial. Not only did the experienced subjects rely on a different part of the brain, but they were also more effective in performing the sorting task.[58]

A lot of political behavior—including decision making by elites—requires the ability to sort people and decisions into groups. Evidence shows that those skills are hard wired into all brains. Emerging work in political psychology suggests that the human brain develops features expressly designed to perceive of, and react to, coalition dynamics.[59] Brain scans taken when subjects are performing tasks related to sorting individuals into "in" and "out" groups show that they functions rely heavily on the default processing mode of the PoMC while most other parts of the brain deactivate.[60] One conclusion from this work is that all people are generally equipped with the hardware needed for politically sophisticated tasks of coalition awareness and sorting.[61] However, while the hard wiring is present in nearly everyone, experience has a large impact on the practical utility of these hard-wired capabilities.

A considerable literature has addressed the influence of experience on behavior. Much of this has focused on the cognitive function of novice versus experienced participants.[62] That work, based mainly on experiments, suggests that experience is specialized and only partially portable to other domains. A telling example pits world-class players of the board game "GO!"

[58] Oxley et al. 2008
[59] Schreiber, 2005; Fowler and Schreiber, 2008; Schreiber and Iacoboni, 2011
[60] Scientists had believed that this default state processing was tantamount to the brain's screen-saver; when nothing else was processing, the PoMC switched on and kept things busy. They were faced by a paradox, however, because the PoMC and the prefrontal cortex – the next brain region nearer to the eyes together consume more than 20% of the brain's metabolic energy. What was more, the PoMC is one of the only brain regions to have a direct artery connecting it to the heart. Taken together, because all individuals are involved in default state processing,
[61] Schreiber, 2005
[62] Ericsson and Lehmann, 1996

against novice opponents. When playing "GO!" the experts win handily, but when they play a closely related game—Gokomu, which uses the same board with similar (but not identical) scoring rules—the expert GO! players only slightly outperform the novices.[63] In another example, chemistry professors were asked to devise a labor plan to increase hypothetical crop production in the Soviet Union. Despite their specific knowledge advantages over the layman, the professional chemists performed very much like novices. Interestingly, political science experts who knew little about crops but a lot about human institutions were much more successful.[64] A host of other studies arrive at similar conclusions that the advantages of experience are not that portable.[65] Compared with novices, chess grand masters are much better at recalling the positions of chess pieces on a board when those pieces align with plausible real chess games; both groups, novice and master, are equally poor at recalling randomly assigned piece positions.[66] In short, a body of experimental research points to the conclusion that elites are different from masses due to their experience. However, no study has yet carefully measured the many selection effects that surely influence who rises to an elite position.

//H2// Difference #1: Elites are less prone to loss aversion

[63] Eisenstadt and Kareev 1979
[64] Voss et al. 1983; Voss, Tyler and Yengo 1983. While the political scientists performed better in a task where motivating individuals toward a goal, they frequently fare no better than the everyman at predicting political events. See, e.g. Tetlock 2005
[65] Fitts and Posner 1967; Barrows et al 1978; Elstein et al 1978; Glaser and Chi 1981; Ericsson and Lehmann 1996; Petrusa 2002; Hodges et al 2006; Lehmann and Gruber 2006; Norman et al 2006; Rosenbaum et al. 2006
[66] Many other examples abound. Skilled electronics technicians construct circuit diagrams according to the functional nature of the elements in the circuit while novice technicians instead produce chunks based on the spatial proximity of the elements (Egan and Schwartz, 1979). Architects recall building plans in levels – first wall segments and doors, then rooms and constructed space, then clusters of rooms and spaces (Chiesi, Spilich and Voss, 1979). Similar patters hold not just in the game of Go! (see main text) but also bridge players (Charness, 1979) and musicians (Sloboda, 1976).

One of the central findings from prospect theory is that people are asymmetrical in how they perceive and choose risks. Experience might advantage elites by making them less prone to these asymmetries in risk management; notably, if they are less prone to loss aversion then they might be better gamblers. Much of international relations is about the calculus of risk, and elites might manage those risks differently from decision makers selected randomly from the phone book.

John List pitted experienced traders against amateurs in a real-world market by randomly assigning one of two similarly valued goods to each group. Because the goods were randomly assigned, and equally valued, one would predict that absent the effects of loss aversion that 50% of the cards should be traded. Where loss aversion is strong—and thus players would prefer to retain their original endowments—trading activity (which included the potential for losses) would lessen. List finds that the experienced traders traded their endowment in roughly 44% of cases, whereas novice traders traded between 20% and 25% of their endowments..[67] Better performance wasn't due to superior knowledge or recall of trading positions; nor was it due to negotiating skills. Instead, it was the result of reduced loss-aversion when trading involved uncertainties. Experienced traders were less likely to focus on potential losses and thus suffered from less of an "endowment effect." Compared with amateurs, when trading was uncertain the experts traded in higher volumes and were more symmetrical in how they treated potential gains and losses.[68] Others have expanded this logic by developing a taxonomy of uncertainty that

[67] List 2003.

[68] List 2003. Similarly, in a study comparing the behavior of expert Chicago Board of Trade (CBOT) traders and students from the University of Maryland, List finds that students were more loss-averse than CBOT traders. That outcome, List says, reflects that traders are less prone to over-act on bad news. This bad news-principle holds that participants in the study react to information on the downside investment risks but ignore information about the upside investment state. Students and elites are both influenced by the downside investment state, but students are significantly more sensitive than the elites. Furthermore, while elite behavior is consonant with the options model, it is more similar to performance predicted by the expected utility model. It is not clear if risk-accepting behavior applies to the whole range of risks. In a separate experience with a pool of expert Costa Rican coffee traders, List

distinguishes between choice uncertainty – that is, imperfect knowledge of outcomes when individuals must choose between two objects – and trade uncertainty, which is the unpredictability that arises when individuals engage in arms length market transactions.[69]

//H2// Difference #2: Elites are more cooperative

Many tasks in international relations require cooperation, such as joint action by different agents within a government and, of course, cooperation between agents of different countries. Many theories of international cooperation, especially those anchored in the prisoner's dilemma, see cooperation as hard to achieve and maintain—especially when decision-makers are aware of the benefits from defection. [70]

Elites, perhaps because they are less averse to losses, also appear to be more cooperative than the masses. In a variant of the trust game, Hedinger and Götte ran a series of experiments that asked each participant to divide an endowment into two: one parcel for keeping and another that is "passed" to a game partner who then, in turn, divided the endowment and passed a portion back to the original player. At each exchange the amount passed was multiplied, creating the prospect for gains if the players trust each other. Comparing the outcomes from a pool of highly-trained Swiss airline pilots and a group of university students, researchers found that pilots are significantly more trusting when they knew that other participants in the game were fellow pilots—they were more likely to pass forward a larger portion of the original endowment and

---

asked the subjects to play a game that involved risk tradeoffs and made explicit reference to the similarity between their experimental conditions and the circumstances faced by real-world policy makers, "*Government officials are developing plans to deal with terrorism risk, chemical plant security, etc.*," (List and Mason, 2009). The authors find that "*For a typical CEO, willingness to pay to reduce the chance of the worst event is very similar to the corresponding willingness to pay for a typical student. Yet, as the extreme events become more likely, CEOs exhibit greater aversion to risk*." The differences between this 2009 study and List's earlier work could be driven by differences in heuristic use between the two experimental conditions, or some other unmeasured variable.

[69] Engelmann and Hollard, 2010

[70] for a review of strategic theories in IR see [cite AJIL paper]

also more likely to receive a larger share in return.[71] This result is familiar in the literature that has examined "permissive" strategies for cooperation in iterated games, but the innovation in Hedinger and Gotte is to show that these cooperation-prone decisions are a result of shared, expert experience.[72] When pilots played these games with students, or students amongst themselves, trust was lower.

Similarly, in a series of experiments in Costa Rica, scholars found that a group of high-level coffee purchasers performed significantly differently than equivalently educated students at a major university. In a trust game analogous to that used in the Heddinger and Gotte experiments with Swiss pilots, they found that expert traders were significantly more trusting (making an initial pass to the other) and trustworthy (the other passing some amount of the endowment back to the original subject) than the sample of university students.[73] One explanation for this behavior is that as social distance decreases, trustworthy behavior increases.[74] Another explanation centers around reduced loss aversion among elite actors – elite actors are less loss averse, and are therefore more willing to take a risk by passing initially for the potential gain on the return pass.

