

# Sorting Through the Wealth of Notions

Bruce Bueno de Mesquita and James D. Morrow

The opportunity to better inform the readership of *International Security* on the important contributions of a rational choice perspective is most welcome. We and Stephen Walt agree on many issues. He says that “[social science] requires theories that are . . . logically consistent,”<sup>1</sup> and that “formal techniques facilitate the construction of precise and deductively sound arguments” (p. 8). Walt asserts, correctly we believe, that “the formal language of mathematics can impart greater precision to an argument, and helps guard against inconsistencies arising either from a failure to spell out the causal logic in detail or from ambiguities of normal language” (p. 14) and that the “virtues [of formal theory] should not be dismissed lightly” (p. 15). We agree completely with these views.

Walt raises issues worthy of fuller discussion. He contends, and we agree, that “the central aim of social science is to develop knowledge that is relevant to understanding important social problems. Among other things, this task requires theories that are precise, logically consistent, original, and empirically valid” (p. 8). We discuss how the rational choice approach to security studies contributes significantly in these ways. Additionally, we address some misrepresentations in Walt’s article.

## *The Centrality of Logical Consistency for Scientific Theories*

Walt gives three criteria for evaluating social science theories: logical consistency, degree of originality, and empirical validity. We believe that logical consistency takes precedence over the other two criteria; without logical consistency, neither the originality of a theory nor its empirical validity can be judged. Logical consistency is the first test of a theory because consistency is necessary, though not sufficient, for understanding how international politics works.

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1. Stephen M. Walt, “Rigor or Rigor Mortis? Rational Choice and Security Studies,” *International Security*, Vol. 23, No. 4 (Spring 1999), pp. 5–48, at p. 8. Subsequent references to Walt’s article appear in the text.

A basic point in logic drives our view. A theory, in terms of logic, consists of a system of assumptions and conclusions derived from those assumptions. A logical inconsistency exists when two mutually contradictory statements can be derived from the assumptions of a theory. When such a contradiction exists in a theory, then *any statement* follows logically from the theory. There is, then, no discipline for arguments in a logically inconsistent theory; those using the theory are free to draw any conclusion they wish from the premises of the theory.

Logical inconsistencies deny the possibility of a theory having empirical content. Theories derive empirical content by producing falsifiable hypotheses, conclusions that could be contradicted by evidence. A theory gains credence as more of its falsifiable propositions are supported by evidence, although there are no hard and fast rules here. However, because *any* pattern of evidence can be matched with some conclusion of a logically inconsistent theory, such theories cannot be falsified and so cannot have empirical content. A theory is falsified when an alternative is shown to fit the range of predictions better than the initial theory. Falsification of a theory cannot happen if any evidence can be interpreted as an implication of the theory.

Theories with logical inconsistencies can also appear highly original simply because there are no constraints on reaching conclusions. Such a theory appears to “explain” all previous results while also allowing its proposer to advance any claims that appear to reflect the historical record as she sees it. The originality of a logically inconsistent theory is dubious at best.

Further, logically inconsistent theories present serious problems for policy prescriptions, a central goal of social science theory according to Walt. Again, any conclusion can be derived when a logical inconsistency exists, and so the choice of which conclusion to use for policy purposes falls entirely on the tastes or prejudices of the party making the prescription. Indeed, the use of a logically inconsistent theory to justify a policy recommendation is worse than recommendations not supported by any theory. Policy recommendations based on an inconsistent theory use the appearance of social science to cover their lack of supporting argument and evidence.

For these reasons, we believe that logical consistency has pride of place among the criteria for judging social science theories. Other criteria, particularly empirical content, are also critical. We do not believe that it is sufficient for social science merely to pass a test of logical consistency. Rather, logical inconsistencies undermine all other criteria, and so take precedence over those other criteria.

SOME PRACTICAL MATTERS IN THE DEVELOPMENT OF THEORY

It is rarely the case that theories with well-known logical inconsistencies persist in any field, although vague or incomplete theories do. The practical problems in the development of scientific theories lie in unexposed inconsistencies in arguments. Few theories are sufficiently elaborated that the complete logic is known and all the conclusions tested against evidence. Research strives to improve knowledge by refining or inventing theories that fit the empirical record better and that remedy logical problems.

Walt is correct when he quotes Larry Laudan that "'inconsistent theories have often been detected in almost all . . . branches of science,' and argues that efforts to resolve such inconsistencies often form an important part of specific research traditions" (p. 16) and that "the only conceivable response to a conceptual problem of this kind is to refuse to accept the offending theory until the inconsistency is corrected" (p. 16 n. 29).<sup>2</sup> That is, the resolution of logical inconsistencies through the exploration of the logic of a theory is a central part of the scientific enterprise.

This is why the two of us use formal models in our research. We find that the discipline of formal models forces us to confront logical inconsistencies in the theories we study. Of course, formalism is not necessary for the analysis of the logic of a theory. The rigor of mathematics, however, does force the analyst using formal methods to confront logical problems that can be missed in purely verbal arguments.

What logical problems are likely to arise in the development of a theory? First, assumptions necessary for the argument may be unstated. Because verbal arguments often rely on the eloquence of their presentation rather than the logic of their argument, the author may leave out critical assumptions. Indeed, the author may be unaware of the omission of a necessary assumption. Many of Walt's examples of logically inconsistent and yet fruitful theories are really examples of logically incomplete or vague theories. Certainly, parts of Kenneth Waltz's neorealist theory fall into this category.<sup>3</sup> Formal models, however, require a fuller statement of assumptions, and so force the author to come to

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2. Larry Laudan, *Progress and Its Problems: Towards a Theory of Scientific Growth* (Berkeley: University of California Press, 1977), pp. 49–50.

