The Past, Present, and Future of Behavioral IR

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Abstract Originally developed by applying models from cognitive psychology to the study of foreign policy decision making, the field of behavioral IR is undergoing important transformations. Building on a broader range of models, methods, and data from the fields of neuroscience, biology, and genetics, behavioral IR has moved beyond the staid debate between rational choice and psychology and instead investigates the plethora of mechanisms selected by evolution for solving adaptive problems. This opens new opportunities for collaboration between scholars informed by rational choice and behavioral insights. Examining the interactions between the individual's genetic inheritance, social environment, and downstream behavior of individuals and groups, the emerging field of behavioral epigenetics offers novel insights into the methodological problem of aggregation that has confounded efforts to apply behavioral findings to IR. In the first instance empirical, behavioral IR raises numerous normative and philosophical questions best answered in dialogue with political and legal theorists.

In the introduction to a recent special issue of *International Organization (IO)*, the authors champion a research program "focused on the causes and consequences of heterogeneity" across social actors. Although "still in its early stages," they argue that a "new behavioral revolution" is underway. With a focus on individual heterogeneity, it portends "several big payoffs." Among these are "more empirically realistic models of individual decision-making processes" and a better understanding of how individual and aggregate behavior are linked.[1]

In fact, important strains of social science have always been interested in the causes and consequences of individual heterogeneity and behavioral variation.[2] Over a half-century old, the original behavioral revolution set out to construct empirically realistic models of decision making.[3] The empirical study of foreign policy decision making developed rapidly with the application of concepts and methods borrowed from cognitive psychology.[4] Distinct from approaches that stressed ego dynamics, personality traits, and psychobiography,[5] this strand of political psychology quickly recognized shared research interests with the field of behavioral economics

1. Hafner-Burton et al. 2017, S4.
2. See Bueno de Mesquita 2003; Bueno de Mesquita et al. 2005; Camerer, Loewenstein, and Prelec 2005; Samuelson 1963; Sen 1973.
3. Easton 1969.
4. For the classic statement on the need for a decision-making approach to IR during the original behavioral revolution, see Snyder, Bruck, and Sapin 1954.
5. Examples include Adorno et al. 1959; George and George 1956; Greenstein 1975; Hermann 1978; and Holsti 1962.

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as it developed in the 1980s and 1990s.[6] But whether such "bottom up," empirically grounded approaches are helpful for theory building and explanation remains a topic of heated debate across economics and political science.[7]

Although behavioral IR's focus on individual heterogeneity and decision-making processes is not all that new, the field *is* undergoing important transformations, only some of which have been discussed in the wider international relations (IR) community. Originally built on insights and methods drawn primarily from psychology, behavioral research now employs a wider range of theoretical models, methods, and data from the fields of neuroscience, biology, and genetics. Consequently, behavioral IR is characterized by increasing disciplinary, theoretical, and methodological pluralism.

The effects are liberating and stimulating. Behavioral researchers no longer have to frame questions in terms of the staid theoretical debate between rational choice and psychology. Rather, they investigate the plethora of psychological mechanisms selected by evolution for solving adaptive problems.[8] To do so, political scientists now team up with researchers in the biological sciences to investigate the political implications of our evolutionary legacy. Methodologically, case studies and statistical methods are being augmented by laboratory and field experiments, with findings of interest to realists, liberals, and constructivists alike. Empirically, research in the emerging field of epigenetics suggests the social environment can affect individuals' genes in ways that influence downstream behavior. This not only opens novel avenues for social constructivist research but also points to previously unknown mechanisms that help redress the oft-criticized "mismatch between behavioral findings about individuals and the fact that the actors in most IR models and theories are aggregate actors."[9]

In what follows, we review the origins, status, and future of behavioral IR, understood as the empirical study of political decision making by individuals, groups, and institutions. In doing so, we point to areas where behavioral and rational IR meet. First, we summarize the development of political psychology in IR and discuss the integration of insights from behavioral economics into the IR research agenda. The section ends with a discussion of the growing importance of experimental research in IR. Although the experimental method is fueling much behavioral research, it raises new ethical, methodological, and empirical questions. Importantly, experiments are unlikely to supplant other established methods of data collection, and thus cannot be conflated with the larger field of behavioral IR. Second, we turn to new research in genetics, human biology, emotion, and cognition. These newer strands of research relate directly to many questions central to IR and political decision making. Third, we identify areas of research where scholars informed by

6. See Jervis 1992; Levy 1992a, 1992b; McDermott 2001, 2004a.
7. Friedman 1953; Lebow and Stein 1989; Samuelson 1963; Waltz 1979.
8. Cosmides and Tooby 1994.
9. Powell 2017, S265.

