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Cognitive Heuristics and American Security Policy

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Flawed arguments often recur in debates on U.S. security policy long after their weaknesses have been exposed. In this article I argue that certain political misconceptions and fallacies resist counterargument because they are reinforced by particular reasoning shortcuts known as "cognitive heuristics." Although heuristics save time and mental work, they can lead to error because they are based on violable assumptions. I discuss seven different cognitive heuristics and the particular security fallacies they perpetuate—from the domino theory to the idea that deterrence requires force matching. Finally, the scope and limitations of such psychological explanations will be discussed.

Many of the tenets underlying American security policy are held with strong but unwarranted conviction. Further, these dubious beliefs often persist even after their flaws have been widely exposed. The problem is not simply that defense intellectuals, policy makers, and the public are simple-minded or disingenuous. Rather, I argue here that even intelligent and sincere people often reach erroneous conclusions by using any of several fallible reasoning strategies. While in general ill-conceived policies may result from a variety of causes—psychological, organizational, and economic factors are all important—the focus of this article will be on a particular set of psychological factors.

Cognitive psychologists have uncovered a number of strategies, or heuristics used in everyday reasoning (for example, see Kahneman, Slovic, and Tversky, 1982). These mental rules of thumb or shortcuts give quick and

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generally reasonable solutions to many everyday problems. However, the convenience of heuristics comes at a cost: Under many conditions they lead to biased or wrong answers. In this article I will describe seven different reasoning heuristics that may figure importantly in foreign and military policy decision making and may help explain the persistence of certain fallacies in political debate.¹ After describing each heuristic and the fallacies it leads to, I will discuss the scope and limitations of psychological accounts of the origins of flawed policy.

Two main methodological concerns must be addressed at the outset. First, how do we know which ideas or arguments count as fallacies? Although carefully controlled laboratory studies can demonstrate that people often make clear-cut errors of logic, in the real world it is rarely possible to prove definitively that a given argument is wrong. This difficulty is especially severe in security policy, where evidence is often ambiguous or even nonexistent. Consequently, in the following examples I will use a weaker and necessarily more subjective criterion: An argument or assumption will be called a "fallacy" when it is held with a conviction much stronger than warranted by the available evidence. To meet this standard, I will show that each belief is opposed by powerful counterevidence or unanswered counterarguments.

The second methodological question is whether anyone really believes the positions I deem fallacious. This challenge is not only serious because of the difficulties in disentangling declaratory policy from true policy, but because of the diversity of the population being studied—voters, members of Congress, and defense policy makers. The kind of crude missile-matching argument that is effective in congressional debates, for example, may not be taken seriously by Pentagon planners. On the other hand, arguments about filling in the gaps in the escalation ladder may be more compelling to nuclear strategists than voters. Whether a given position is really believed will thus depend on which group is being discussed.

For evidence on elite beliefs, I will rely heavily on Steven Kull's interviews with top defense policy makers (Kull, 1988). It could be argued that because many of Kull's interviewees alternated between strict military rationales and "perceptual" arguments (discussed later), their military rationales should not be taken as reflecting true beliefs. However, it seems more plausible to argue (with Kull) that the policy makers in fact hold *both* sets of beliefs or "mind-sets." If so, the tendency to flip-flop between mind-sets would be consistent with the fact that heuristic fallacies often remain com-

1. Other work suggesting that reasoning heuristics play an important role in political thinking include Quattrone and Tversky (1988), Plous (1989), and—in a rather different style—Bentham (1952).

pling even after one sees their underlying error. If a certain flawed military rationale is reinforced by a particular heuristic, then continued use of the heuristic will regenerate the same fallacy whether or not its erroneousness has already been exposed.

Even when arguments are stated largely for propaganda purposes, they would not persuade their intended audience if they did not have a high degree of surface validity. In these cases, heuristics may help us understand not only why elites believe certain rationales, but why these rationales are compelling to Congress or the public.² As a final source on the credibility of arguments, I will appeal to the intuitions of the reader: Like visual illusions, biases and errors that derive from heuristics will often continue to *feel* forceful even after one understands the underlying error.

THE CONJUNCTION FALLACY AND SCENARIO PLAUSIBILITY

In a study of heuristics used in probability judgments, Tversky and Kahneman asked the participants of the 1982 Second International Congress on Forecasting to evaluate hypothetical scenarios (Tversky and Kahneman, 1983). All participants were professional forecasters and planners, and many had used scenarios in their work. One group evaluated the probability of "a complete suspension of diplomatic relations between the USA and the Soviet Union, sometime in 1983"; the other group judged the probability of "a Russian invasion of Poland, and a complete suspension of diplomatic relations between the USA and the Soviet Union, sometime in 1983."

The suspension-and-invasion scenario was judged to be much more probable than the suspension-only scenario, even though the latter event is a strict subset of the former. Tversky and Kahneman call this the "conjunction fallacy," because the conjunction of two events is judged more likely than one of them, even though this is a logical impossibility. People's probability judgments seem to follow their impressions of the plausibility of different

2. Further, the distinction between what individuals say for propaganda purposes and what they believe is often not very clear even to the individuals themselves. In one of Kull's (1988) interviews with a prominent former National Security Council member, for example, he asked whether U.S. war-winning policies are action policies or simply declaratory policies. The interviewee responded (slowly, after a long pause): "I don't even know if we know that ourselves, really. I'm not really sure" (1988: 174). Psychology research has also shown that people often infer their beliefs and attitudes from their own behavior and verbal output (Bem, 1967), so simply stating a position may under some circumstances cause the speaker to come to believe that position.

scenarios: They find the suspension-and-invasion scenario more "representative," or typical, of superpower behavior than the suspension-alone scenario, which may seem inexplicable and hence not representative. This fallible evaluation method is an example of what Tversky and Kahneman call the "representativeness heuristic."