3. Kenneth N. Waltz, *Theory of International Politics* (Reading, Mass.: Addison-Wesley, 1979). Waltz's theory also illustrates the difficulties created by inconsistency. On p. 109 he argues that "states face a prisoners' dilemma." Yet Waltz also says that "politics among the European great powers tended toward the model of a zero-sum game. Each power viewed another's loss as its own gain" (p. 70). The prisoners' dilemma is not zero-sum and, in repeated play, it has cooperative equilibria. Two-player zero-sum games never have cooperative equilibria. How are we to interpret a theory that says international politics are both zero-sum and not? This inconsistency may lead different neorealists to arrive at opposite conclusions about the prospects of cooperation among states. See

terms with the assumptions of the argument and allow the reader to view them in their totality.<sup>4</sup> When such assumptions are visible to the reader in their complete form, the reader can take exception to them, replace them with alternate assumptions, and then pursue the modified argument to its logical conclusions. Establishing the unstated assumptions of a theory is one common example of scientific progress through logical elaboration.

A second problem is that a theory may appear to lead to contradictory conclusions when it does not because the relevant contingencies have not been specified. Close logical analysis, as done in formal models, can solve this problem by identifying the lacuna in the flawed argument. A revised version of the theory may show how one of the conclusions holds under certain, previously unspecified conditions, while the apparent contradiction holds in others.

Third, logical analysis can show that seemingly disparate, known empirical regularities actually follow from a single theory. That is, logical analysis can unify accepted results within one theory, and so improve our knowledge by creating connections that did not exist before. Unifying known results within one theory is scientific progress even though it provides no new empirical discoveries.

Formal models are not necessary for any of these improvements in the logic of a theory; we and others find them helpful. Close logical analysis is demanding, and formal models require logical rigor. The game-theoretic models we use force us to be clear in our assumptions about who the actors are, the choices they face, the consequences of those choices, how the actors evaluate the possible outcomes, and what information each has at each choice. All of this can be done in a verbal argument, but such specificity is rarely seen outside of formal models.

Commonly accepted theories or known empirical regularities are one fertile ground for the application of formal models, as is the development of novel ideas. Are existing theories logically sound, and if not, how can their logical

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Charles L. Glaser, "Realists as Optimists: Cooperation as Self-Help," *International Security*, Vol. 19, No. 3 (Winter 1994/95), pp. 50–90; and John J. Mearsheimer, "The False Promise of International Institutions," *ibid.*, pp. 5–49. Even James D. Morrow's typographical error on p. 89 of his *Game Theory for Political Scientists* (Princeton, N.J.: Princeton University Press, 1994) cannot make the prisoners' dilemma a zero-sum game!

4. A personal example makes this point. Bruce Bueno de Mesquita, James D. Morrow, and Ethan Zorick claim the existence of a surprising equilibrium in a crisis bargaining game in "Capabilities, Perception, and Escalation," *American Political Science Review*, Vol. 91, No. 1 (March 1997), pp. 15–27. The "equilibrium" is the product of a mathematical error. Because all assumptions are explicit, the error was discovered. There is no debate, and a correction will be published. In formal models, the logic is reproducible so that errors are readily discovered.

inconsistencies be removed? How do those logical remedies change the conclusions of the theory, and so its empirical predictions? Rather than striking out only for novel arguments in every paper, we and others also examine well-established theories to test and refine their logic. Not surprisingly, those models often produce well-known conclusions. Sometimes, they produce surprising results. A claim that such models contribute nothing requires more than just a recitation of the well-known conclusions that follow from the model. These efforts contribute by showing which “well-known” conclusions do not follow from the model, as suggested in the earlier quotation from Laudan, thereby sorting out a confusion of hypotheses that might contradict one another. Models that try to capture well-known theories also contribute by connecting previously unconnected empirical results in a unified explanation. Further, such models provide a baseline for future developments that depart from existing arguments in novel directions. In that way, the original model allows us to judge the impact of changes in the assumptions of the theory.

The question of judging theories is separate from originality as measured by the source of scientific inspiration. Scientists have drawn inspiration from any number of sources, including mystic beliefs, for hypotheses that later proved to be true. Walt’s article sometimes confounds the source of scientific inspiration with the criteria for judging the results of that inspiration (pp. 30–31, 47). We think it does not matter from where scientists draw their hypotheses, provided that the hypotheses are subjected to logical examination and rigorous empirical testing.

All of the criteria for judging scientific theories are guides to improving knowledge because few theories are complete and final. We, like Walt, do not think that theories that contain logical inconsistencies should be abandoned solely on those grounds; instead, their errors should be remedied. In the sections that remain, we show how the formal literature promotes logical consistency and the consequences of that for fostering scientific progress.

### *Rigor and Insight: What Does the Formal Literature Say?*

Walt surveys several papers that use formal models to study questions in international politics and argues that the formal literature lacks creativity and empirical tests. One article cannot survey an entire literature. In this section, we briefly discuss some papers Walt mentions and others that he does not to help the reader gain a clearer image of the recent literature that uses models to study international politics. The discussion first provides examples in which rational choice models (1) clarify unstated assumptions in prior research;

(2) eliminate apparent contradictions by identifying the contingencies underlying cases; (3) tie known empirical regularities together in a unified logical framework; and (4) identify previously accepted results that do not follow. We go on to discuss novel results in the formal literature not mentioned by Walt and close this section with a sampling of inaccuracies in Walt's characterizations of specific publications.