//H2// Difference #3: Elites select better heuristics when processing complex information

[71] Hedinger and Götte 2006
[72] Implying that the mechanism at work is a change in risk aversion, this work corroborates the findings of List 2003; Fehr and List 2004; List and Mason 2009 that experts are more likely to view risks symmetrically and thus more prone to see gains from cooperation rather than focus on potential losses. However, this result may also be due to special piloting attributes—namely the need to cooperate in multi-pilot cockpit settings.
[73] Fehr and List, 2004
[74] La Porta et al., 1997; Fershtman and Gneezy, 2001; Ruffle and Sosis, 2006; Hoff and Pandey, 2006; Bernhard et al., 2006; Goette et al., 2006

Physiologically, all people search for low-cost ways to process complex information and make decisions. Heuristics plays a central role in that simplifying effort, and some evidence suggests that elites are better at selecting the "right" heuristics. For example, in a series of game experiments in China, Cooper et al. compared the performance of production managers (including both novice and seasoned managers) chosen by the Communist Party for participation in the experiment and a group of university students who had no management experience. In a game designed to replicate the dynamics between firms and central planners command economy, the authors find that experienced managers behave more strategically and their choices align with equilibrium predictions. While the experienced managers performed more strategically in all cases than the students, importantly, the managers performed "better" in their roles as central planners than as firm production engineers because the experimental task before the "central planner" was very similar to the managers' daily activities, while the task before the "firm manager" was a largely new experience.[75] Experienced managers behave more closely to what would be predicted of a fully-rational actor when the experimental task allows the subject to import decision processes and rules of thumb from experience. Similarly, studies of medical clinicians have shown that when confronted with routine cases, expert clinicians make data-driven diagnoses by applying a small set of rules to the data and sorting for the right decision pattern. By contrast, novice clinicians tend to use hypothesis-driven approaches that keep open a wide range of possible diagnoses, and are therefore less efficient in processing information and fail to deliver superior results to patients.[76]

[75] Cooper et al. 1999, p. 799
[76] Patel & Kaufman 1995

A key asset that experienced experts bring to tasks is the ability to make choices with greater automaticity.[77] Slow and serial decision-making processes require sustained, conscious attention; with experience these can become faster and less deliberate, allowing for parallel processing with other decision tasks.[78] This allows them to focus cognitive energy on aspects of performance where control is desirable. It concentrates attention on key facts while ignoring those that are not material to outcomes.[79]

//H2// Difference #4: Elites update their heuristics more effectively

In addition to relying more on heuristics and choosing the "right" heuristics at the outset, experimental research suggests that elites also revise (or even jettison) their heuristics more efficiently than non-elites. They are more likely to know when their heuristics don't work. The key concept is "metacognition"—that is, the knowledge an individual has about his own cognitive performance. Metacognition helps condition the mechanisms for efficient retraining or even restarting when an individual learns that lines of reasoning and heuristics are not performing satisfactorily.[80] While there is also a literature on over-estimation of cognitive skills, there is suggestive evident that for experts this metacognition may be automatic—a skill learned from years of awareness of their own performance.[81]

For example, Alevy et al. measure the rate and effectiveness at which distinct population samples update their beliefs by comparing the performance of university students with

[77] Schneider, 1985
[78] Schneider and Shiffrin 1977; Feltovich, Prietula and Ericsson 2006
[79] Adelson 1984; Schmidt and Boshuizen, 1993; Ericsson 2006
[80] Glaser and Chi, 1988; Feltovich, Petrulia & Ericsson 2006
[81] Reder & Shunn, 1996

professional traders from the Chicago Board of Trade (CBOT) in a laboratory experiment. The authors loaded an urn with a number of valued balls—each worth different amounts—but did not reveal the average value or distribution of the balls to the participants. The subjects compensation was based on the ball values drawn from the urn, giving a strong incentive to draw from the urn believed to contain the higher average value.[82] Each subject drew a ball and watched her peers do the same and then drew again—with each draw the subject learned more about the possible contents of the urn. The authors found that market professionals update on public information only when they are confident of its quality, but they ignore public information and rely on private sources when the public signal is of unknown or dubious veracity.[83] By more effectively updating their heuristics – updating when appropriate but not updating when inappropriate – experienced traders were less likely to become victims of what Alevy et al call "reverse cascades"— cases where small amounts of information at the beginning of a sequence, such as a string of unlucky draws, leads the group to draw from the less lucrative urn over the long term.[84]

The sum of this research suggests that when elites are asked to process task in which they have domain specific knowledge (so they can work heuristically), they are more likely to choose the right way to reason about the task. However, should they choose the wrong method for

[82] Alevy, Haigh and List 2007

[83] The authors employ two experimental conditions, in one denoted *symmetric*, the urns contain symmetric distributions of balls: Urn A contains two type-*a* balls and one type-*b* ball, while urn B contains two type-*b* balls and one type-*a* ball. The other condition, denoted *asymmetric*, four additionally type-*a* balls are added to each Urn (both Urn A and Urn B). In this fashion, Urn A (Urn B) contains 6 (5) type-*a* balls, and 1 (2) type-*b* balls. This modification decreases the meaningfulness of a type-*a* signal, whether public or private.

[84] The authors also found that these traits were the result of skills obtained on the job, not merely the selection of trading as a profession. Neophyte traders – day-traders and traders with low trade-volume or low trade-intensity – behaved more like the students than do the more established elites. Alevy, Haigh and List, 2007

reasoning they are more likely to automatically deploy the metacognition that is necessary to be aware of the need for change.[85]

//H2// Difference #5: Elites May be More Aware of their Strategic Interactions

K-level reasoning could find a home, especially, in international relations through crisis-bargaining and deterrence theories. Imagine the case that a NATO leader is attempting to deter nuclear proliferation in a volatile region. He must evaluate the appropriate level of signal to send to the states in that region; sending too costly a signal is inefficient, and sending a signal not costly enough is ineffective. If the deterring leader believes that his peer leaders in the region are all Level-0 players, he can send a straightforward signal that is epsilon greater than the average of the countries' willingness-to-not-proliferate point. However, if NATO believes that other leaders are a mix of Level-0 and Level-1 players, then he must choose a signal cost that is high-enough to deter the states aware of NATO's intentions, who therefore demand a higher signal cost. The logic of this game is a straightforward extension of Level-k reasoning. Long ago, international relations scholars focused on misperception as one explanation for international politics—including misperception of the decision-making systems and goals of adversaries in strategic situations—and k-level analysis offers the prospect of measuring and explaining this type of misperception systematically.[86] Extending k-level reasoning to these kinds of settings could be extremely important since bargaining and deterrence are fundamentally elite-level decisions steeped in strategic choice.

[85] Alevy, Haigh and List, 2007

[86] [add cite here to Jervis 1968 WP essay on hypotheses; Jervis book on perception/misperception; and Allison "three models" stuff on Cuban missile crisis]

A few studies that look at elite (or semi-elite) populations suggest that elite status, experience and training could affect k-level reasoning. Other studies compare different subject pools—Camerer looked at Caltech Undergraduates and Economics Ph.D students, members of the Caltech board of trustees, and a sample of 20 CEO, corporate presidents, and board chairmen and found that subjects highly skilled and trained in game there scored about one k-level closer to the equilibrium.[87] Other studies point to similar results, with game theorists and economics professors adopting strategies closer to equilibrium predictions than typical subjects while self-selected general readers of finance newspapers were little different in their strategic reasoning from sophomore economics students (both clustered around L_1 and L_2 reasoning).[88] The results related to trained game theorists may simply reflect the similarity between that training and k-level experiments, but the results for elite decision-makers may reflect that elites have higher k-levels and thus might make equilibrium-like decisions in strategic settings more readily than mass decision makers.

//H2// Conclusion: Decision Rules and Strategic Performance of Elites and Masses

So far, we have learned two things. First, the cognitive revolution has led to a series of theories that help explain how humans process information and make decisions. Since Herbert Simon's work on "satisficing" in the 1950s this work has explained why humans use heuristics in decision-making—a phenomenon that recent physiological research has now explained by

[87] Camerer, 2003, p. 217, citing Camerer 1998, Unpublished Manuscript.
[88] Antoni Bosch-Domènech, et al., 2002, p. 1694. One telling difference in the patterns of play is that in the undergraduate students were better attuned to how other members of the same sample would play the game—a larger proportion of the undergraduate sample believed the others would behave at random. Plott argues that this seemingly irrational behavior could be the result of rational players expected others to behave irrationally. Plott 1996

observing how routine, heuristic decisions are more efficient. Cognitive science also helps explain asymmetries in risk management and endowment effects—concepts rooted in prospect theory of the 1970s. The most recent research in this vein has not only offered much stronger physiological and evolutionary explanations for these traits but has also helped explain human attributes of special interest to political scientists—such as how individuals perform in strategic games when their actions depend on awareness of how others will behave (so-called "k-level").

Second, there is thinner but suggestive evidence that elites differ from masses in systematic ways. Looking across that thin literature we have suggested five ways that elites differ, such as in their experience and their choice and revision of heuristics. Elites are more cooperative than non-elite samples of decision makers. They rely more heavily on heuristics (and thus are more efficient at processing information), choose the right heuristics and update those heuristics more efficiently (if not quickly).

The tenor of our review has been to examine the ways in which experienced and elite subject pools outperform the population at large. However, there are some ways that elite experience could be a liability in decision-making, such as through the creation of false confidence. In an excellent review, Michelene Chi suggests that experts may sometimes overlook surface features and details to instead focus on paradigmatic reasoning.[89] While elite actors may understand deep logic that under girds decision circumstances, they may focus on this deep logic at the expense of influential surface facts. When asked to describe a simple task, computer programmers were less successful than were recreational computer users.[90] This line of argument is closely related to information processing in complex environments; many times experienced actors appropriately winnow extraneous facts to focus on core concepts that impact

[89] Voss, Vesonder and Spilich 1980; Adelson 1984
[90] Adelson 1984

decisions, but this winnowing process in fallible. Experienced decision makers may cull so much information to get to core issues, that the unique, distinguishing facts are left on the drawing room floor.