Thus, intuition tells us that the more detailed a scenario is, the more probable it is. Logically, however, the exact opposite is true. Tversky and Kahneman conclude that

scenarios can usefully serve to stimulate the imagination. . . . However, the use of scenarios as a prime instrument for the assessment of probabilities can be highly misleading. . . . A detailed scenario consisting of causally linked and representative events may appear more probable than a subset of these events. This effect contributes to the appeal of scenarios and to the illusory insight that they often provide [Tversky and Kahneman, 1983: 308].

Consideration of particular war-fighting scenarios has long played a key role in strategic analysis. Herman Kahn, who developed a complex taxonomy of different possible war-fighting scenarios, argued that scenarios "serve to call attention, sometimes dramatically and persuasively, to the large range of possibilities that must be considered in strategic analysis, some of which may escape notice if an analysis is done using conventional analytic techniques" (Kahn, 1962: 144). But while Kahn correctly recommends that the scenario not be used as a "predictive device," his position reflects some psychological naiveté. People find causal sequences highly compelling and will often judge a representative scenario to be more likely than any of its component events. Thus, even if the purpose of developing scenarios is not to make or influence probability judgments, this may be the unintended consequence.

In fact, there is evidence that strategic priorities have in the past become distorted by overemphasizing the most extreme scenarios at the expense of less flashy but more likely ones. In 1960, although 90% of RAND studies used a bolt-out-of-the-blue surprise attack as a starting point, Herman Kahn and Tom Schelling polled their RAND colleagues and found that this was considered the *least* likely scenario (Herken, 1985: 205). Overemphasis on first-strike scenarios is not restricted to Hawks. Rathjens and Reed (1986) point out that while the most important arguments that Doves raised against the MX missile were that it was unnecessary and expensive, "it was most effectively opposed, however, by calling attention to its threatening characteristics as a first-strike weapon and its attractiveness as a target for a first-strike by the Soviet Union" (1986: 45). But, they contend, such arguments are unrealistic and lead to a distortion in perceptions of what are the most likely scenarios for the initiation of conflict.

Thus, while scenarios may be helpful in some respects, they may distort the focus of both strategic analysis and arms control. If scenarios must be used, one way to guard against biased probability estimates might be to estimate the probability of independent components in the causal sequence and multiply them together to estimate the overall probability of the overall scenario. Unfortunately, using confidence intervals may not be very helpful, because of the strong tendency for experts to be overconfident of their estimates (Lichtenstein, Fischhoff, and Phillips, 1982). At the very least, however, strategic analysts should carefully consider the consequences of providing the defense community with esoteric but deceptively compelling stories about nuclear war.

It might be argued that biases in the subjective probabilities of scenarios do not matter because in "worst-case planning" probability is irrelevant; one simply prepares for the worst case — no matter how improbable — and assumes this preparation will suffice for less drastic scenarios. Two things are wrong with this argument. First, preparations for a worst-case scenario may make other undesirable events more probable. For example, preparing for what to do if deterrence fails may well increase the probability that it will in fact fail. As Les Aspin, chairman of the House Armed Services Committee, said recently on the issue of MX vulnerability to surprise attack, "the chances for a true, bolt-from-the-blue surprise attack are extremely small. But even in times of crisis, our political leaders may choose not to put our nuclear forces on wartime alert for fear of triggering a nuclear shoot-out" (reported in *New York Times*, March 24, 1989: A 9). Thus, the overall utility of preparing for the worst case cannot be determined without assessing how such preparations affect the likelihood of that worst case and of other scenarios. Second, since the domain of possible scenarios (and the range of attributes used to characterize those scenarios) is unbounded, it is impossible to define the worst case.³ The only way to salvage the idea is to reintroduce the role of probability and deal with "worst plausible cases." But once scenario probability assessment became necessary again, the problem of psychological distortions would resurface.

3. A demonstration of the impossibility of specifying the worst case occurs in Monty Python's *The Secret Policeman's Ball*: "We used to live in a tiny old, tumbled-down house with great holes in the roof." "A house? You were lucky to have a house. We used to live in one room, 26 of us, no furniture, and half the floor was missing. We were all huddled in one corner for fear of falling." "You were lucky to have a room. We used to have to live in a corridor." "Oh, we used to *dream* of living in a corridor. We used to live in an old water tank at a rubbish tip. Got woke up every morning by a tub of rotting fish dumped all over us." "We lived for three months in a rolled-up newspaper in a septic tank. . . ."

THE HOMEOPATHY HEURISTIC AND MISSILE MATCHING

Richard Nisbett and Lee Ross have suggested that people use similarity when seeking the cause of a phenomenon (Nisbett and Ross, 1980; Einhorn and Hogarth, 1986; Rozin, in press). So, they claim, "people believe that great events ought to have great causes, complex events ought to have complex causes, and emotionally relevant events ought to have emotionally relevant causes" (Nisbett and Ross, 1980: 116).

While few people would explicitly state that causes should resemble their effects, Nisbett and Ross provide evidence for just such a bias in causal reasoning. In early Western medicine antidotes were thought to resemble the symptoms of the diseases they cured. For example, the brilliant yellow color or turmeric was taken as an indication that it would be effective in the treatment of jaundice. In the African Azande culture, fowl excrement was used as a cure for ringworm because it resembles the ringworm infection. Belief in the similarity of cause and effect also plays a fundamental and explicitly stated role in magic⁴ and modern homeopathic medicine.⁵ John Stuart Mill (1974) called this belief the "doctrine of signatures"; Frazer called it "homeopathic magic." Use of similarity in this way, which I will call the "homeopathy heuristic,"⁶ often leads to error because causes (or antidotes) need not resemble their effects. Nisbett and Ross note that Freudian theory, which uses simple resemblance to map symbols onto the things they stand for, may owe some of its popularity to the fact that "it encourages the layperson to do what comes naturally in causal explanation, that is, to use the representativeness heuristic" (1980: 244).