Robert Powell shows that Thomas Schelling's argument about the reciprocal fear of surprise attack depends on an unstated assumption.<sup>5</sup> Powell demonstrates that the reciprocal fear of surprise attack requires the assumption that states in a nuclear crisis do not have the option to end the crisis by surrendering the stakes. Unrecognized by Schelling and a massive informal literature, if either has the option to end the crisis by surrendering the stakes, nuclear war cannot occur except by accident.

James Morrow's study of asymmetric alliances identifies contingent circumstances under which states form alliances for reasons other than security.<sup>6</sup> He shows that many alliances are asymmetric in their aims, with one side gaining security at the expense of some of its autonomy and the other side acquiring greater freedom of action at the expense of a heightened risk of being entangled in its partner's disputes. This study makes clear why the prevalent view of alliances cannot apply in all cases and provides a novel logic that accounts both for the many cases that do not fit the standard view and for those that do.

Bruce Bueno de Mesquita, Morrow, Randolph Siverson, and Alastair Smith construct a model to investigate the logical foundations for the observed regularities associated with the democratic peace, demonstrating how formal models can unify seemingly unrelated facts.<sup>7</sup> They show that a simple model accounts for diverse observations, including: (1) democracies tend not to fight wars with one another; (2) democracies fight nondemocracies with regularity; (3) democracies win a disproportionate share of the wars they fight; (4) democracies are more inclined to resolve disputes through negotiation or mediation than are autocracies; (5) all else being equal, democracies are more likely to initiate war against autocracies than are autocracies to initiate war against

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5. Robert Powell, "Crisis Stability in the Nuclear Age," *American Political Science Review*, Vol. 83, No. 1 (March 1989), pp. 61–76; Powell, *Nuclear Deterrence Theory: The Search for Credibility* (New York: Cambridge University Press, 1990); and Thomas C. Schelling, *Arms and Influence* (New Haven, Conn.: Yale University Press, 1966).

6. James D. Morrow, "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances," *American Journal of Political Science*, Vol. 35, No. 4 (November 1991), pp. 904–933.

7. Bruce Bueno de Mesquita, James D. Morrow, Randolph M. Siverson, and Alastair Smith, "An Institutional Explanation of the Democratic Peace," *American Political Science Review*, Vol. 93, No. 4 (forthcoming, December 1999).

democracies; (6) democracies are particularly likely to coerce into submission much smaller adversaries, including democratic rivals; and (7) democracies, when in a war, tend to suffer fewer casualties and tend to fight shorter wars than nondemocracies. The same theory, in other papers, accounts for significant variation in economic growth, human capital, war aims, and political survival rates of leaders.<sup>8</sup>

A commonly held view in international relations is that foreign policy decisionmaking improves when leaders seek advice from people holding diverse opinions.<sup>9</sup> Randall Calvert shows, to the contrary, that it is rational for political leaders to surround themselves with “yes-men,” and that doing so enhances rather than harms effective policy.<sup>10</sup> Decisionmakers consider the source of opinions on policy and discount for the biases of those sources. When a leader receives a contrary opinion from a frequent critic, the leader is likely to credit that judgment to the bias of the critic. When a leader receives advice against her policy from an adviser whose views usually are the same as hers, she is likely to reassess her judgment. This adviser’s disagreement cannot be attributed to a general bias against the leader’s viewpoint.

### *A Fuller Picture*

Walt’s review article could not possibly discuss all of the research within the formal modeling literature. To clarify additional contributions of this literature, we now summarize results from several papers Walt does not mention. Like Walt, we cannot possibly discuss all of the fine research given the limited space provided to us. What follows should be read as a sampler.

Woosang Kim and Morrow examine the consequences of long-term shifts in power on the likelihood of war.<sup>11</sup> Contrary to most treatments of this topic,

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8. On war aims, see Bruce Bueno de Mesquita, James D. Morrow, Randolph M. Siverson, and Alastair Smith, “Inside Out: A Theory of Domestic Political Institutions and the Issues of International Conflict,” Hoover Working Papers in International Relations (Stanford, Calif.: Hoover Institution, 1998). On economic growth and related matters, see Bueno de Mesquita, Morrow, Siverson, and Smith, “Policy Failure and Political Survival: The Contribution of Political Institutions,” *Journal of Conflict Resolution*, Vol. 43, No. 2 (April 1999), pp. 147–161; and Bueno de Mesquita, Morrow, Siverson, and Smith, “Political Institutions, Political Survival, and Policy Success,” in Bueno de Mesquita and Hilton Root, eds., *Governing for Prosperity* (New Haven, Conn.: Yale University Press, 2000).

9. See Alexander L. George, *Presidential Decisionmaking in Foreign Policy: The Effective Use of Information and Advice* (Boulder, Colo.: Westview, 1980).

10. Randall L. Calvert, “The Value of Biased Information,” *Journal of Politics*, Vol. 47, No. 2 (May 1985), pp. 530–555.

11. Woosang Kim and James D. Morrow, “When Do Power Shifts Lead to War?” *American Journal of Political Science*, Vol. 36, No. 4 (November 1992), pp. 896–922. See also Morrow, “The Logic of

they demonstrate that war is more likely if the declining state is risk averse and the challenging state is risk acceptant.<sup>12</sup> Further, the period of transition when power is approximately equal between rivals is not particularly dangerous. Additionally, the rates of growth in power are irrelevant to the likelihood of war. All these hypotheses are tested against the evidence and are supported. The latter two and the conjunction of the three are novel.