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behavioral and rational choice models could benefit from sustained interaction and collaborative research. In our concluding remarks, we link behavioral IR to important normative questions of political practice.

Political Psychology as an Approach to International Relations

Psychological studies of political behavior date at least to the 1930s.[10] However, political psychology—the application of our knowledge of human psychology to the study of politics—first emerged as a self-conscious discipline in the late 1960s. Foundational studies published in the 1970s addressed such phenomena as individual biography and personality, intra- and intergroup dynamics, mass political behavior, political socialization, political communication, leadership, and decision making.[11] In IR, political psychology took root in studies of conflict, in particular the ongoing Cold War. Herbert Kelman pioneered the application of social psychology to the study of international conflict, foreshadowing subsequent developments with the publication of *International Behavior* in 1965.[12] The turning point in the systematic application of psychology to international politics and the development of a "cognitive paradigm" in IR was the publication of Robert Jervis's *Perception and Misperception in International Politics* a decade later.[13]

Recognizing that foreign policy decision makers confront a complex world in which much of what is relevant for their decisions is unknown, uncertain, ambiguous, or outright contradictory, Jervis studied how leaders perceive and try to make sense of their world in pursuit of effective action. He found that the perceptions of decision makers, like those of people in general, are mediated by pre-existing beliefs, images, and theories. To reduce complexity and resolve ambiguity, decision makers employ numerous cognitive shortcuts that bias inferences in systematic ways. Because people exhibit a strong predisposition to perceive what they already know or expect, they tend to ignore information that contradicts prior beliefs; they assimilate ambiguous information to pre-existing beliefs; and they are quick to reach conclusions, as theory-driven perceptions seem to confirm these preexisting beliefs. The result is frequent misperception.[14]

The implications for IR are many. Enemy images persist even when states try to signal benign intentions.[15] Leaders are slow to perceive impending attacks from states previously held to be benign or incapable of effective military action.[16] The

10. Lasswell 1930.
11. McDermott 2004c; Sears, Huddy, and Jervis 2003, 3.
12. Kelman 1965.
13. Levy 2003, 253, 260; McDermott 2013.
14. "Misperception" can be understood either as a discrepancy between perceptions and "reality" or as deviation from the normative model of rational information processing. See Jervis 1976, 7; and Levy 2003, 261–63.
15. Tetlock 1998; Yarhi-Milo 2014, chapters 9 and 10.
16. Bar-Joseph and McDermott 2017; Lebow 1985a; Stein 1985.

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formative experiences of leaders, together with significant events in a country's collective memory, provide a repertoire of analogies that decision makers often apply in overly simplified ways in search of lessons for the present.[17] Because of cognitive rigidity, fundamental change in foreign policy is likely to come only in the wake of massive shock, foreign policy failure, or major change—often generational—in the state's leadership.[18]

Cognitive biases at the level of the individual interact with and often enhance behaviors resulting from the condition of international anarchy. A prominent example is the security dilemma. Because of anarchy, military preparations of states that fear for their security can have the unintended consequence of menacing the security of others because weapons acquired for defense often can be used for offensive ends, and states rarely feel completely certain about other states' intentions. The countermeasures adopted by others in response can then produce a situation in which neither is more secure.[19] Leaders who know they have no offensive aims tend to assume that this is self-evident and therefore attribute the countermeasures of others to hostile intent.[20] The behavior is consistent with what psychologists call the "fundamental attribution error"—the tendency of people to explain their own behavior as a reaction to the situation they confront whereas they explain the behavior of others in terms of their inner disposition.[21] Enhanced by such psychological dynamics, the security dilemma can lead to arms races and spirals of hostility even among states that have only defensive motives, and when particularly virulent, it can tempt decision makers to contemplate preemptive or preventive war.[22]

Of course, decision makers are not always motivated by defensive aims. Sometimes military measures are a credible signal of hostile intent. Thus, knowledge of the security dilemma and its dynamics does not ensure that states can escape it.[23] Because the prospect of avoiding war often hinges on an accurate assessment of the motives behind states' actions or the veracity of their signals, much of political psychology has been focused on questions of signaling, resolve, and reputation.[24]

The cognitive paradigm in foreign policy analysis conceives of decision makers as cognitive misers and explains biases and misperceptions in terms of the mental shortcuts they employ (usually unconsciously) in an effort to save mental time and energy, and to reduce pervasive complexity and ambiguity in international relations. By contrast, the motivational model assumes that human cognition is largely driven by desires and emotions, most notably mechanisms of ego defense, reflecting a basic human need to avoid stress, fear, shame, and guilt. The impulse to avoid these