This predilection for causes that match their effects may explain a variety of theoretical tendencies in the study of international relations. One example is the common historiographic fallacy of assuming that big effects must have big causes, as seen in the popularity of theories that invoke such large factors as imperialism to explain the origins of World War I. Lebow (1981) has

4. Frazer (1922) describes one of the two "principles of thought on which magic is based . . . : first, that like produces like, or that an effect resembles its cause, . . . [This is] called the Law of Similarity" (1922: 12).

5. Homeopathic medicine is founded on the stated principle that "like cures like" and prescribes for patients treatments that would produce in healthy persons symptoms of the disease being treated—such as hot compresses for burns. This is known as the "law of similars" or *similia similibus curantur*. Homeopathic medicine is still widely practiced in Western countries and has many national and international professional societies. ("Homeopathy," p. 24 in *Encyclopedia Britannica*, Vol. 6. Chicago: Encyclopedia Britannica, 1988.)

6. Nisbett and Ross (1980) call it a "misapplication of the representativeness heuristic," but this invites confusion with the many other meanings and uses of representativeness.

criticized this tendency to focus on deep conflictual causes of war rather than proximal causes, arguing that "the proximate causes of conflict may even be as important as the underlying ones if a crisis can determine whether longstanding tensions are ultimately eased or lead to war" (1981: 4). A second example of cause and effect matching may be the strong bias among international relations theorists for structural theories that denigrate psychological and bureaucratic factors, favoring *political* accounts of political phenomena. Third, the well-known tendency to infer states' intentions directly from their military capabilities may be exacerbated by the homeopathy heuristic. As Rothbart and Fulero (1987) write: "as the importance, profoundness, or dramatic quality of an outcome increases, there will be a corresponding increase in the attribution of profound motives to explain the outcome." A fourth example might be found in the rejection of nuclear weapons as "a technological fix" for a political problem, as though political problems necessarily must have political solutions.

The homeopathy heuristic also thrives in the logic of nuclear deterrence, where countermeasures are frequently matched to threats. Perhaps the most familiar of these is the notion that the most effective way to deter the Soviets from using a certain kind of weapon is to deploy a similar weapon. Several of the defense analysts interviewed by Kull (1988) stated that Pershing IIs—rather than GLCMs alone—were necessary to balance Soviet SS-20s, explaining that "the speed of the Pershing IIs specifically 'checked' the use of the equally swift SS-20s" (1988: 56). Similarly, Reagan asserted that "the only answer to those [SS-20] systems is a comparable threat to Soviet threats" (quoted in Jervis, 1984: 88). Another example is the belief that the MX missile is necessary to deter Soviet SS-18s, since both are large, MIRVed, hard-target kill-capable ICBMs. Kull quotes a RAND analyst who argued that "the MX is a kind of equalizer for the SS-18. It is something to do the same thing to them." (Kull, 1988: 55).

In strict military terms, it makes no more sense to match missiles in this way than it makes sense medically to treat ringworm with bird droppings. As Robert Jervis put it, "There is no reason why the only, or even the best, deterrent against a menace should be a counterthreat which closely resembles it" (1984: 88). (If either "cure" has some placebo effect, that is hardly a justification for its use; compare Kull, 1985.) But while these crude missile-matching arguments make little sense *militarily*, we can explain widespread belief in them *psychologically* by pointing to their possible origin in terms of the similarity heuristic.

A second topic in strategic thinking that bears the earmarks of the homeopathy heuristic is the discussion of the overall military "balance."

There is a widespread assumption — among politicians, if not academics — that total numbers of weapons, overall military strength, or levels of military spending must be similar for deterrence to work. This view surfaced most explicitly in the debate over the SALT I treaty and was codified in the Jackson Amendment, which stressed the importance of numerical equality in each weapons category. (The fact that in the Jackson Amendment Hawks called for such a literal form of equality is all the more noteworthy because it conflicts with other hawkish arguments about the need for *more* than parity — such as the ability entailed in PD-59 to hold at risk Soviet leadership and political control and to do this in the final stages of a war with a presumably much-depleted stockpile of weapons.) Parity was also implicitly endorsed by many proponents of the nuclear freeze movement, who argued that the time was right for a nuclear-weapons freeze in part because it would preserve parity. More sophisticated criteria such as “essential equivalence” differ in their recommendations of what should be matched, but not in the fundamental importance of matching itself.

But, as many have pointed out, nuclear deterrence rests on the absolute ability to retaliate, and parity or numerical equivalence is irrelevant to this. (Even if deterrence required superiority, as some might argue, parity or equivalence would still be irrelevant.) Why are arguments for parity invoked so often, if they don’t make military sense? They probably owe part of their appeal to the homeopathy heuristic, according to which a deterring force must resemble in scale the force it is deterring.

A third example of an attempt to cure a military problem by matching antidote to symptoms concerns American and Soviet nuclear doctrine. It is often argued that the United States needs a counterforce doctrine because the Soviet Union has one. One of Kull’s interviewees argued that “our goal is to be a mirror image of what we perceive to be their doctrine and force posture. I think we are taking steps to be that mirror image” (1988: 164). Another congressman interviewed by Kull responded to a question about what our war-fighting goals should be: “if it’s clear and determined that the other side is attempting to take land that doesn’t belong to them, then the only real answer is to take their land” (1988: 78). While taking Soviet perspectives into account is important, however, there is no *a priori* reason why the United States should simply match Soviet military doctrine.⁷

By examining these consequences of the similarity heuristic, I do not intend to imply that antidotes never resemble the conditions they cure.

7. It should be noted, however, that there are some strands of the countervailing strategy that do not simply mirror Soviet doctrine, such as the requirement to hit Soviet political control and leadership targets.

Rather, any such resemblance is usually coincidental. What I am suggesting is that groundless missile- and doctrine-matching arguments persist because they correspond to common intuitions and that these intuitions arise in part from the homeopathy heuristic.