Kenneth Schultz's formalization of domestic political debate provides a new way to think about the nexus between domestic politics and foreign policy.<sup>13</sup> Whereas it is commonplace to argue that partisanship should end at the water's edge, Schultz shows formally and demonstrates empirically that partisan debate disciplines democratic leaders to seek effective foreign policies, whereas nonpartisanship in foreign affairs invites foreign adventurism and potential disaster.

Morrow shows that U.S. presidents were more likely to offer significant concessions to the Soviet Union in arms control negotiations when domestic economic factors threatened their re-election prospects.<sup>14</sup> He also shows systematic effects of congressional action on arms control negotiations through legislation on defense. Morrow tests the propositions of his model and finds support. His argument challenges structural views of arms control by showing how domestic political considerations shape negotiations.

Joanne Gowa models how security externalities influence trade policy. She argues that security concerns make states reluctant to trade with prospective adversaries. Bipolar systems mitigate this problem by reducing uncertainty about who prospective rivals are.<sup>15</sup> Gowa and Edward Mansfield report supporting evidence for this deduction.<sup>16</sup> Subsequent formal research draws attention to the limited circumstances under which this effect is expected to

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Overtaking," in Jacek Kugler and Douglas Lemke, eds., *Parity and War* (Ann Arbor: University of Michigan Press, 1996), pp. 313–330. For an alternative model of power shifts, see Robert Powell, "Uncertainty, Shifting Power, and Appeasement," *American Political Science Review*, Vol. 90, No. 4 (December 1996), pp. 749–764.

12. A.F.K. Organski, *World Politics* (New York: Alfred Knopf, 1958); Organski and Jacek Kugler, *The War Ledger* (Chicago: University of Chicago Press, 1980); and Robert Gilpin, *War and Change in World Politics* (New York: Cambridge University Press, 1981).

13. Kenneth A. Schultz, "Domestic Opposition and Signaling in International Crises," *American Political Science Review*, Vol. 92, No. 4 (December 1998), pp. 829–844.

14. James D. Morrow, "Electoral and Congressional Incentives and Arms Control," *Journal of Conflict Resolution*, Vol. 35, No. 2 (June 1991), pp. 243–263.

15. Joanne Gowa, "Bipolarity, Multipolarity, and Free Trade," *American Political Science Review*, Vol. 83, No. 4 (December 1989), pp. 1245–1256; and Gowa, *Allies, Adversaries, and International Trade* (Princeton, N.J.: Princeton University Press, 1994).

16. Joanne Gowa and Edward D. Mansfield, "Power Politics and International Trade," *American Political Science Review*, Vol. 87, No. 2 (June 1993), pp. 408–420.

hold.<sup>17</sup> The formal nature of Gowa's argument facilitated this theoretically fruitful debate.

George Downs and David Rocke model decisions by leaders facing disastrous military defeat.<sup>18</sup> Whereas it is commonplace to think that it is irrational for *states* to continue to fight when their defeat is imminent and continued fighting is costly, Downs and Rocke show that it is rational for *leaders* to take high risks in such situations. The downside risk for the leader is low and the upside for political resurrection is great. Their model provides a coherent explanation for the seemingly irrational acts of desperation common among leaders facing military defeat. They note that independently derived evidence supports their resurrection hypothesis.<sup>19</sup>

Alastair Smith addresses the puzzle of the reliability of alliances.<sup>20</sup> The dismal record of allies in coming to the defense of their partners leads many to infer that alliances are unreliable.<sup>21</sup> Smith shows formally that selection effects lead would-be aggressors to attack in exactly those cases when the allies are not expected to aid one another. He demonstrates in theory and shows empirically that the cases in which attacks are deterred involve allies who had significantly higher *expected* reliability than in those cases in which an attack did take place. He provides a theory that solves the puzzle of the dog that barks and the dog that does not.

Powell shows that a long shadow of the future can, as argued by Michael Taylor and Robert Axelrod, foster cooperation, but he also shows when a long shadow of the future fosters conflict.<sup>22</sup> A longer shadow of the future increases the benefits of the peaceful period that follows a military victory, increasing the benefits of victory and therefore the willingness to fight.

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17. James D. Morrow, "When Do 'Relative Gains' Impede Trade?" *Journal of Conflict Resolution*, Vol. 21, No. 1 (February 1997), pp. 12–37.

18. George W. Downs and David M. Rocke, "Conflict, Agency, and Gambling for Resurrection," *American Journal of Political Science*, Vol. 38, No. 2 (May 1994), pp. 362–380.

19. Bruce Bueno de Mesquita and Randolph M. Siverson, "War and the Survival of Political Leaders," *American Political Science Review*, Vol. 89, No. 4 (December 1995), pp. 841–855; and Bueno de Mesquita, Siverson, and Gary Woller, "War and the Fate of Regimes," *American Political Science Review*, Vol. 86, No. 3 (September 1992), pp. 638–646.

20. Alastair Smith, "Alliance Formation and War," *International Studies Quarterly*, Vol. 39, No. 4 (December 1995), pp. 405–425.

21. Alan N. Sabrosky, "Interstate Alliances: Their Reliability and the Expansion of War," in J. David Singer, ed., *The Correlates of War II* (New York: Free Press, 1980); and John A. Vasquez, "The Steps to War: Toward a Scientific Explanation of Correlates of War Findings," *World Politics*, Vol. 40, No. 1 (October 1987), p. 119.