Philip Tetlock argues that expert political analysts fare little better than novices in predicting political outcomes. In predictions about prospective students' success in graduate and medical school, novices predict success at equivalent levels as experienced counselors.[91] This suggests there is some level of uncertainty about outcomes beyond which expertise is unable to generate superior outcomes; or perhaps politics, medical, and graduate schools have very few systematic components to be evaluated. In either case, experience may lead an actor to efficiently arrive at decisions, but for at least a class of problems there is no guarantee that efficient decisions are also effective.

Additionally, experienced actors may find difficulty in predicting the behavior of novice performance. Closely related to k-level reasoning, this potential difficulty centers on the inability of elite actors to appropriately gauge the mental processes of people who reason in vastly different ways. [92] An experienced actor, used to dealing only with other experienced actors holds a set of beliefs about what options are available in a decision circumstance, but a novice who has not been socialized in the way of reasoning of the group may play stratagem outside what the experienced actors consider.

Experience lessens loss aversion and leads to more active and accurate decision-making about risky choices. However, a decline in loss aversion might also amplify the tendency for

[91] Tetlock 2005; Johnson 1988; Dawes 1971 (*see citation information on p. 28 Cambridge Handbook)*
[92] "Noisy Introspection" is one conceptualization of k-level reasoning; actors evaluate in incentive structure, and project their reasoning process onto other actors. With the belief that other actors will behave as they would, they then re-evaluate the incentive structure, and project their conclusions again onto other actors, and so on. This would be problematic if other actors do not re, and Chi 2006; Hinds 1999 finds that experienced cell-phone users inaccurately predict the speed with which novices utilize the device;

people to overestimate their abilities. Indeed, there is suggestive evidence that experts are overconfident in their domains. Chess grandmasters more frequently overestimated the number of moves they could recall compared to novices who were generally more accurate.[93] Physics professors and musicians also overestimated their comprehension of respective physics and musical texts, while novices were much more accurate.[94] Studies of negotiations show how two parties can systematically overestimate their skills, raising the prospects for deadlock in strategic situations. In zero sum bargaining situations the parties' own assessments of their predicted success frequently sums to more than 100% because each believes it has a better than even chance of reaching its preferred outcome.[95] Indeed, when asked to evaluate how certain they are in their beliefs, individuals frequently have unwarranted confidence.[96] Although we do not explore the implications of overconfidence in more detail, we note that many bargaining situations—including those relevant for political science theories, such as realted to crisis decision-making—overconfidence could affect elite choices. What looks like bombastic nationalistic pride—for example, the refusal of a leader to back down in the face of overwhelming odds of failure—might simply be the result of improper self-assessment.

//H1// Implications for Political Science: Two Illustrations

Now we turn to exploring how the insights from cognitive psychology—especially the limited work focused on elites—might affect political science. This is not a new dialogue

[93] Chi 1978
[94] Oskamp 1965; Glenberg and Epstein 1987 but see also, Dawes 1996; Gervais 2003, Johnson 2009, Andreoni 2010
[95] Neal and Bazerman 1983, 1985
[96] Neale and Bazerman 1985; Einhorn and Hogarth 1978

between these fields,[97] although new branches of cognitive science offer especially interesting possibilities for application in political science. Table 1 summarizes the main ways that elites might differ from the masses, and next we apply those differences to two leading theories in political science.

Difference between Elite and Mass	**Illustrated with Veto Players Theory**	**Illustrated with Crisis Bargaining Theory**
#1: Elites are Less Prone to Loss Aversion	✔	✔
#2: Elites are More Cooperative	✔	
#3: Elites Select Better Heuristics	✔	✔
#4: Elites Update their Heuristics more Effectively	✔	✔
#5: Elites may be more aware of their strategic situation		✔

Although it has yet to be fully incorporated, the current body of evidence about human behavior and real-world decision-making by elites has significant implications for core theories in political science—including international relations and comparative politics. To illustrate what might be at stake we examine two clusters of theories – "veto players" and "crisis bargaining" – that have been particularly influential and are amenable to this kind of illustration. We chose these two clusters of theories because a) they have been used across the boundaries of important fields within political science, b) they are explicitly about elite behavior and thus particularly dependent on assumptions about elites, and c) they offer crisp and testable hypotheses provide a useful starting point for exploring how changes in our understanding of

[97] [add cite here to Herb Simon's piece about 1995 in APSR—on the dialogue between psychology and political science]

elites could lead to practical changes in theories that matter to political scientists. These are hardly the only political science theories that might be affected by new understandings of how individuals behave—and how elites, in particular, might display distinct behaviors—but they are a good place to start.

Our review has identified a wide array of insights into individual behavior and elite-mass differences. Here we focus on five areas where the existing research from cognitive science is particularly well grounded in studies generally of individuals and specifically on elites. Those five are: a) the tendency, rooted in prospect theory, for individuals to perceive risks asymmetrically and to avoid losses while elites, because of their experience, are less averse; b) the tendency for elites to be more cooperative than non-elites; c) the particularly strong and growing evidence that elites select and refine their heuristics more efficiently than non-experts; d) research on k-levels, which suggests that people vary in their strategic skills, although elite k-levels have not been measured systematically, and e) the possibility that experts, although skilled, are more likely to over-estimate their skills.

//H2// Illustration: Veto Players

A veto player is "an individual or collective actor whose agreement is required for a change in policy."[98] The original roots of the veto player concept lie in studies of public policies that require long chains of decisions—such as from the adoption of legislation to the final implementation of an urban renewal program on the street—with the prospect of decision failure at any link in the chain.[99] The veto players concept is an important illustration of questions that political scientists address, for it has a central role for elite decision makers (ie, politicians and

[98] Tsebelis 1995
[99] Pressman and Wildavsky 1984

bureaucrats who can veto policies) as well as institutions that determine which individuals matter as well as the costs and benefits that accompany veto decisions. In the field of comparative politics the veto players concept has emerged as an alternative categorization to democracy/autocracy paradigm, for systems can be categorized by the number of veto points that must be cleared to pass policy.[100] The more veto points, the more stable and predictable the system of governance, while instability rises along with the potential for single actors or institutions to assume control in systems with fewer the veto points. For international relations the veto players paradigm is one of a host of "two level" theories that help explain the interaction between national policy making and international since crucial international policy choices—such as waging war or adopting trade legislation—is amenable to analysis within the veto players framework.[101]

All veto models share at least two core assumptions and one core prediction. The first core assumption is that policy outcomes depend on decisions at veto points. Usually those decision points are occupied by a single individual, or by small number of individuals. Thus many of the modifications to our understanding of individual decision making that we have reviewed in this essay apply to decisions of this type.

The second core assumption is the defining characteristic of veto bargaining. In all its forms, veto bargaining is the take-it or leave-it offer where a "not-take" by any party to the process ends the game.[102] One decision maker offers a policy; another accepts or rejects the

[100] See, for example Tsebelis 1999; Tsebelis 2000

[101] From a Review by Fearon 1998: noteworthy examples are Bueno de Mesquita & Lalman 1992 on interstate war; Huth 1996 on territorial disputes; Peterson 1996 on crisis bargaining; Milner 1997, O'Halloran 1994, and Verdier 1994 on trade policy; Downs & Rocke 1995 on compliance and international cooperation; Evans et al 1993 on "two-level games"; Russett 1993 on democracy and war; Snyder 1991 on great power expansionism; Stamm 1996 on war outcomes; Kier 1997 and Legro 1995 on military doctrine; and the contributors to Rosecrance & Stein 1993 on grand strategy. See also Farnham 2004; Goldsmith, Chalup and Quinlan 2008.

[102] The progenitor of the veto bargaining paradigm is Romer and Rosenthal's 1978 take-it or leave-it bargaining model.

proposal. The current position of policy is denoted as the status quo (SQ) and policy movements are described relative to the SQ. A particular policy movement could, for example, be more or less hawkish; the outcome "veto by one player." When there are no vetoes, the policy passes and the SQ changes to reflect the new policy position.[103] In more complex constructions, proposals may be repeated several times, passed through domestic or international structures as in "two-level" models, but the core "propose then Veto/No-Veto" dynamic is unchanged. Nearly all veto models involve chains of decisions in which choices at one veto point interact with others—such as long chains of decisions, each of which is needed to change a policy from SQ.