Some might argue that the reasonableness of missile matching is not the issue. Rather, many defense planners believe, even if missile- and force-level matching are irrelevant in strict military terms, they strengthen deterrence because the Soviets *think* they are relevant. This argument is known as "perception theory" and has been addressed in detail by Kull (1985). Proponents of perception theory could even claim that the homeopathy heuristic provides further evidence that the Soviets must think matching matters, since they presumably reason with the same heuristics. However, even if the Soviets *do* think matching matters, it does not follow that the only option is for the United States to match Soviet forces. Fallacies are much easier to overcome once diagnosed, and it would be more reasonable to attempt to remove the fallacy from both U.S. and Soviet thinking than simply to follow its dictates. Along these lines, Jervis (1989:199) suggests the possibility that "because the problem is perceptual, one can deal with it by redefining the situation, rather than by changing physical reality."

An alternative counterargument might claim defense planners think missile matching is important not because the Soviets think it is, but because it has a communicative function in *symbolizing* U.S. resolve (Jervis, 1989). As such, it might be argued that matching strategies are necessary at the level of symbolic politics and tacit bargaining (Schelling, 1960; Snyder and Deising, 1977). However, this view is too deterministic; in general what is notable about symbols is precisely the *arbitrariness* of their relationship to their referents. In fact, Jervis (1989: 202) has argued that while it may be necessary to spend a lot of money to give one's symbols any force, "in principle . . . there is no reason why the money had to be wasted on weapons. We and the Soviets could agree on a different definition of the situation which allowed us to demonstrate resolve by sending each other gifts, potlatch fashion." The strong tendency to externalize and reify the symbolic significance of nuclear weapons often prevents policy makers from appreciating that these symbols were not externally imposed upon them, but rather created by them.⁸ There is no logical necessity for missile- and force-level matching—whether on military, perceptual, or symbolic grounds—and the re-

8. A similar pattern of symbol creation occurs in foreign policy. Schoultz (1987) traces the Reagan administration's successful efforts to "make Central America a *symbol* of U.S. power and resolve." As with nuclear strategists and the symbolic significance of nuclear weapons, makers of foreign policy often come to treat the symbolism they have created as an inevitable externally imposed fact.

peated tendency to adopt matching policies is better explained by the homeopathy heuristic.

THE ILLUSION OF CONTROL AND THE PROLIFERATION OF OPTIONS

In her seminal work on the illusion of control, Ellen Langer (1983) has argued people do not generally appreciate the distinction between skill and luck. In particular, she has written that "while people may pay lip service to the concept of chance, they behave as though chance events are subject to control" (1982: 231). Sociologists have noted, for example, that Las Vegas dice players play as if they had control over the result of the toss. They tend to throw hard for high numbers and softly for low numbers, showing both an illusion of control and an assumption that causes resemble effects.

In an extended series of experiments, Langer first showed that competitive circumstances increased the illusion of control. Subjects placed higher money bets on the identity of a card drawn randomly from a deck when they were competing with another subject than when they were not. She argued that competitive situations lead people to think they have control over the outcome of random events, presumably because competition and skill are often paired in day-to-day experience.

Second, Langer compared subjects who purchased lottery tickets for a dollar in one of two different conditions: Some subjects were allowed to *choose* their ticket from a box of many, and others were simply handed a ticket from the box. Subjects were later contacted by the experimenter, who attempted to buy the tickets back before the drawing. Those subjects who had been handed their tickets required an average of \$1.96 before they would sell; those who had chosen their own demanded an average of \$8.67. Langer concluded that whether or not people treat an event as controllable depends largely on the presence of factors such as competition and choice. While these factors usually imply control, in a situation in which one is choosing among random lottery tickets, the feeling of control is illusory.

The illusion of control is probably due to both motivated and cognitive biases, and it is not restricted to cases when subjects are assessing their skill in *past* behavior. Langer found evidence for the illusion of control in a study where subjects were simply asked to *predict* their performance in a series of coin flip guesses. Of these subjects 25% "reported that their performance would be hampered by distraction . . . [and] 40 percent of all subjects felt that performance would improve with practice" (Langer, 1983: 97). Thus, the

illusion of control affects predictions of the future as well as interpretations of the past.

A key idea in U.S. nuclear strategy is that escalation can be controlled and that limited nuclear war is at least possible.⁹ This idea—and the doctrine of flexible response more generally—rests on the assumption that control is somehow ensured by the flexibility derived from having numerous military “options.”

But do options really lead to control in this case? Flexibility would only be useful if there were options that it made sense to use. Jervis (1984) has argued there are not: “flexibility is stressed in part because it is very hard to construct a convincing case for any of the proposed options” (1984: 79) Colin Gray similarly argues that “no matter how flexible U.S. strategic planning may be, if it is not matched by some very significant ability actually to defend North America, it would have to amount, in practice, to suicide on the installment plan. Flexibility, per se, carries few advantages” (quoted in Jervis, 1984: 84). It is sometimes argued that options lead to control on the grounds that they would allow for fancy footwork on the ladder of escalation, but Gray has argued that “Herman Kahn’s hypothetical escalation ladder . . . may have encouraged some particularly dangerous illusions concerning the potential for the control of conflict” (1986: 176). Indeed, if escalation is viewed as a slippery slope rather than as a ladder, a proliferation of options might be expected to lead to a *loss* of control. Thus, many of the arguments for why increased nuclear options should lead to greater control are dubious, and there is some reason to think the exact opposite might be the case.

Why, then, do so many people continue to believe that nuclear war might be controllable? We have already seen that competition and choice enhance the illusion of control over chance outcomes, and our common framework for thinking about U.S.-Soviet relations obviously involves a high degree of competition. But the choice factor seems even more pertinent: The countervailing strategy and the doctrine of flexible response make a fetish out of options. Perhaps this preoccupation with choice gives strategists a sense of control in the same way that Langer’s subjects felt they had gained control by selecting their tickets. In other words, because choice is often associated with control, strategists may wrongly think they are gaining control simply by maintaining the possibility of choice.¹⁰

9. Some strands of the countervailing strategy—such as the effort to militarily “couple” Europe and the United States—require the opposite assumption. However, the more fundamental view must be that limited war is possible. Otherwise, proponents of the flexible response could not claim that their limited options differed significantly from Mutually Assured Destruction (MAD) threats.