22. Robert Powell, "Guns, Butter, and Anarchy," *American Political Science Review*, Vol. 87, No. 1 (March 1993), p. 120; Michael Taylor, *Anarchy and Cooperation* (New York: John Wiley and Sons, 1976); and Robert Axelrod, *The Evolution of Cooperation* (New York: Basic Books, 1984).

We hope this sampler will tempt some readers to take a closer look at the formal, rational choice literature dealing with security studies. A place to begin is with informed reviews of this literature.<sup>23</sup>

#### ERRORS IN WALT'S CARICATURES

As we have noted, models often attempt to capture existing theories and such models, not surprisingly, reproduce some conclusions that are already known. Then it is easy to point to any number of "well-known" conclusions and claim that the literature lacks originality. The proper test of originality is whether these models produce novel results. Here we reexamine some of the papers that Walt discusses to show novel conclusions he ignores. (We refer to Walt's examples by using the numbers he gives to each of the example papers he cites.)

EXAMPLE NO. 1. James D. Morrow, "Capabilities, Uncertainty, and Resolve."<sup>24</sup> In addition to the conclusions that Walt mentions (p. 23), this paper also presents the first analysis of selection effects on unobservable resolve using a formal model. This paper is a precursor to James Fearon's discussion of selection effects, which Walt (p. 15) describes as an important contribution of the formal theory literature.

EXAMPLE NO. 4. David Lalman and David Newman, "Alliance Formation and National Security."<sup>25</sup> Walt describes their conclusion that "nations *generally* enter into alliances in the expectation of improving their security position" as "prosaic" (p. 25, emphasis added). Two points are noteworthy. First, Lalman and Newman offer no formal theory; it is an empirical paper motivated by prior theoretical research, so its inclusion by Walt seems odd. Second, their empirical results pose a puzzle: there are many alliances that are not security seeking. Morrow's investigation of the trade-off between security and autonomy in alliances was partially motivated by Lalman and Newman's observation that 12 percent of nations in alliances expected to lose security as a

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23. Recent surveys include James D. Morrow, "Leaders, States, and International Politics," in Eun Ho Lee and Woosang Kim, eds., *Recasting International Relations Paradigms* (Seoul: Korean Association of International Studies, 1996), pp. 79–101; Morrow, "The Strategic Setting of Choices: Signaling, Commitment, and Negotiation in International Politics," in David A. Lake and Robert Powell, eds., *Strategic Choice and International Relations* (Princeton, N.J.: Princeton University Press, 1999), pp. 77–114, particularly pp. 103–112; and Morrow, "The Ongoing Game-Theoretic Revolution," in Manus I. Midlarsky, ed., *Handbook of War Studies II* (Ann Arbor: University of Michigan Press, forthcoming).

24. James D. Morrow, "Capabilities, Uncertainty, and Resolve," *American Journal of Political Science*, Vol. 33, No. 4 (November 1989), pp. 941–972.

25. David Lalman, and David Newman, "Alliance Formation and National Security," *International Interactions*, Vol. 16, No. 4 (1990), pp. 239–254.

consequence of the alliance.<sup>26</sup> As discussed earlier, Morrow's study led to significant new insights about alliance formation, duration, and termination.

EXAMPLE NO. 5. James D. Morrow, "Alliances, Credibility, and Peacetime Costs."<sup>27</sup> Walt admits that "Morrow's formulation challenges the idea that alliance credibility is largely driven by concerns about reputation" (p. 25) but goes on to argue that "the conclusions for the most part echo the conventional wisdom" (pp. 25–26). Far from being a deficiency, this is an example of the power of rational choice models. Morrow has constructed a model that echoes some conventional wisdom while showing that other parts of received knowledge, specifically the presumed need to invoke international reputation, are not needed to render alliances credible. In a single model, Morrow shows the logical basis for supporting some conventional insights and for refuting others.

EXAMPLE NO. 7. James D. Fearon, "Rationalist Explanations for War."<sup>28</sup> Walt's characterization is mistaken in two fundamental ways. First, Walt depicts Fearon's description of the commitment problem as "merely to give a new label to a well-established idea" (p. 28). This is incorrect. The conventional argument for why anarchy leads to war—the "well-established idea"—is that there is no supernational authority to enforce agreements. Fearon notes that the absence of a central authority does not explain why states choose war over negotiated settlement. Instead, Fearon says, "the fact that under anarchy one state's efforts to make itself more secure can have the undesired but unavoidable effect of making another state less secure. . . . says nothing about the availability or feasibility of peaceful bargains that would avoid the costs of war."<sup>29</sup> The conventional arguments about anarchy have not adequately considered, as Fearon has, that rivals can resolve disputes peacefully to avoid costs without the aid of a central authority. Conventional arguments about anarchy are insufficient to explain the failure of negotiations to avoid war. As will be evident when we turn to Walt's critique of *War and Reason*, the recognition of commitment problems in bargaining leads to propositions that contradict realist claims about international politics.

Second, as Walt recognizes in footnote 62, "Unlike some forms of secrecy (such as number of weapons, for example), 'private information' includes information (such as a player's level of resolve) that could not be reliably

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26. Morrow, "Alliances and Asymmetry," p. 906.

27. James D. Morrow, "Alliances, Credibility, and Peacetime Costs," *Journal of Conflict Resolution*, Vol. 38, No. 2 (June 1994), pp. 270–297.