The earliest, formally structured veto player models were developed in the late 1970s by Romer and Rosenthal.[104] Since then there have been a series of refinements and the addition of many new complexities, such as formal models of sequential veto bargaining under full information, analysis of the behavior of decision makers who make take-it or leave-it offers and those who respond to such offers, and now a suite of models with incomplete information.[105] Models with incomplete information are of special interest because the individuals who make take-it or leave-it offers do not know which offers will be accepted or vetoed and thus many of the attributes that cognitive psychologists have studied—such as the propensity to trust and cooperate and asymmetrical decisions about risk—come into play.[106] Moreover, these new models offer a potential role for learning and adjustment of heuristics through experience. By combining sequential bargaining games and incomplete information decision makers can make

[103] In the core model, an individual, P, proposes a bill, b, to change the reversion point, or status quo, q. The receiver of the proposal, R, accepts the proposal if it is not welfare damaging, and just vetoes the bill if it is welfare damaging.
[104] Romer and Rosenthal 1978. For a very good review, see Cameron 2004
[105] Cameron 2000; Primo 2002 demonstrates that the behavior of proposers and receives is identical in both finite and infinitely repeated games. Most recent work on veto bargaining has focused on incomplete information, such as reviewed in Cameron 2004.
[106] Matthews 1989, McCarty 1997

several offers, learn about the preferences of other decision makers who decide whether to accept the offers, and then adjust.

The standard projections from veto player models depend on many factors, notably information. Essentially all formal veto player models show that when all participants have full information that vetoes don't happen because advocates for particular policies find ways to avoid veto decisions in advance. When vetoes are observed the standard explanation is rooted in some form of misperception. Decision-makers are unaware of the structure of the game, for example, or they suffer some other lack of information. We don't deny that incomplete information plays a large role in these models, but the insights from cognitive psychology can help predict which types of misperceptions are most likely and which game structures may be particularly prone to veto behavior.

//H3// Variations in Key Assumptions: Inexperience Decision-makers are More Prone to Loss Aversion

Now we explore how the baseline predictions from veto player theories might change in light of what cognitive psychology has learned about individual decision-making—especially decision-making by elites. We look at three that are particularly well matched to the kinds of decisions that elites make in veto games—prospect theory, cooperativeness, and the use of heuristics.

The central implication of prospect theory for veto player models is that calculations about policy changes to propose, accept or reject are likely to be affected by how the proposer or receiver views the consequences of changes relative to the status quo. If a move from the status quo is viewed in the domain of gains, the individual considering it should be relatively risk

averse: experimental subjects prefer sure gains to risky gains. In contrast, if a move from the status quo is seen as a loss, the individual considering it should be relatively risk acceptant: subjects prefer larger risky losses to smaller certain losses. If decision-makers are amateurs then this asymmetry in how losses and gains are viewed relative to the status quo could be quite large. If they are experts working in their domain then the asymmetries may not be so large. And if decision makers are a mélange that spans varied degrees of experience and familiarity with the domain then each veto interaction could be affected by high variations in how losses and gains relative to the status quo are viewed.

Two sets of stylized facts help illustrate how a new perspective on the symmetry of gains and losses might lead to outcomes that are different from standard full information, symmetrical veto bargaining situations. First, consider the recent debate over the U.S. debt ceiling. New House "Tea Party" Republicans viewed the SQ (relatively liberal fiscal policy, Democratic President, Democratic Senate) as being squarely in the domain of losses. They were therefore risk acceptant and used a potentially very costly (politically and/or economically) veto gambit to force a move from the SQ. Because no single coalition—traditional Democrats, traditional Republicans, and new Tea Party Republicans—had a working majority on its own the faction that was most likely to view a shift from SQ as a loss had the strongest incentive to veto. The other, traditional political factions all viewed the SQ in the domain of gains and were much more risk averse.

Second, consider negotiations over the future of Gaza, which cease whenever one of the negotiating parties leave the table—a form of mutual veto authority. Palestinian negotiators, especially from Hamas, view shifts from the SQ in the domain of losses, which may explain why

they are more willing to take riskier moves—such as rocket attacks—that are more likely to result in veto behavior.

One of the insights from elite studies is that experience reduces the tendency for decision-makers to view gains and losses differently. At the extreme—where decision makers are highly experienced elites who may have little asymmetry—the standard predictions from veto player theories (which do not include any asymmetry) apply. This may help explain some of the important features in both these stylized examples where levels of experience vary. While traditional Democrats and Republicans may see gains and losses somewhat symmetrically, relative novices in the Tea Party are more likely to behave according to prospect theory and thus be especially prone to risky veto behavior in the domain of losses. Hamas, which is politically relatively new, demonstrates similar behavior in the face of more experienced decision makers both in the Palestinian Authority and the Israeli government.

//H3// Variations in Key Assumptions: Elites are More Cooperative

Experimental research suggests a second way that veto models might work differently from standard predictions when they involve elites. That research suggests that elites are more cooperative, although the causal mechanisms for cooperation are still hard to pin down. One line of thinking sees experience as reducing the tendency to view risks asymmetrically—a pattern of behavior that scholars have suggested will often lead to more cooperation in games where outcomes are uncertain.[107] Other studies suggest that trusting and trustworthy behavior are

[107] List 2003

higher among elites due to shorter social distances.[108] Elites are more prone to gamble on trust and to hope for trusting behavior in return.[109]

If these patterns of play were to also exist in the real-world – elites demonstrating more cooperative behavior, and elites demonstrating more cooperative behavior to other elites – it would significantly change the predictions of outcomes in veto players models in two ways. First, in iterated games, this modification predicts that more experienced participants should propose more modifications to the SQ than less experienced participants. Because they are less risk averse, in essence experienced proposers enter the policy change market more frequently. Equivalently, the decreased loss aversion mechanism also predicts that decision makers should be more willing to veto unattractive proposals accepters in hopes of gaining a better deal in future rounds. Second, when decision makers in a veto game contemplate interactions with decision makers that are less experienced they will be less certain of the novice's behavior and will make decisions with greater trepidation.[110]

The tendency to cooperation among elites may help explain why advanced countries generally have highly cooperative bureaucracies and are generally able to craft and implement policy despite large numbers of veto points in modern bureaucratic institutions. By contrast, across a gamut of policy issues, emerging countries may have key veto players who are less experienced than parallel veto players in developed countries. This lack of experience could be a function of having a young state with bureaucratic roles that have high turnover as regimes shift. Indeed, these effects can be observed in states that make an abrupt transition from a stable

[108] La Porta et al., 1997; Fershtman and Gneezy, 2001; Ruffle and Sosis, 2006; Hoff and Pandey, 2006; Bernhard et al., 2006; Goette et al., 2006
[109] Hedinger and Götte 2006
[110] For simplicity, we do not look at strategic skills in this discussion, but the logic plays out in a similar fashion. As social distance increases the ability to predict the behavior of other actors decreases (La Porta 1997 and Bernhard et al 2006). In other words, as social distances rise level-k probably declines—a proposition that would lead to similar outcomes in veto player models although one that nobody has yet examined experimentally.

bureaucracy to a setting where the identities of key decision makers is harder to determine and where social distances are much larger due to the entry of many new political parties. New, inexperienced veto players should be more risk-averse, and less cooperative than more experienced veto players. For example, consider some stylized facts related to the recent case of the Egyptian transition following the mass uprising in spring 2011. The military leadership who assumed stewardship of the nascent democracy were certainly among the most elite members of Egyptian society; many were western trained, and all were highly experienced in the administration of a long-standing army. However, it quickly became clear that these individuals were inexperienced in maintaining a functioning state; they were highly risk averse, and in veto-prone settings such as the negotiation over a new constitution this risk aversion leads to gridlock.[111]

//H3// Variations in Key Assumptions: Elites Select and Update Heuristics Differently

In the real world, policy vetoes can involve a complex set of decisions and high levels of uncertainty. When policy makers rely on a staff to help them make decisions then information processing and management raise the level of complexity even further. It is exactly those settings where individual decision-makers are most likely to use heuristics. The experimental research suggests that elites are more likely to use the "right" heuristics and while they may update them more slowly their updating is likely to be more accurate.

Consider, for example, the stylized facts about international bargaining over allocation of allowable global warming pollution. Elite decision makers—such as top negotiators from countries as well as the heads of various public agencies that might be expected to implement international decisions—must process huge amounts of information. They decisions depend on

[111] We need to cite something here probably. *Newspaper Article, NPR? What is the standard for IO?*

what they think other countries will promise and honor, and they also depend on highly complex models that allow them to predict (with huge bands of uncertainty) future levels of emissions and the economic consequences of regulating those emissions.[112] Many studies have pointed out that a full blown analysis of how pollution quotas are set could lead to large benefits for developing countries, such as through increased sales of competitive new energy technologies and the earning of credits for absorbing extra pollution in large forests.[113] Yet as these countries have entered global warming talks the space for negotiation has diminished and gridlock has increased. While national interests surely have a dominant role in this, heuristic decision-making under uncertainty may also be at work.