10. The illusion of control is not an effect that only appears after (and as a result of) choice. In fact, there is evidence for the opposite: Langer (1983) has shown that subjects place higher

Further, the problem with multiplying options is not simply that it leads to an unwarranted optimism; there are several psychological reasons to suppose that having a large number of options might be *counterproductive*. First, decision makers may be easily overwhelmed when they have too many alternatives to choose among: In laboratory experiments, subjects think more carefully about (i.e., spend more time considering) a choice between two alternatives than they do for a choice among four or more alternatives (Kiesler, 1966). Second, people under the illusion of control will tend to overestimate their chances of success and therefore unwittingly engage in riskier behavior than they would otherwise (Langer, 1983: 45). So, to the extent that control over nuclear escalation would be more a function of chance than of skill, we might expect an excessive number of nuclear options to be counterproductive — both because it would lead to an exaggerated sense of control and because it would degrade the quality of a decision between those options.

THE “HOT HAND” IN BASKETBALL AND THE DOMINO THEORY

Another cognitive bias that arises from a general misconception about chance phenomena was explored in a study by Gilovich, Vallone, and Tversky (1985). Most basketball fans believe players have hot and cold shooting streaks (i.e., that a player’s chance of making a basket seems to be greater immediately following a hit than following a miss). Gilovich and associates analyzed shooting records to find out whether the “hot hand” is real or whether shooting records have only as many streaks as one would find in a sequence of coin tosses.

They found — contrary to the beliefs of basketball fans — that the probability of a basket following a few consecutive hits was no higher than the probability of a basket after a few consecutive misses. Similar analyses showed that the number of “runs” — the number of strings of several baskets in a row or misses in a row — was no greater than would be predicted by chance. (A few of the analyses even showed statistically significant trends in the *opposite* direction.) Other analyses revealed there were no slow fluctuations of hit rate, or “hot” or “cold” nights for players, beyond the fluctuations expected by chance alone. Nevertheless, when Gilovich and associates gave

wagers in a dice game when betting before, rather than after, the dice has been thrown. The current situation of nuclear strategists would seem to resemble the “before” condition more than the “after” condition.

a questionnaire to members of the Philadelphia 76ers, most agreed with various statements asserting the existence of the hot hand.

Gilovich and associates hypothesized that this belief persists in part because people do not know what random strings look like. To test this idea, they showed people sample sequences of hits and misses and asked them to rate each sequence as "chance shooting" (like a coin flip), "streak shooting" (having more clusters than chance), or "alternate shooting" (having fewer clusters than chance). Because the subjects were looking directly at the written sequences, remembering the sequence was not an issue. Still, Gilovich and associates found that people were biased in their responses. Sequences that were actually random were thought to have too many clusters, and sequences that actually had fewer clusters than chance were seen as random. This finding accounts for both the origin and the persistence of erroneous beliefs in the hot hand; if random sequences are perceived as streak shooting, then no amount of exposure to random sequences will weaken a belief in streak shooting. In practice, then, the hot hand is psychologically unfalsifiable.

There is a prevalent political belief that (at least superficially) resembles belief in the hot hand. Just as the hot hand theory posits that the probability of a hit goes up after a sequence of previous hits, the domino theory assumes that the "fall" of one country to communism will increase the probability of subsequent "losses" to communism. There are several variants of the domino theory, but these have been widely challenged on both theoretical and empirical grounds. Ted Hopf (1987) has shown, for example, that the Soviets do *not* perceive weakened U.S. resolve after a U.S. defeat in the Third World. Further, Stephen Walt (1985) has shown that allies generally balance against, rather than bandwagon with, expanding powers. Related arguments against the domino theory can be found in Slater (1987), Jervis (forthcoming), and Glad and Taber (forthcoming). The popularity of belief in the domino theory is particularly mysterious considering how few political scientists have embraced it.

Why is the domino theory so influential among political leaders and decision makers? Part of the answer may be that this belief persists for the same reasons as the hot hand in basketball. Political leaders may feel that strings of Soviet successes are causally related without realizing that the pattern of such strings might be expected to occur by chance alone in the historical pattern of fluctuating alliances. As with the hot hand effect, belief in the domino theory may actually be reinforced by contrary evidence. (Insofar as belief in the domino theory is a purely theoretical prediction, rather than a generalization over experience, however, this account does not

hold. Most likely, domino beliefs are reinforced *both* by biases in the interpretation of experience and by biases in prediction.)

The hot hand and the domino theory are not merely erroneous beliefs; they are erroneous beliefs that serve as the bases of counterproductive policies. In the case of basketball, players and coaches believe that it is important to pass the ball to someone who has just made several shots in a row. Points are lost in this way because the better strategy is to pass the ball not to the "hot" player, but to the overall best shooter.¹¹ Similarly, belief in the domino theory has been strong enough to provide a main bulwark of support for a set of counterproductive policies, such as the Vietnam War and numerous interventions in Latin America.

MISLABELED REGRESSION AND THE ILLUSORY ADVANTAGE OF NEGATIVE SANCTIONS

A related phenomenon that results from a misunderstanding of the role of chance is the failure to recognize regression phenomena (Kahneman and Tversky, 1973). Kahneman and Tversky illustrate this with an anecdote about some Israeli flight instructors who were urged to reward good performances rather than punish bad ones. The instructors objected, arguing that in their experience, praising an exceptionally good performance usually led to worse performance on the next flight, whereas criticizing a bad flight usually led to improvement on the next flight. The flight instructors concluded that punishment was more effective than reward.

This conclusion, however, is not supported by the evidence at hand. To see why, imagine that the distribution of performance is a normal curve and each flight is a random event from that distribution. Then chance alone predicts that an extreme performance, superb or terrible, will regress to the mean, that is, will be followed by a more average showing. This regression effect has an important asymmetry: Praised or not, great flights will tend to be followed by average flights; and criticized or not, poor flights will tend to be followed by better, more average flights. The seeming efficiency of punishment and counterproductiveness of reward is an illusion. Kahneman and Tversky argue that simple regression effects are often misunderstood in this way.