28. James D. Fearon, "Rationalist Explanations for War," *International Organization*, Vol. 49, No. 3 (Summer 1995), pp. 379–414. Walt mistakenly refers to this paper as "Rationalist Theories of War."

29. *Ibid.*, pp. 384–385.

revealed to the other side even if one wanted to" (p. 28), yet Walt maintains in the body of the text that "although the concept of 'private information' is broader than the more familiar idea of 'secrecy,' its effects on crisis bargaining are essentially the same" (p. 28). The effects are quite different exactly because even efforts to truthfully reveal private information may be construed by the opponent as lies or bluff, whereas secrets can be truthfully revealed and accepted as such by the other side. Incentives to misrepresent private information complicate crisis bargaining even for those inclined to be honest in ways not fully appreciated previously.

EXAMPLE NO. 10. Bruce Bueno de Mesquita and David Lalman, *War and Reason: Domestic and International Imperatives*.<sup>30</sup> Walt contends that the results of Bueno de Mesquita and Lalman's model are trivial in the sense that they are well known. By our count, nineteen of at least twenty-five explicit propositions are novel. Twelve of the nineteen and several of the others are tested against evidence, and none of the novel hypotheses are discussed by Walt. For instance, Bueno de Mesquita and Lalman show conditions under which extreme weakness makes countries more belligerent. Their pacific dove hypothesis—under uncertainty, very peace-loving, weak states are especially likely to respond to threats by attacking—contradicts views articulated by most realists, yet the evidence is consistent with this hypothesis. Additionally, Bueno de Mesquita and Lalman show how a commitment problem can, without uncertainty, lead to war even though all actors prefer negotiation. This result, also identified by Fearon as discussed above, is supported by the evidence.<sup>31</sup> The theoretical result and tests contradict Walt's claim that uncertainty always increases the risk of instability and also contradict Robert Keohane's contention that improved information always promotes cooperation.<sup>32</sup>

Walt claims that Bueno de Mesquita and Lalman conclude trivially that "if both sides would rather talk than fight and if both sides know this, they do

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30. Bruce Bueno de Mesquita and David Lalman, *War and Reason: Domestic and International Imperatives* (New Haven, Conn.: Yale University Press, 1992).

31. Fearon, "Rationalist Explanations for War."

32. Waltz, *Theory of International Politics*, p. 170; and Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton, N.J.: Princeton University Press, 1984), pp. 245–247. Curtis S. Signorino's test in "Strategic Interaction and the Statistical Analysis of International Conflict," *American Political Science Review*, Vol. 93, No. 2 (June 1999), pp. 279–297, contains corrected empirical tests of the paper Walt (p. 38 n. 96) cites. Signorino shows that, because of measurement—not theoretical—difficulties in *War and Reason*, the theory fares modestly at worst and at best does well. Alastair Smith, "Strategic Estimation in International Relations," paper presented at the annual meeting of the American Political Science Association, Boston, Massachusetts, September 3–6, 1998, uses a demanding Bayesian test. He finds that the international interaction game is the only theory of conflict whose predictions outperform the null hypothesis.

not fight" (p. 36 n. 93). This is incorrect. The point of *War and Reason* is to explain when nations wage war and when reason prevails so that war is averted. In *War and Reason*, all players are assumed to prefer to talk rather than wage war, and this is assumed to be common knowledge.<sup>33</sup> Nevertheless, the game shows conditions under which war takes place even though everyone prefers to talk (negotiate) rather than wage war. Additionally, *War and Reason* shows when doves will not fight one another and when they will; it shows when hawks will not fight one another and when they will; and it shows when hawks and doves will live peacefully or will fight one another. The propositions are contingent, and all are equally burdened by the assumption that all players know that everyone would rather talk than wage war.

Walt (p. 37 n. 95) suggests that the empirical results in *War and Reason* are not replicable because the method for measuring variables is not explained. The measurement of the primitive components of every variable are explained in the appendix so that anyone can reconstruct the composite variables. All of *War and Reason* has been replicated by others, including extensions to new or enlarged data sets. Indeed, D. Scott Bennett and Allan Stam have constructed a web site for those who wish to experiment with the replicated variables from *War and Reason* on new data sets.<sup>34</sup>

The case studies in *War and Reason* critiqued by Walt are used only to illustrate the intuition behind the model's logic and not as evidence. That book relies on large-*N* statistical studies because the hypotheses deduced from the theory are about *variation* across cases.<sup>35</sup> Prediction of individual cases is not the appropriate way to test the propositions in *War and Reason*. Space limitations preclude addressing Walt's criticisms of individual case illustrations, each of which is readily defended.

### *Relevant Knowledge*

Walt's concluding remarks contend that "instead of using their expertise to address important real-world problems, academics often focus on narrow and trivial problems that may impress their colleagues but are of little practical

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33. "ASSUMPTION 4: *All nations prefer to resolve their differences through negotiation rather than war.*" See Bueno de Mesquita and Lalman, *War and Reason*, p. 40 (emphasis in original).

34. Their EUGene software, data, and documentation can be found at <http://wiz-ard.ucr.edu/cps/eugene/menu.html>.

35. Because of the difficulty in estimating values for key variables, tests evaluate whether the *central tendency* of the data supports the propositions. The tests all support the theoretical claims in Bueno de Mesquita and Lalman, *War and Reason*, pp. 76 n. 10, 84, 88, 90, 112–114, 127–128, 133–134, 157, 190–191, 195–197, 205–208, 215–216, and especially 280.

value" (p. 46). In this section, we explain our view of the relationship between basic science and policy engineering and point to a development from formal models that has proven of immense practical value in the policy world.