As many new developing countries have entered those negotiations each has revealed particularly risk averse behavior—unwilling to accept a quota that might constrain its economic growth yet uncertain about the exact level of growth and emissions that will unfold in the future. Those uncertainties along with lower levels of familiarity and shared mission among negotiators from these new countries help explain why those talks have ended in gridlock. Because developing countries are growing much more rapidly and unpredictably their uncertainties are greater. Their negotiators are most likely to adopt the heuristic rule that all commitments are to be avoided. And when they update their heuristics they do so in areas where tangible information about the benefits to their countries is greatest—such as in the markets for earning "offsets" by adopting discrete policies that lower emissions. A large portion of the diplomatic effort by these countries has focused on the offsets rules, which can be viewed as a way to narrow the areas where the economic harm from global warming policy and to focus investment

[112] For example, for just one survey of the number of models and their factor of 100 variation in predicted levels of future emissions see [IPCC 2007 working group 3 report]. And for a recent study that looks just at one of the many options for controlling emissions—renewable energy sources—which also shows that the future could vary from barely any renewable sources of energy to more than 80% by 2050 see [IPCC 2011 special report on Renewables]
[113] Goulder and Stavins 2011

activity on those projects.[114] While the broader negotiations are too complex to allow for predictions of national interest, experienced elite decision makers develop successful means to deal with this information environment and map it onto their preferences. They look for settings, such as the existing and well-ordered offsets market, where they can use low-cost processing mechanisms and devote more of their limited time on evaluating particular, discrete policy choices. And since most of international bargaining has a veto form—it requires unanimous consent—policy is stuck in gridlock at the broad, abstract and highly uncertain levels even as the offsets markets have grown rapidly. Experienced and elite veto players should be better able to make decisions that are in line with their preferences, and should take action adverse to their interest less frequently.

//H2// Crisis Bargaining: Signaling and Commitment

Now we turn to a second illustration that is particularly familiar in international relations studies scholarship on national security. Often called "crisis bargaining," these models are structured to approximate the strategic interactions that arise when decisions occur quickly (and thus concentrate on a few individuals) and concern matters of central interest to national security or economic prosperity. Actors bargain over how to allocate an asset and where failure leads to costly outcomes. Usually the negotiation is zero sum—a gain for one is necessarily a loss for the other.[115]

Bargaining in these settings depends on two closely related attributes: uncertainty and communication. First, these models usually make the assumption that uncertainty is high. Preferences are usually uncertain, and since neither party reliably knows the preferences of the

[114] Victor 2011
[115] Jervis 1979; Rubenstein 1982; Williamson 1983; Morrow 1989; Fearon 1994; North 1994; Fearon 1995; Powell 1996; Powell 1999; Gintis 2001; Slantchev 2003; Tomz 2007

other communication is essential—a topic to which we turn next. Often in such models the final outcomes are also uncertain—if the parties fail to agree on an outcome then the exact consequences are drawn from a lottery that is populated mainly with costly outcomes. Many national security crises have this kind of structure—one party challenges the status quo by invading another's turf, a crisis emerges as both contemplate whether to back down.

Second, because preferences are uncertain the outcome of these models usually hinges on the credibility of communications between the players. Both sides listen and watch the other, trying to discern true preferences from bluffing. Usually these models focus on the cost of signaling and other forms of communication. The standard conclusion is that communication won't carry credible messages unless it is costly. If costless communication—"cheap talk"—could affect the actions of the other, each would misrepresent his position and signal he was stronger than in actuality to elicit concession from the other. Because cheap talk is assumed to be ineffective, in these models communication is often tacit and is based on costly actions that reveal more reliably what a decision maker is willing to pay and endure to achieve a particular outcome. Just what the level of cost that unambiguously sends this signal, however, is not known to either party before beginning the bargaining process.

Now we look at how crisis bargaining models might behave if we modified core assumptions about decision-making in light of what cognitive psychology has learned about individuals generally and elites in particular. These crisis bargaining models are particularly amenable to analysis of elites because in crises, especially, decisions are concentrated in the hands of a few elites—heads of state, key bureaucratic officials such as directors of war and intelligence, and perhaps a handful of legislators. We first examine how sophistication affects equilibrium predictions, and find that there is a strong incentive for actors to represent

themselves as being low-sophistication actors. We then examine how complex information might affect the decision/strategic environment if decision makers cannot fully examine every piece of information.

//H3// Variations in Key Assumptions: Strategic Skills and "K-level" reasoning

In crisis bargaining situations, the actor needs to send credible signals. When signaling, how the sender behaves is only part of the story. How the viewer responds also matters—indeed, the assumption that costliness is important is based on the insight that viewers will discern the right message from sent signals only when those signals carry costs such as fiscal expense, reputation or some kind of domestic audience cost. When each player makes decisions based on sent and observed signals, those decisions depend on the attributes of the elite. They include loss aversion (which we address in the next section), possible overconfidence, and the battery of other ways that people (and elites in particular) reason. Here we focus on one aspect: the interaction between decision-makers. Each player's decision depends on the level of rationality that it assumes for the other. That is a matter that the level-k literature has addressed squarely.

Determining the level of signal to send is one of several interactions that is amenable to level-k analysis. If the others in the game interpret the credibility of signals at random (L_0), the sender can just send a signal at the mean of this distribution of credibility. His signal will be credible as frequently as it is not, and the outcome of the crisis bargaining situation will depend heavily on the lottery of outcomes since the communication signals, themselves, don't carry much meaning. However, if the others are L_1 actors (believe that our participant is a random chooser at L_0) then they will view as credible only a signal whose cost is greater than the mean of the distribution. Knowing this, a L_2 actor (who formulates a best response strategy to a L_1)

will just send a signal that is slightly greater than the mean. Still higher k-level players will look for even costlier signals. In a crisis bargaining situation if all the players have high k-levels then signals must be costly. If not then finding costly ways to send a signal is a waste of resources. (Put differently, high k-levels and extensive information—the attributes often called "common knowledge rationality"—leads to the equilibrium outcome of costly signaling.)

K-level reasoning suggests an extension of crisis bargaining models that might explicitly link observed k-levels to model outcomes. Imagine an example with two commanders engaged in crisis bargaining. Each wants to intimidate the other to gain a concession in the bargaining. To do so, he and she must demonstrate just how serious each is about going to war. Actually going to war is an outcome that both want to avoid, for it is probably costly. To signal his preferences he must move troops to the border of the territory in question, but how many should he send? The equilibrium answer, which depends on common knowledge rationality, makes huge demands on the skills of the bargainers. Moreover, there exists a signaling game around level-k itself. In an attempt to elicit rents—such as excessively costly signals by the other and the need to pay lower cost for useful signals by the original signaler himself—each actor has an incentive to signal a lower level-k than in actuality. Whereas political scientists have focused on the "tying of hands" as a mechanism for limiting the cost of signals that must be sent, feigning stupidity may be important as well. If other players in a crisis game hold beliefs that you are unsophisticated then the signal you must send to create a credible risk of high cost outcomes is much lower. This outcome mirrors the "madman" theories of international relations—where madmen are better able to get their way because their behavior is unpredictable—but roots it in the psychology of strategic interaction.

As an example, consider the popular uprising and insurgency in Libya in 2011. In the wake of other "Arab Spring" uprisings, many in the international community sought a cessation of hostilities directed against the Libyan peoples along with a transition of power away from Gaddafi. Mindful of the political damage created when the U.S. unilaterally intervened in Iraq starting in 2001, the Obama administration was reluctant to pursue political goals unilaterally. The Administration was faced with a two-tiered signaling challenge: How could it signal to Gaddafi and his military leadership that the US was willing to use force adequate to achieve its goals in Libya while also signaling (at home and to potential allies) that it would not act without support of the international community? As often observed in real crisis bargaining, the Administration began with low cost "cheap talk" signals—such as travel prohibitions and freezing of assets—but these signals had little effect on Gaddafi's behavior. Signaling costs rose with air strikes and direct assistance to the Libyan rebels. But Gaddafi did not alter his behavior even as the U.S. and other members of the international community signaled more credibly their preferences.[116]

Put differently, the Libyan regime was operating at a level of strategic sophistication that was lower (lesser k-value) than the senders of the signals. Thus signaling was less effective and the strategic interaction costlier for both sides—although the sender's costs were incurred in the signaling itself (more airplanes and interventions were needed for longer) while the Gaddafi's regime paid its cost through the endgame of the crisis that extinguished them from power. Interestingly, at the outset of the crisis the U.S. indicated that it believed Gaddafi to be a highly skilled leader—adroit not only at manipulating the power forces around him but also sending and

[116] Seeking to heighten the signal level, the United Nations passes UN Security Council Resolution 1973 (UNSC 1973) to establish the legal basis for military intervention. This action clearly increased the signal strength, a move signal Western states took clear note of, but failed to deter the actions of the Gaddafi regime.

receiving signals.[117] The U.S. (and likely other countries that comprised the "international community") thought it was interacting with a high k-level player while Gaddafi, himself, may have been operating at a much lower level.[118]

//H3// Variations in Key Assumptions: the Choice and Use of Heuristics

In empirical crisis barging situations, the information environment is fantastically rich. Strategic placements of troops, information generated by intelligence, considerations about valuation of the object being bargained over all weigh into calculations about likelihood of victory in a possible conflict situation. Such considerations are surely complex enough to generate heuristic processing. Added to that, many of key decisions are implemented through bureaucracies—such as military structures—that are designed to manage tasks in systematic, rule-based fashion. Those rules are learned and taught through professional academies and rotations throughout the bureaucracy that create on the job experience. During a crisis these factors—large amounts of complex information and management of key decisions through bureaucratic rules—point to a large role for heuristics. If the heuristic applied is inappropriate, they will generate inaccurate beliefs that they will carry into the signaling process. If experience leads to the better selection and use of heuristics, the construction of the information environment that surrounds the crisis bargainer might be expected to change. Inexperienced bargainers might be slow to make decisions, leading to greater uncertinaty about the true signals being sent. By contrast, a relatively experienced bargainer is predicted to focus much less on the

[117] The US held beliefs at the outset of the conflict that Gaddafi was a highly skilled leader, adroit at manipulating the circumstances surrounding his loyalists to ensure that no one individual had the ability to usurp his power. http://www.washingtonpost.com/wp-dyn/content/article/2011/02/22/AR2011022207298.html

[118] See for example stories profiling the leader: http://www.nytimes.com/2009/09/24/world/24nations.html

details and focus, instead, on the structure of the bargaining. The novice, unable to focus on which facts are most important, will concentrate on the trees but the master on the forest.