11. Because the other team can anticipate that the ball will be passed to the "hot" player, this player will be more heavily guarded and will actually be less likely to make successful shots. Indeed, Gilovich and associates (1985) argue that this effect is in part responsible for the small *negative* correlations they found between successive shots. On the other hand, it is not the case that there would normally be a hot hand in basketball games if not for this extra guarding effect, because Gilovich and associates found no hot hand in controlled free-shooting sequences.

One of the conspicuous characteristics of international affairs is the predominance of negative sanctions (punishment) over positive sanctions (reward). Yet, David Baldwin (1971) argues that "the tendency of political scientists to assume a priori that negative sanctions work better than positive ones is not justified" (1971: 34). In fact, he points out, there are numerous situations in which one would expect carrots to be at least as effective as sticks. Why are they so rarely used? One possibility is that policy makers, like the flight instructors, have mislabeled simple regression phenomena and incorrectly concluded that negative sanctions are more effective than positive sanctions.¹²

PREFERENCES: CHOICE VERSUS MATCHING AND FOREIGN POLICY DECISIONS

Preferences among options are fundamental to decision theory; they are the basic measures of utility and value. Scholars have traditionally treated preferences as fixed, but recent psychological research has shown preferences depend critically on the method used to measure them. There are two ways to elicit a preference system. One is *choice*, in which people are asked which of two options they prefer. The other is *matching*, in which people are asked to make two options equally attractive by adjusting an attribute (such as price) of one of them. Tversky, Sattath, and Slovic (1988) have shown that these two methods can give contradictory preference orderings.

In one study, for example, Tversky and associates (1988) gave their subjects the following problem:

About 600 people are killed each year in Israel in traffic accidents. The ministry of transportation investigates various programs to reduce the number of casualties. Consider the following two programs [see Table 1], described in terms of yearly costs (in millions of dollars) and the number of casualties per year that is expected following the implementation of each program.

Problem A is a classic "choice" problem: 67% of subjects opted for Program X, reasoning that "lives are more important than money, so I'll go with the program which saves more lives." Thus, in choice problems people often decide which factor is more important and choose the option that maximizes it. This heuristic is not unreasonable, and it spares the subject from the painful process of deciding what a human life is worth. But it means

12. Notice that the current argument is only relevant to the apparent effectiveness of sanctions when used to reward (and thus maintain) or punish (and thus alter) past behavior and does not apply to the use of threats or promises to prevent or encourage (respectively) new future actions.

TABLE 1

	<i>Problem A: Choice</i>		<i>Problem B: Matching (or Pricing)</i>	
	<i>Expected no. casualties</i>	<i>Cost</i>	<i>Expected no. casualties</i>	<i>Cost</i>
Program X	500	\$55M	500	?
Program Y	570	\$12M	570	\$12M
	Which program do you favor?		What should Program X cost for the two programs to be equally attractive?	

that the choice is entirely a function of the more important factor. An option that saved a single additional life would be selected by this strategy regardless of its extra cost. In other words, this strategy has a strong bias toward overweighting the most important factor relative to other relevant factors.

Next, a different set of subjects were given Problem B, on the right in Table 1, which is identical to Problem A except that the cost of Program X was omitted. They were asked to determine the cost of Program X that would make it equivalent to Program Y. This is a classic "matching" or "pricing" problem.

Notice that responses to these two problems are logically related. A subject who prefers Program X in the choice problem ought to assign a value of at least \$55 million to Program X in the matching problem. However, Tversky and associates' subjects were inconsistent. Only 2% of subjects in the matching problem gave an equivalence value of \$55 million or more for Program X, compared to 67% who chose Program X in the choice problem. Further experiments showed that even when the same subject was given both problems, the responses were usually inconsistent in the same way.

Tversky and associates (1988) have argued that different heuristics are used in matching and choice problems. In matching, people start by assigning Program X the same dollar value as Program Y. Then the cost of Program X is adjusted upward until Program X and Y seem equivalent. But this strategy is subject to a bias called "anchoring." Tversky and Kahneman (1974) and others have shown in a variety of tasks that subjects do not adjust sufficiently in this kind of situation, as if they are somehow "anchored" to the value they began with.

(The anchoring bias is a strong effect. In another study, subjects were asked to estimate the percentage of African countries in the United Nations, but to give their response only after a wheel of fortune had been spun to produce a random number between one and 100. They were asked to first say

whether the random number was greater or lower than their African estimate and then to say by how much. It turned out that given an apparently random anchor of 65, subjects' average estimate of the percentage of African countries in the United Nations was 45, but when the wheel showed 10, the average estimate was 25. Even though subjects knew that the wheel was generating an irrelevant number in a random fashion, they were nevertheless influenced by it. Paying subjects for accuracy did not change the result. The random number continued to "anchor" subjects' estimates.)

The result of the Tversky and associates (1988) matching experiment can be explained in much the same way. For Program X, subjects start with \$12 million and adjust upward from there. But because of the anchor, they fail to adjust as far as the choice paradigm would suggest.

Thus, choice and matching lead to two different decision heuristics, which have different biases.¹³ While subjects in the choice problem overweighted *lives*, subjects in the matching problem overweighted *cost*, resulting in contradictory preferences for the two sets of subjects.

Most political decisions tend to be cast as either choice problems or matching problems. Foreign policy decisions, for example, usually take the form of choice among options: Should a particular action be taken or not? We might expect, then, to see an overweighting of the most important attribute of foreign policy decisions.