We share Walt's view that social science should inform public policy. To inform public policy effectively, advice should be based on careful logical and empirical foundations. Basic research, whether through formal modeling or other methodologies, is necessary to establish such foundations. Social engineering based on personal wisdom, judgment, or taste alone fails to provide a framework for determining appropriate policy responses under changing circumstances. Results grounded in careful science are much less subject to idiosyncratic variations in tastes.

We believe that basic science uncovers general principles that are useful for informing decisions about current problems, even though the purpose of basic science is not immediately directed at the policy arena. Science should, in our view, drive policy engineering; basic science should not be driven by policy concerns. The focus of basic research is the discovery of general principles. Thus we should not be surprised that there can be a long interlude between scientific discoveries and their practical application.

Given the short history of formal models in international relations, it is encouraging that this literature has already produced a practical tool for policy analysis—Bueno de Mesquita's "expected utility" model, sometimes referred to as Policon or as Factions—derived from basic research.<sup>36</sup> This computerized model predicts the outcome of complex political settings, including detailed forecasts of actor-specific actions. Used as a simulation tool, it allows the design of strategies to improve the chances of achieving desired ends. These strategies are detailed, dynamic, and practical. The model leads to specific policy advice and has an independently documented track record of accuracy and precision. Real-time predictions from this model are in the academic literature.<sup>37</sup> The

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36. The applied model grows out of Bruce Bueno de Mesquita, *The War Trap* (New Haven, Conn.: Yale University Press, 1981); Bueno de Mesquita, "An Expected Utility Explanation of Conflict Escalation," in Dina Zinnes, ed., *Conflict Processes and the Breakdown of International Systems*, Denver Monograph Series in World Affairs, vol. 20, bk. 2 (Denver: University of Denver, 1983), pp. 47–60; Bueno de Mesquita, "The War Trap Revisited," *American Political Science Review*, Vol. 79, No. 1 (March 1985), pp. 157–176; Bueno de Mesquita, David Newman, and Alvin Rabushka, *Forecasting Political Events* (New Haven, Conn.: Yale University Press, 1985); and Bueno de Mesquita and Frans Stokman, eds., *European Community Decision Making* (New Haven, Conn.: Yale University Press, 1992).

37. Bueno de Mesquita, Newman, and Rabushka, *Forecasting Political Events*; Bruce Bueno de Mesquita, "Multilateral Negotiations: A Spatial Analysis of the Arab-Israeli Dispute," *International Organization*, Vol. 44, No. 3 (Summer 1990), pp. 317–340; Bueno de Mesquita and A.F.K. Organski, "A Mark in Time Saves Nein," *International Political Science Review*, Vol. 13, No. 1 (January 1992),

reader can judge the accuracy and value of the model from reading these articles. Some examples include predictions about the succession to Ayatollah Khomeini in Iran (published five years before his death), North and South Korea's entry into the United Nations, and Yasser Arafat's willingness to accept a very limited concession over land from Israel in exchange for a peace accord (published in 1990).

Others have evaluated the accuracy of the model's predictions in the academic literature. James Ray and Bruce Russett note that "this 'expected utility' forecasting model has now been tried and tested extensively. The amount of publicly available information and evidence regarding this model and the accuracy of its forecasts is sufficiently substantial, it seems to us, to make it deserving of serious consideration as a 'scientific' enterprise."<sup>38</sup>

The United States government also reports that it finds the model accurate and that it uses the model to assist with important foreign policy matters. According to Stanley Feder, of the Central Intelligence Agency, the model was "found to be accurate about 90 percent of the time." Feder reports that "forecasts and analyses using Policon have proved to be significantly more precise and detailed than traditional analyses. Additionally, a number of predictions based on Policon have contradicted those made by the intelligence community, nearly always represented by the analysts who provided the input data. In every case, the Policon forecasts proved to be correct."<sup>39</sup>

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pp. 81–100; Bueno de Mesquita, James D. Morrow, and Samuel S.G. Wu, "Forecasting the Risks of Nuclear Proliferation: Taiwan as an Illustration of the Method," *Security Studies*, Vol. 2, Nos. 3–4 (Spring/Summer 1993), pp. 311–331; Bueno de Mesquita and Stokman, *European Community Decision Making*; Wu and Bueno de Mesquita, "Assessing the Dispute in the South China Sea: A Model of China's Security Decision Making," *International Studies Quarterly*, Vol. 38, No. 3 (September 1994), pp. 379–403; Bueno de Mesquita, David Newman, and Alvin Rabushka, *Red Flag over Hong Kong* (Chatham, N.J.: Chatham House, 1996); Bueno de Mesquita and Yi Feng, "Forecasting China's Political and Economic Future," *Problems of Post-Communism*, Vol. 44, No. 2 (March–April 1997), pp. 14–27; Bueno de Mesquita, "The End of the Cold War: Predicting an Emergent Property," *Journal of Conflict Resolution*, Vol. 42, No. 2 (April 1998), pp. 131–155; Roberto Ley-Borrás, "Forecasts and Decisions on Economic Pacts in Mexico," *Annals of the American Academy of Political and Social Science*, Vol. 550 (March 1997), pp. 85–95; Bueno de Mesquita, "Forecasting Policy Decisions: An Expected Utility Approach to Post-Khomeini Iran," *PS*, Vol. 17, No. 2 (Spring 1984), pp. 226–236; Bueno de Mesquita and Chae-Han Kim, "Prospects for a New Regional Order in Northeast Asia," *Korean Journal of Defense Analysis*, Vol. 3, No. 2 (Winter 1991), pp. 65–82; and an entire special issue of *International Interactions*, Vol. 13, No. 2 (Fall 1997), edited by Jacek Kugler and Yi Feng, as well as more than a dozen articles not listed here.