Consider the bargaining problem that a firm faces when it considers whether to invest fixed capital in a country where the presence of the firm may have a large impact on local welfare (positive or negative). Once the capital is deployed it is extremely costly to exit.[119] International Oil Companies (IOC) are frequently presented just this scenario. IOCs must make large capital investments in oil fields located in countries that have few local institutions; thus they face acute concerns about the impact of the investment on human rights and the environment. In countries with well-functioning institutions they can defer to the state and other established bodies to manage broad public concerns. But where those institutions are immature the IOC, itself, is often the most visible organization and expected to provide a wide range of public goods. An IOC is highly experienced with this calculus for it makes similar investments across a portfolio of countries where the local details vary but the general challenges are common. In bargaining about the investment the IOC engages with the host government as well as a variety of other stakeholders, and the terms of the bargaining concern factors such as rights, wages and protections all parties to the negotiation find satisfactory. Failing to reach an agreement causes a variety of uncertain outcomes that are, to different degrees, catastrophic for each party – rights violations, work stoppages, environmental damages, or failed investments.

The complexity of the bargaining task makes heuristic information processing likely to play an influential role in the shaping the outcome of the process. The IOC – experienced in the negotiation process in a variety of similar settings, is perhaps the most symmetrical in how it

[119] [cite to Vernon's obsolescing bargain][cite to Woodhouse piece in NY J INt'l Law & Pol on power sector investments]

analyzes risk – will use learned heuristics from other settings to guide its processing.[120] For example, having faced similar challenges previously, the IOC can readily implement a "corporate social responsibility" package of measures – the creation of local human rights councils, review boards, and other development projects. In contrast, the other stakeholders local organizations with relatively limited experience in the negotiation process, are perhaps more *prospect* in how they analyze risk: they are more likely to focus on narrow violations concerns and mechanisms and methods of redress.

In this example, heuristic reasoning processing not only frames this form of negotiation, it may also explain the gridlock that frequently obtains. The mismatch of issue and solution considerations on the parts of local stakeholders and IOC may not allow for bargaining to reach common ground. The local stakeholder concerned about a specific, salient concern may be unswayed by a large readily implemented portfolio of institutions if that portfolio fails to address the salient concern.[121] This may help explain why some of the world's richest oil and gas resources are, in effect, unavailable for IOCs to tap and why oil prices are a lot higher than would be expected if this commodity exhibited normal dynamics in supply and pricing.[122]

//H3// Variation in Key Assumptions: Experience and Loss Aversion

[120] Indeed, the symmetry in risk management is why IOCs invest in a large portfolio of similarly structured projects around the world. [cite to Nolan and Thurber, in press, study on IOC risk portfolio]

[121] The differences in heuristics used lends to a further implication, a result of k-level reasoning. The sage bargainer is aware of her own cognitive processes, as well as the cognitive processes of the bargaining partner (metacognition). We earlier argued this ability is more readily available in experienced individuals, because automatic processing of details allows for freed cognitive resources to be expended on performance evaluation. Then, as the level-k logic suggests, the optimal strategy is one informed by beliefs about the processing of the bargaining partner; beliefs about the heuristic/systematic reasoning capability certainly are in this domain. Because the more experienced the individual at the bargaining table, the more capable she is to undertake sophisticated metacognition tasks, we should expect the more experienced negotiators to be successful relatively more frequently than less experienced negotiators.

[122] For more, including on the interaction between IOCs and national oil companies (NOCs) see [Victor, Thurber and Hults, eds., in press]

Finally, crisis bargaining models are well suited for exploring the effects of prospect theory—that is, the human aversion to losses. The application of prospect theory to crisis bargaining models focuses on the lottery that determines the final outcomes. In cases where loss aversion is high – as when decision-makers are inexperienced – players may incur costly signals to halt the crisis and avoid the final lottery. They may also choose signals whose own costs and outcomes are geared to avoid perceived losses. By contrast, when players have lower loss aversion—such as when they are experienced in the domain—they are more likely to evaluate losses and gains symmetrically and make decisions that better reflect the actuarial assessment of benefits and costs. Depending on the costs of signaling and the potential for extreme negative outcomes from the final lottery, crisis bargaining games played with parties of highly unequal levels of risk aversion could generate potentially huge differences in strategy. Inexperienced, loss-averse players focus on sending and receiving clear signals to ensure they do not engage in the risky-lottery that would result from a bargaining failure; by contrast, experienced, risk-acceptant players may instead focus resources on shaping the odds to their benefit in the final lottery.

For example, consider the difficulties in reaching agreement on post-conflict order in Afghanistan. Since 2010 the United States has held negotiations with Afghani leadership as well as periodical clandestine talks with Taliban leaders. Additionally, the U.S. has undertaken a "hearts and minds" campaign with the goal of producing a stable power-sharing arrangement as U.S. forces prepared to leave. These efforts have lead to only measured success because best practices for successful "hearts and minds" campaigns that U.S. policy makers had learned on other battlefields were largely perceived of as foreign and unattractive to their Afghani

counterparts, especially the Taliban.[123] Put differently, the "hearts and minds" campaign is an effort to shift the odds in the final lottery and make even the failure of crisis bargaining more acceptable to the US.

The standard view is that Taliban ideological conviction and an inability to effectively communicate its goals explains why negotiations have stagnated and why the Taliban is frustrating the U.S. "hearts and minds" campaign.[124] Taliban negotiators took a hard line position—refusing negotiations until all foreign troops had left Afghani soil—that is often justified in brinksmanship negotiations where one side aims to extract concessions from the other. However, we suggest an alternative explanation is rooted in the psychology of decision-making, not in the simple structure of the negotiating game. While the Taliban had extensive battlefield experience, the tactics and processes of negotiation were entirely unfamiliar. Battlefield risks had a range of familiar uncertainties. Bargaining, too, had uncertainty but of an unfamiliar type. This experience gradient led Taliban officials to be much less risk-averse in the realm of uncertainties they knew how to manage but led them to loathe risks at the negotiating table that would yield deviations from their existing endowments.[125]

//H1// Conclusions

[123] Tistall 2010

[124] http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA523203&Location=U2&doc=GetTRDoc.pdf

[125] In a single collection of actors—the Taliban—we see how familiarity and experience leads to differential management of risks. Individually, each member of Taliban negotiation envoys was inexperienced at the negotiation table; collectively this inexperience was uniform across all members of the Taliban resistance. We believe this uniformity of condition, the inexperience and loss aversion generated by the unknown, is a more plausible explanation of Taliban strategies. Uniform coordination would be extremely difficult in a distributed network like the Taliban, however the psychological story does not require coordination to play a uniform strategy. Instead, all members just manifest the same loss-aversions to the negotiation process and committed to continued conflict. Similar issues arise with "madman" negotiation strategies, which require coordination and strong commitment to the strategy, even in the face of incentive structures that are heavily damaging. Maintaining this sort of devotion to a madman gambit requires an organizational discipline that plainly was not built into the Taliban architecture. See, e.g. Halderman 1978

[to be written]

References

Alevy, Jonathan E., Michael S. Haigh and John A. List. 2007. "Information Cascades: Evidence from a Field Experiment with Financial Market Professionals." The Journal of Finance 62(1):151–180.

Alvarez, R.M. and J. Brehm. 2002. Hard choices, easy answers: Values, information, and American public opinion. Princeton University Press.

Andreoni, J. and C. Sprenger. 2010. "Certain and Uncertain Utility: The Allais Paradox and Five Decision Theory Phenomena." Levine's Working Paper Archive .

Arrow, K.J. 1963. Social choice and individual values. Yale University Press.

Axelrod, R. and W.D. Hamilton. 1981. "The evolution of cooperation." Science 211(4489):1390.

Bargh, J.A. 1984. "Automatic and conscious processing of social information." Handbook of social cognition 3:1–43.

Barros, G. 2010. "Herbert A. Simon and the concept of rationality: boundaries and procedures." Revista de Economia Política 30(3):455–472.