Suppose, for example, that the United States is deciding whether or not to intervene militarily in some area of the world. Decisions of this type are among the most frequent and important foreign policy decisions made. Traditionally, most American decision makers have judged that U.S. security considerations are the most important factor in such decisions (see Chase and Carr, 1988, for a historical treatment of this issue). Other factors that tend to be ranked lower in importance might include cost in lives, cost in dollars, domestic opposition, international opinion, effect on human rights, and so on. If U.S. decision makers behave like Tversky and associates' subjects, we would expect their choices to focus largely on what they think is the single most important factor—that is, security. Indeed, Lars Schoultz (1987) has argued that while most U.S. makers of Latin American policy care as much as anyone else about the protection of human rights, "when they perceive a conflict between the protection of U.S. security and the promotion of values such as human rights, security invariably wins" (1987: 325). Decisions of this type can be flawed, because even if security is more important than, say,

13. While these data do not constitute evidence for two different biases for choice and matching (rather than one relative bias), the fact that when confronted with their inconsistent responses subjects choose an intermediate value might be considered as evidence that both choice and matching are biased in opposite directions.

lives or money, a small gain in security is *not* likely to be worth a huge loss of lives and money.¹⁴ A famous example that shows the rhetorical force of this kind of argument appeared in John F. Kennedy's inaugural address: "Let every nation know, whether it wishes us well or ill, that we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe to assure the survival and the success of liberty."

While foreign policy decisions tend to involve choice, budget decisions tend to be an exercise in *matching* or *pricing*. The president submits a budget proposal to Congress, and members of Congress adjust the proposed allocations in the directions they prefer. Consequently, we might then expect the amounts to be underadjusted because the president's proposal will act as an anchor. If so, then whoever proposes the budget first—the president in this case—is at a significant advantage. In other words, just as subjects trying to estimate the percentage of African countries in the United Nations were swayed by the wheel of fortune, those deciding on the federal budget may be overinfluenced by the first amounts suggested. This effect would not simply be part of an effort to work out a compromise between the president and Congress. It would distort the representative's own personal preference even *before* the budget negotiation began. Plous (1989) has suggested that the previous year's budget may also act as an anchor. Indeed, one might expect anchoring to affect decision making not only in budgetary negotiations, but in *any* negotiating situation in which proposals are passed back and forth.

In summary, certain policy questions are generally framed as choice problems, whereas others tend to be framed as matching problems. This difference in format is a function both of the type of issue being decided and the structure of the organization making the decision. The format of the problem—choice or matching—determines the heuristic used in making the decision, and each heuristic leads to different biases.

Thus, by examining particular types of foreign and military policy issues and the organizations that resolve them, we might be able to predict different biases for each kind of decision. Further, it may be that decisions can be influenced by reframing the underlying policy question. For example, rather than asking whether it is better to intervene or not in a given situation, we might ask what cost in lives and human rights would be justified by the intervention and then try to determine whether it can be carried out for that cost or less. Finally, these format effects challenge models of decision making

14. This example was used because it typifies mainstream American priorities for foreign policy, but the same counternormative decision making would certainly be expected within a more left-liberal ranking of priorities as well (which might assign a higher priority ranking for lives or compliance with international law). This might take the form of arguing that no increment in U.S. security is worth a given cost in lives or human rights.

(especially game theoretic models) that assume preference rankings are fixed. Tversky and associates ask: "if different elicitation procedures produce different orderings of options, how can preferences and values be defined? And in what sense do they exist?" (1988: 383).

THE MONOTONICITY HEURISTIC

The final heuristic to be addressed is something I will call the "monotonicity heuristic"; it is simply the tendency to assume that if some is good then more is better, and if some is bad then more is worse.¹⁵ While I know of no literature on this, there are many suggestive examples of situations in which, when given a choice, people seem to prefer to overdo things rather than underdo them. "To be on the safe side" is to be on the side of surplus rather than shortage. Indeed, there are about four times as many English verbs with the prefix "over," meaning to do in excess, than verbs with the prefix "under," meaning to do insufficiently. (*The Random House Dictionary of the English Language*, 1973, contains 240 such over- words and 65 such under- words.) What people often fail to recognize is that there are times when some is good but more is worse. For example, more people are harmed by vitamin overdoses than vitamin deficiencies in the United States (Herbert, personal communication, 1988; Herbert and Barrett, 1982; Marshall, 1985).

The monotonicity heuristic appears both in "hawkish" and "dovish" security thinking. The hawkish version regards U.S. security as a monotonically increasing function of U.S. military capability. One of Kull's (1988) interviewees stated this view in particularly bald fashion: "If, instead of 3,000, we had 6,000 [surviving weapons following an all-out Soviet strike], we'd have twice the capacity to make certain the Soviets understand they'd have losses which they might not have the tolerance to accept" (1988: 50). Weaker (i.e., less strictly linear) versions of this view are frequently assumed by defense policy makers. Another Kull interview with a presidential advisor went as follows. Interviewee: "because if you have a deterrent, the more you have the better deterrent you have." Kull: "Is it unlimited? Is more always better, or do you get to some critical point where. . . ."; Interviewee: "No, more in relation to them is always better" (1988: 50). However, such

15. Technically, functions that are increasing everywhere or decreasing everywhere are called "strictly monotonic" (simply "monotonic" functions include those that become completely flat), but for convenience I will use "monotonicity" to refer to functions that are either always increasing or always decreasing. The monotonicity heuristic might be considered a variant of the representativeness heuristic or the Law of Small Numbers (Tversky and Kahneman, 1971), either of which could lead to the assumption that the value function would behave at the extremes much as it does near the origin (where the relevant data sample presumably lies).

arguments ignore the logic of strategic sufficiency. As Jervis (1984: 23) has argued, "although it is often true that the greater the power to harm others, the greater the power to affect their behavior, the relationship is not linear; past a certain point the ability to destroy may not be useful." Nevertheless, the monotonic view is compelling to many.