38. James L. Ray and Bruce M. Russett, "The Future as Arbiter of Theoretical Controversies: Predictions, Explanations, and the End of the Cold War," *British Journal of Political Science*, Vol. 25, No. 4 (October 1996), p. 1569. See also William McGurn, "We Warned You," *Far Eastern Economic Review*, June 13, 1996, p. 68.

39. Stanley A. Feder, "Factions and Policon: New Ways to Analyze Politics," in H. Bradford Westerfield, ed., *Inside CIA's Private World: Declassified Articles from the Agency's Internal Journal, 1955–1992* (New Haven, Conn.: Yale University Press, 1995), pp. 274–292, at pp. 275, 292.

Feder discusses a few applications in depth while enumerating many others. Analysts have used the model to examine economic, social, and political issues. They have dealt with routine policy decisions and with questions threatening the survival of particular regimes. Issues have spanned a variety of cultural settings, economic systems, and political systems. For instance, the model helped keep Taiwan in the Asian Development Bank when China entered, and it identified important, previously undetected weaknesses in the coalition backing Ferdinand Marcos in the Philippines. Feder's discussion makes clear that the model provides added insights and real value above and beyond the knowledge of the experts who provide the data.

The extensive use of this model by the government of the United States is further documented by a story reported in *Izvestia*. Officials from the U.S. government demonstrated the model to Russian journalists and Russian intelligence officials. *Izvestia* reported on what it was told: "Experts engaging in studies within the framework of this system state that on the basis of long experience of using it, it can be said with a great degree of confidence that the forecasts are highly accurate. In particular, according to them, the 'Factions' method was used in May 1991 to predict the August putsch. . . . The forecasts are given to the President, Congress, and the U.S. government and are a substantial factor influencing the elaboration of the country's foreign policy course."<sup>40</sup>

Several aspects of the model just discussed are important to understand our view of how basic science informs policy. First, the model uses the results of basic research. That research was not designed to address specific policy problems; it strove to understand the general properties of political conflict. Second, one cannot know in advance which basic research will prove fruitful for policymaking. To judge basic research in general because most fails to make an immediate contribution to public policy is to abandon the prospect of having scientifically grounded policy analysis. Third, the model discussed here does not express policy opinions or make normative judgments. It elucidates feasible paths to chosen outcomes; it does not suggest what outcomes should be desired. Fourth, the model is general across cases. It always uses the identical computerized analysis to specify how variables relate to one another. Only the data vary from case study to case study. Fifth, the model required extensive engineering to convert abstract research results into a practical policy tool. We should be clear that theory should not be expected to jump directly

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40. "Russia Is Doomed to Stability Consider American Experts," *Izvestia*, April 3, 1995.

into policy applications. Much hard engineering work needs to be done following equally hard scientific work.

### *Conclusion*

An anonymous political scientist once explained to an economist the difference between their fields as follows: "In economics, you have *The Wealth of Nations*; in political science we have a wealth of notions." We have tried to lay out some of the advantages of using formal theory to sort through the wealth of notions in the field of international politics. The criteria for judging scientific theories, on which we and Walt agree, require logical consistency and empirical validity. We believe that logical consistency is the gatekeeper for judging theories; a theory that contains logical inconsistencies must be remedied before it can have any empirical content. The criteria of logical consistency and empirical validity are how a scientific field sorts through a wealth of notions.

Formal models assist this sorting by helping the research community examine the logical consistency of arguments. Of course, formalism is not necessary for close examination of the logic of an argument. We have found models helpful, particularly in dealing precisely with the details of arguments. As we have shown, Walt's article at times misrepresents the arguments advanced in papers using formal models. The details matter, and models have helped us establish both the details of an argument and their consequences for the conclusions of the argument.

Walt's article also appears to suffer from some confusion about the scientific enterprise. Scientists specialize across the research community. Some physicists, for example, are theorists and others are experimentalists. Yet Walt criticizes modeling papers that do not contain immediate empirical tests of their propositions even when he knows that other papers test implications of those models.<sup>41</sup> Both logical analysis and empirical assessment are essential for the advancement of science. They need not be done by the same people at the same time.

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41. Walt criticizes James D. Fearon, "Domestic Audience Costs and the Escalation of International Disputes," *American Political Science Review*, Vol. 88, No. 3 (September 1994), pp. 577–592, for not containing a direct test (pp. 34–35). Yet Walt also notes in footnote 86 (p. 34) that Joe Eyerma and Robert A. Hart Jr. test Fearon's prediction in "An Empirical Test of the Audience Cost Proposition: Democracy Speaks Louder Than Words," *Journal of Conflict Resolution*, Vol. 40, No. 4 (December 1996), pp. 597–616.

We have tried to clarify our views about the contributions of formal theory to security studies. Through examples we have shown how logical rigor has helped clarify arguments. We have explored briefly some of the novel insights that the formal literature, though still in its infancy, has already contributed. And we have demonstrated that the formal literature has made an important contribution to public policy. We conclude, then, by agreeing with Walt that “security studies should welcome contributions from formal theory” (p. 48).