Beer, F.A., A.F. Healy, G.P. Sinclair and L.E. Bourne. 1987. "War cues and foreign policy acts." The American Political Science Review 81(3):701–715.

Beer, F.A., G.P. Sinclair, A.F. Healy and L.E. Bourne. 1995. "Peace agreement, intractable conflict, escalation trajectory: A psychological laboratory experiment." International Studies Quarterly 39(3):297–312.

Bonham, G.M. 1971. "Simulating international disarmament negotiations." The Journal of Conflict Resolution 15(3):299–315.

Camerer, C., E. Johnson, T. Rymon and S. Sen. 1993. "Cognition and framing in sequential bargaining for gains and losses." Frontiers of game theory pp. 27–48.

Camerer, Colin, Teck Ho and Kuan Chong. 2003. "Models of Thinking, Learning, and Teaching in Games." The American Economic Review 93(2):192–195. URL: http://www.jstor.org/stable/3132223

Camerer, Colin F., Teck-Hua Ho and Juin-Kuan Chong. 2004. "A Cognitive Hierarchy Model of Games*." Quarterly Journal of Economics 119(3):861–898. URL: http://www.mitpressjournals.org/doi/abs/10.1162/0033553041502225

Camerer, Colin, Teck Ho and Kuan Chong. 2003. "Models of Thinking, Learning, and Teaching in Games." The American Economic Review 93(2):192–195. URL: http://www.jstor.org/stable/3132223

Camerer, C.F. 2007. "Neuroeconomics: Using Neuroscience to Make Economic Predictions*." The Economic Journal 117(519):C26–C42.

Cameron, C. and N. McCarty. 2004. "Models of vetoes and veto bargaining." Political Science 7(1):409.

Caraco, T. 1981. "Risk-sensitivity and foraging groups." Ecology pp. 527–531.

Charness, N. 1979. “Components of skill in bridge.” Canadian Journal of Psychology/Revue canadienne de psychologie 33(1):1.

Chen, S. and S. Chaiken. 1999. The heuristic-systematic model in its broader context. In Dual Process Theories in Social-Psychology. Guilford Press pp. 73–96.

Chi, M.T.H., P.J. Feltovich and R. Glaser. 1981. “Categorization and repre- sentation of physics problems by experts and novices*.” Cognitive science 5(2):121–152.

Chiesi, H.L., G.J. Spilich and J.F. Voss. 1979. “Acquisition of domain-related information in relation to high and low domain knowledge.” Journal of verbal learning and verbal behavior 18(3):257–273.

Cooper, David J., John H. Kagel, Wei Lo and Qing Liang Gu. 1999. “Gaming against Managers in Incentive Systems: Experimental Results with Chinese Students and Chinese Managers.” The American Economic Review 89(4):781–804. URL: http://www.jstor.org/stable/117159

Costa-Gomes, M., V.P. Crawford and B. Broseta. 2001. “Cognition and Behavior in Normal-Form Games: An Experimental Study.” Econometrica 69(5):1193–1235.

Costa-Gomes, M. and K.G. Zauner. 2001. “Ultimatum Bargaining Behavior in Israel, Japan, Slovenia, and the United States: A Social Utility Analysis* 1.” Games and Economic Behavior 34(2):238–269.

Costa-Gomes, M.A. and V.P. Crawford. 2006. “Cognition and behavior in two- person guessing games: An experimental study.” The American economic review 96(5):1737–1768.

Crawford, Vince. 2008. “Modeling Behavior In Novel Strategic Situations Via Level-K Thinking.” Slides from a 2008 Berkelely Presentation.

Crawford, V.P. and N. Iriberri. 2007. “Level-k Auctions: Can a Nonequilibrium Model of Strategic Thinking Explain the Winner’s Curse and Overbidding in Private-Value Auctions?” Econometrica 75(6):1721–1770.

De Groot, A.D. 1978. Thought and choice in chess. Mouton De Gruyter.

DeNardo, James. 1995. The Amateur Strategist: Intuitive Deterrence Theories and the Politics of the Nuclear Arms Race. Cambridge University Press. Deutsch, M., Y. Epstein, D.

Deutsch, M., Y. Epstein, D. Canavan and P. Gumpert. 1967. “Strategies of inducing cooperation: An experimental study.” Journal of Conflict Resolution pp. 345–360.

Canavan and P. Gumpert. 1967. “Strategies of inducing cooperation: An experimental study.” Journal of Conflict Resolution pp. 345–360.

Egan, D.E. and B.J. Schwartz. 1979. “Chunking in recall of symbolic drawings.” Memory & Cognition 7(2):149.

Eisenstadt, M. and Y. Kareev. 1975. “Aspects of human problem solving: The use of internal representations.” Explorations in cognition pp. 308–346.

Engelmann, D. and G. Hollard. 2010. “Reconsidering the Effect of Market Experience on the “Endowment Effect”.

Ericsson, K.A. and A.C. Lehmann. 1996. “Expert and exceptional performance: Evidence of

maximal adaptation to task constraints." Annual review of psychology 47(1):273–305.

Farnham, B. 1992. "Roosevelt and the Munich crisis: Insights from prospect theory." Political Psychology pp. 205–235.

Fehr, Ernst and John A. List. 2004. "The Hidden Costs and Returns of Incentives – Trust and Trustworthiness Among CEOs." Journal of the European Economic Association 2(5):743–771.

Fowler, James H. and Darren Schreiber. 2008. "Biology, politics, and the emerging science of human nature." Science 322(5903):912.

Gartner, Scott S. 2011. "On Behalf of a Grateful Nation: Conventionalized Images of Loss and Individual Opinion Change in War1." International Studies Quarterly 55(2):545–561. URL: http://dx.doi.org/10.1111/j.1468-2478.2011.00655.x

Goemans, H. E. 2000. "Fighting for Survival: The Fate of Leaders and the Duration of War." The Journal of Conflict Resolution 44(5):555–579.

Goldgeier, J.M. and P.E. Tetlock. 2001. "Psychology and International Relations Theory." Annual Review of Political Science 4(1):67–92.

Goulder, L. and R. Stavins. Challenges from state-federal interactions in us climate change policy. American Economic Review, 101(3):253–57, 2011.

Grager, Rober F. and Lynn Vavreck. 2011. "The Political Costs of Crisis Bar- gaining: Presidential Rhetoric and the Role of the Party." American Journal of Political Science 55(3):526–545.

Guthrie, C., J.J. Rachlinski and A.J. Wistrich. 2000. "Inside the Judicial Mind." Cornell Law Review 86:777.

Harbaugh, W.T., K. Krause and L. Vesterlund. 2001. "Are adults better behaved than children? Age, experience, and the endowment effect." Economics Letters 70(2):175– 181.

Healy, A.F., J.M. Hoffman, F.A. Beer and L.E. Bourne Jr. 2002. "Terrorists and democrats: Individual reactions to international attacks." Political Psychology 23(3):439–467.

Hedinger, Beat and Lorenz Götte. 2006. "Cooperation in the Cockpit: Evidence of Reciprocity and Trust Among Swiss Air Force Pilots.".

Hobbes, Thomas. 1651. The Leviathan.

Hyde, Susan D. 2010. "The Future of Field Experiments in International Relations." The ANNALS of the American Academy of Political and Social Science 628(1):72.

Kahneman, D. and A. Tversky. 1979. "Prospect theory: An analysis of decision under risk." Econometrica: Journal of the Econometric Society pp. 263–291.

Kahneman, D., J.L. Knetsch and R.H. Thaler. 1990. "Experimental tests of the endowment effect and the Coase theorem." Journal of political Economy 98(6):1325–1348.

Kahneman, D., J.L. Knetsch and R.H. Thaler. 1991. "Anomalies: The endowment effect, loss aversion, and status quo bias." The Journal of Economic Perspectives 5(1):193–206.

Kahneman, D., P. Slovic and A. Tversky. 1982. Judgment under uncertainty: Heuristics and biases. Cambridge University Press.

Knetsch, J.L. 1989. “The endowment effect and evidence of nonreversible indifference curves.” The American Economic Review 79(5):1277–1284.

Knutson, Brian, G. Elliott Wimmer, Scott Rick, Nick G. Hollon, Drazen Prelec and George Loewenstein. 2008. “Neural antecedents of the endowment effect.” Neuron 58(5):814–822.

Kraus, S. and J. Wilkenfeld. 1993. “A strategic negotiations model with applications to an international crisis.” Systems, Man and Cybernetics, IEEE Transactions on 23(1):313–323.

Kraus, S., J. Wilkenfeld, M.A. Harris and E. Blake. 1992. “The hostage crisis simulation.” Simulation & Gaming 23(4):398.

Kydland, F.E. and E.C. Prescott. 1977. “Rules rather than discretion: the inconsistency of optimal plans.” The Journal of Political Economy 85(3):473–491.

Laibson, D. 1997. “Golden Eggs and Hyperbolic Discounting*.” Quarterly Journal of Economics 112(2):443–477.

Larkin, Jill, John McDermott and Dorothea P. Simonand Herbert A. Simon. 1980. “Expert and novice performance in solving physics problems.” Science 208(4450):1335.