The monotonicity heuristic also appears in dovish arguments that invert the above relationship and assume that the probability of nuclear war is roughly proportional to the total number of (U.S. and Soviet) nuclear weapons. While this may be a reasonable assumption for some part of the curve, it becomes problematic near zero: Many have argued that the most *unstable* possible configuration would be if the United States and the Soviet Union had very small numbers of nuclear weapons (i.e., less than a dozen apiece; Rathjens and Reed, 1986: 40). Further, there is reason to doubt that even bilateral reductions of strategic forces by 50% would reduce the probability of nuclear war (or the expected level of damage if such a war to occur; Rathjens and Reed, 1986). But again, the monotonic view seems compelling to many people.

CONCLUSIONS

I have argued that the origin and persistence of certain misconceptions in foreign and military policy debates may be explained in part by the operation of cognitive heuristics. In particular, I have discussed seven cognitive heuristics that perpetuate various dubious ideas about American security policy:

- (1) the conjunction fallacy, which lends spurious plausibility to highly detailed nuclear war-fighting scenarios;
- (2) "homeopathy heuristic," which reinforces the notion that deterrence requires force and doctrine matching;
- (3) the illusion of control, which leads to the conviction that escalation can be controlled by the development of numerous military options;
- (4) the tendency to perceive patterns in random sequences, which may strengthen belief in the domino theory;
- (5) the mislabeling of regression phenomena, which causes positive sanctions to appear less effective than negative sanctions;
- (6) decision heuristics that overweight security considerations in evaluating foreign policy options; and
- (7) a new "monotonicity heuristic," which results in beliefs such as (a) U.S. security is proportional to relative U.S. military superiority, or (b) the probability of nuclear war is proportional to the total number of U.S. and Soviet nuclear weapons.

One challenge to this view is the charge that heuristics and their attendant biases are hothouse flowers: They only show up in specialized laboratory conditions. If people are paid to answer strange questions that do not matter to them, perhaps it is not surprising that they give illogical or biased responses. How likely are the same tendencies in the political arena, where the issues matter?

Several investigators have questioned whether heuristics and biases ever occur outside of laboratories. Philip Tetlock (1985), for example, has suggested that people reason differently when they are accountable to others for their decisions. In particular, Tetlock showed that expecting to justify one's decisions to others can reduce some judgmental biases and encourage more sophisticated reasoning.¹⁶

However, Tetlock argues that accountability is not a panacea. When decision makers can determine the opinions and preferences of their constituency, they may resort to what he calls the "acceptability heuristic," adopting positions likely to please those to whom they are accountable (1985). But the effort to make policy decisions publicly palatable might exacerbate biases by leading policy makers to invoke flawed justifications that are compatible with the heuristics used by the public. Fallacies and misconceptions may therefore persist because of interactions among heuristics used by political decision makers and members of the general public.

Further, simply raising the stakes of a cognitive task is not sufficient to eliminate bias and error. After all, many of the reasoning biases (such as anchoring) have been shown to persist even when subjects are paid for accuracy. People even err when answering questions fundamental to their own profession (for example, see Arkes and Hammond, 1986; Fischhoff, 1982; Kahneman and Tversky, 1973; and Tversky and Kahneman, 1971, 1982). For example, doctors make heuristic-based errors in questions concerning medical diagnosis (Casscells, Schoenberger, and Grayboys, 1978; McNeil, Weishelbaum, and Pauker, 1978), and the hot hand illusion misleads professional basketball coaches. It is hard to make a case that deterrence matters more to defense planners than basketball matters to basketball coaches or diagnoses matter to doctors. Clearly, heuristics and their associated errors are not confined to the laboratory or to issues without personal importance.

Similarly, it would be surprising if Hawks were more susceptible to cognitive error than Doves. While the present article contains more Hawkish

16. Tetlock (1983) notes that expecting to simply *communicate* one's impressions of an event encourages people to suppress ambiguity, whereas expecting to *justify* one's impressions of an event encourages people to express more complex opinions. If policy makers are in the former situation more than the latter, political accountability may *not* lead to a reduction in judgmental bias.

than dovish fallacies, this is an artifact of my effort to focus on arguments that have been influential in policy-making circles in the last decade. Although a case can be made that conservatives are more prone to cognitive error than liberals—conservatives tend to be less “integratively complex” (Tetlock, 1983) and high integrative complexity has been linked to the ability to resist cognitive bias (Tetlock and Kim, 1987)—a key piece of the argument is missing. It is not yet clear that integrative complexity, an attribute of verbal output, is a valid indicator of the complexity of underlying thought. Until that connection is established, one can only suspect that a dovish policy elite would provide just as rich a gold mine of cognitive fallacies as has been offered by the hawkish elite of the last decade.

Finally, the scope of the current account should be clarified. The explanation of security misconceptions in terms of cognitive heuristics is certainly not intended as any kind of alternative to accounts that invoke either (i) psychological phenomena other than reasoning heuristics or (ii) organizational and economic forces. On the first point, it is unlikely that the majority of political and strategic fallacies can be explained by cognitive heuristics. Jervis's (1976) book, *Perception and Misperception in International Politics*, presents many nonheuristic psychological accounts of political misperceptions. The aim here is more circumscribed—to suggest that the origin and persistence of at least some fallacies may be due to the use of specific heuristics.

On the second point, psychological accounts are most useful in their ability to supplement (rather than supplant) explanations at other levels. For example, consider the claim that a certain weapons system is being developed without a coherent rationale because powerful economic forces support it. Such accounts sometimes feel implausible because they leave one wondering about the people implementing the policy: Don't they know better? Can everyone involved really be that stupid (or cynical) that they can blithely carry out an incoherent strategy? The suggestion here is that people do not have to be either stupid or disingenuous to be in the grip of fallacious ideas. Thus, an understanding of the role of cognitive processes in generating and sustaining fallacies can lend plausibility to economic and organizational accounts of why flawed policies are implemented.

The analysis of cognitive heuristics is useful in two main ways. First, diagnosing the particular psychological cause of a given fallacy will help to determine the most effective way to correct it. Second, it shows that we can *expect* very smart people to be very wrong on certain issues—and we should therefore be particularly vigilant for cognitive fallacies in debates on security policy.

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