Levy, J.S. 1997. “Prospect theory, rational choice, and international relations.” International Studies Quarterly 41(1):87–112.

List, J.A. 2003. “Does Market Experience Eliminate Market Anomalies?*.” Quarterly Journal of Economics 118(1):41–71.

List, John A. and Charles F. Mason. 2009. “Are CEOs expected utility maximizers?” 15453, Accepted for Journal of Econometrics.

Majeski, S.J. and S. Fricks. 1995. “Conflict and cooperation in international relations.” Journal of Conflict Resolution 39(4):622.

March, J.G. 1978. “Bounded rationality, ambiguity, and the engineering of choice.” The Bell Journal of Economics 9(2):587–608.

McDermott, R. 1992. “Prospect theory in international relations: The Iranian hostage rescue mission.” Political Psychology 13(2):237–263.

McDermott, R. 2004. “Prospect theory in political science: Gains and losses from the first decade.” Political Psychology 25(2):289–312.

McDermott, Rose. 2011. “New Directions for Experimental Work in International Relations.” International Studies Quarterly 55(2):503–520. URL: http://dx.doi.org/10.1111/j.1468-2478.2011.00656.x

McKelvey, R.D. 2007. “Intransitivities in multidimensional voting models and some implications for agenda control.” Positive changes in political science: the legacy of Richard D. McKelvey’s most influential writings p. 41.

Mercer, J. 2005. “Rationality and psychology in international politics.” Inter- national Organization 59(01):77–106.

Morrow, J.D. 1989. “Capabilities, uncertainty, and resolve: A limited information model of crisis

bargaining." American Journal of Political Science 33(4):941–972.

Nagel, Rosemarie. 1993. Experimental Results on Interactive Competitive Guessing. Discussion paper serie b University of Bonn, Germany. URL: http://econpapers.repec.org/RePEc:bon:bonsfb:236

Nagel, R. 1995. "Unraveling in guessing games: An experimental study." The American Economic Review 85(5):1313–1326.

Neale, M.A. and M.H. Bazerman. 1983. "The role of perspective-taking ability in negotiating under different forms of arbitration." Industrial and Labor Relations Review 36(3):378–388.

Neale, M.A. and M.H. Bazerman. 1985. "The effects of framing and negotiator overconfidence on bargaining behaviors and outcomes." Academy of Management Journal 28(1):34–49.

Nelson, Thomas E., Elaine Willey and Zoe M. Oxley. 1998. Belief content, importance and accessibility in issue opinion. Annual Meeting of the American Political Science Association American Political Science Association.

R. Neustadt and E. May. Thinking in time: The uses of history for decision-makers. Free Press, 1988.

Ostrom, E. 2005. Understanding institutional diversity. Princeton University Press.

Pavlov, Ivan. 2003. Conditioned reflexes. Dover Publications.

Payne, J.W., J.R. Bettman and E.J. Johnson. 1993. The adaptive decision maker. Cambridge University Press.

Phelps, E.S. and R.A. Pollak. 1968. "On second-best national saving and game- equilibrium growth." The Review of Economic Studies pp. 185–199.

Pilisuk, M. 1984. "Experimenting with the arms race." Journal of Conflict Resolution 28(2):296.

Plott, C.R. and K. Zeiler. 2005. "The willingness to pay-willingness to accept gap, the" endowment effect," subject misconceptions, and experimental procedures for eliciting valuations." The American Economic Review 95(3):530– 545.

Popkin, S.L. and M.A. Dimock. 2000. "Knowledge, trust, and international reasoning." Elements of reason: Cognition, choice, and the bounds of rationality pp. 214–38.

Pressman, J. and A. Wildavsky. Implementation: how great expectations in Washington are dashed in Oakland: or, why it's amazing that federal programs work at all, this being a saga of the Economic Development Administration as told by two sympathetic observers who seek to build morals on a foundation of ruined hopes. Univ of California Press, 1984.

Quattrone, G.A. and A. Tversky. 1988. "Contrasting rational and psychological analyses of political choice." The American political science review 82(3):719– 736.

Reitman, J.S. 1976. "Skilled perception in Go: Deducing memory structures from inter-response times* 1." Cognitive Psychology 8(3):336–356.

Richardson, Louis. 1991. "Avoiding and incurring losses: Decision-making in the Suez crisis." International Journal 47:370.

Romer, T. and H. Rosenthal. 1978. “Political resource allocation, controlled agendas, and the status quo.” Public Choice 33(4):27–43.

Sargent, T.J. 1993. Bounded rationality in macroeconomics: The Arne Ryde memorial lectures. Oxford University Press, USA.

Schelling, Thomas. 1960. The Strategy of Conflict. Harvard University Press.

Schreiber, D. and M. Iacoboni. 2011. “Huxtables on the Brain: An fMRI study of Race and Norm Violation.” From Darren’s Website.

Schreiber, Darren. 2005. “Political cognition as social cognition: Are we all political sophisticates.” Unpublished manuscript .

Simon, Herbert A. 1955. “A Behavioral Model of Rational Choice.” The Quarterly Journal of Economics 69(1):99

Simon, Herbert A. 1956. “Rational choice and the structure of the environment.” Psychological review 63(2):129. Simon, Herbert A. 1955. “A Behavioral Model of Rational Choice.” The Quarterly Journal of Economics 69(1):99–118.

Skinner, Burrhus Frederic. 1953. Science and human behavior. Free Press.

Sloboda, J.A. 1976. “Visual perception of musical notation: Registering pitch symbols in memory.” The Quarterly Journal of Experimental Psychology 28(1):1–16.

Stahl, D.O. and P.W. Wilson. 1994. “Experimental evidence on players’ models of other players.” Journal of economic behavior & organization 25(3):309–327.

Stahl,D.O.andP.W.Wilson.1995.“OnPlayers’ Models of Other Players: Theory and Experimental Evidence.” Games and Economic Behavior 10(1):218–254.

Suedfeld, P., & Tetlock, P.E. (Eds.) (1991). Psychology and social policy. Washington, D.C.: Hemisphise.

Sylvan, D.A., T.M. Ostrom and K. Gannon. 1994. “Case-based, model-based, and explanation based styles of reasoning in foreign policy.” International Studies Quarterly 38(1):61–90.

Taliaferro, JW. 1994. Analogical reasoning and prospect theory: Hypotheses on framing. In annual meeting of the International Studies Association.

Tetlock, P. and J. Goldgeier. Human nature and world politics: Cognition, identity, and influence. International Journal of Psychology, 35(2):87–96, 2000.

Thompson, Leigh, Erika Peterson and Laura Kray. 1995. Social Context in Negotiation. In Negotiation as a Social Process, ed. Roderick M. Kramer and David M. Messick. Thousand Oaks, CA: Sage Publications chapter 1, pp. 5– 36.

Tingley, D.H. and B.F. Walter. 2011. “The Effect of Repeated Play on Reputation Building: An Experimental Approach.” International Organization 65(02):343–365.

Tistall, Simon. 26 July 2010. “Afghan war logs: How the US is losing the battle for hearts and minds.” London: The Guardian.

Tomz, Michael. 2007. “Domestic Audience Costs in International Relations: An Experimental Approach.” International Organization 61(4):821–840. URL: http://www.jstor.org/stable/4498169

Tsebelis, George. 1990. Nested games: Rational choice in comparative politics. University of California Press.

Tsebelis, G. 1995. “Decision making in political systems: Veto players in presidentialism, parliamentarism, multicameralism and multipartyism.” British Journal of Political Science 25(03):289–325.

Tsebelis, G. Veto players and law production in parliamentary democracies: An empirical analysis. American Political Science Review, pages 591–608, 1999.

Tsebelis, G. Veto players and institutional analysis. Governance, 13(4):441–474, 2000.

Victor, D. G. Global Warming Gridlock: Creating More Effective Strategies for Protecting the Planet. Cambridge University Press Pr, 2011.

Walt, Stephen M. 1987. The origins of alliances. Ithaca, NY: Cornell University Press.

Walt, Stephen M. 1996. Revolution and war. Cornell University Press

Weaver, R.K. and B.A. Rockman. 1993. Do institutions matter?: government capabilities in the United States and abroad. Brookings Institution Press.

Weingast, B.R. 1995. “The economic role of political institutions: market-preserving federalism and economic development.” Journal of Law, Economics, and Organization 11(1):1.

Weyland, K. 1996. “Risk taking in Latin American economic restructuring: Lessons from prospect theory.” International Studies Quarterly pp. 185–207.

Wilkenfeld, J. and J. Kaufman. 1993. “Political science: Network simulation in international politics.” Social Science Computer Review 11(4):464.

Zaller, J. and S. Feldman. 1992. “A simple theory of the survey response: Answering questions versus revealing preferences.” American Journal of Political Science 36(3):579–616.

Zimmerman, Barry and Magda Campillo. 2003. Motivating self-regulated problem solvers. In The nature of Problem Solving, ed. Janet E. Davidson and Robert J. Sternberg. Cambridge Univ Pr p. 239.