17. Khong 1992; May 1973; Neustadt and May 1986.
18. Jervis 1976, 249–57; Lebow 1985b; Tetlock 1991.
19. See Herz 1950; and Jervis 1978.
20. Jervis 1976, 67–76, 354–55.
21. See Nisbett and Ross 1980; Ross 1977.
22. Reiter 2003.
23. See, for example, Stein 1985, 69–71.
24. See, for example, Brutger and Kertzer 2018; Dafoe, Renshon, and Huth 2014; Lebow 1998; Lebow and Stein 1987; Lupton 2020; Mercer 1996, 2013; Renshon, Dafoe, and Huth 2018; Yarhi-Milo 2018.

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negative emotions can distort or impair cognitive function.[25] Whereas the shortcuts to decision making stressed by Jervis are pervasive, motivated biases appear most relevant when individuals contemplate choices that involve risks to important values or tradeoffs between them. To avoid psychic stress, individuals engage in wishful thinking, deny the existence of threats to values as well as the need to make value tradeoffs, and engage in premature cognitive closure.[26] This "defensive avoidance" can lead a decision maker to ignore warnings or information that might contradict the chosen course of action.[27]

The Cold War context that much of IR theory developed in tended to obscure other traditions in political psychology. Consequently, studies of leadership and group psychology, though never completely absent, were not central to mainstream debates in IR.[28] For realists, the Cold War competition between the United States and the Soviet Union reinforced the basic conviction that international politics is a realm of compulsion rather than choice. Individual leaders, at least from the standpoint of theory, were regarded as interchangeable.[29] In search of generalizable insights, scholars thus tended to study those cognitive limitations that are common to human decision makers rather than focus on individual idiosyncrasies. As developed in the US during the Cold War, liberalism was stripped of much of its Enlightenment heritage and reduced to the notion that the state's foreign policy reflects the sum of choices made by individuals pursuing egoistic preferences.[30] Groups and leaders generally were not seen as independent causal factors in producing foreign policy choices. Moreover, the inability to collect individual or group-level data for large numbers of decision-making elites hindered these scholars' efforts to provide evidence in support of their arguments.[31]

Given its focus on how decision makers cope with pervasive complexity and ambiguity in international politics, political psychology naturally incorporated the related research of psychologists and behavioral economists interested in how individuals make decisions in the marketplace. In particular, the studies of judgment and decision making under conditions of risk and uncertainty influenced the further development of the political psychology research program. Because the basic arguments now are widely known, a brief summary of two areas of research should suffice for purposes of illustration.

25. See Janis and Mann 1977; and Taber and Lodge 2006.

26. See Holsti and George 1975; Janis and Mann 1977, 45–80.

27. Janis and Mann 1977, 74–79. For empirical examples, see Bar-Joseph and McDermott 2017; Lebow 1981; and Lebow and Stein 1994, 64–66.

28. Examples include Hermann 1980; Hermann and Preston 1994; Janis 1982; Post 1991; Tetlock et al. 1992.

29. Morgenthau 1960, 5; Waltz 1979; Wolfers 1962, chapter 3. Not surprisingly, renewed interest in the influence of individual leaders on American foreign policy coincided with the decline of superpower security competition and external constraints on the US.

30. Thus, Arrow 1963 reduced the liberal concept of popular sovereignty to the economic concept of consumer choice. For the Cold War origins of American IR liberalism, see Amadae 2003.

31. Walker 2007.

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Judgment

Judgment refers to an individual's assessment of the probability that a particular observation belongs to a general class of events or the likelihood that a certain event will occur. For example, how likely is it that the Korean dictator Kim Jung Un is a rational actor, his nuclear weapons program a reasonable response to the security fears inspired by an anarchic international system? How likely is it that he is a "madman" who would be willing to risk the existence of his state and life in pursuit of personal or dynastic glory? And how likely is it that US President Donald Trump will respond to Kim's provocations by launching a pre-emptive strike on North Korean nuclear targets? Judgments such as these are crucial to those seeking to devise effective foreign policies, but even under the best of circumstances, they are reached under conditions of uncertainty. Consequently, judgments vary across individuals, although some types and sources of variation are systematic, resulting from common heuristics and biases.[32]

Decision Making Under Risk

Foreign policy decision makers operate in an environment of incomplete information where the incentives for others to misrepresent their interests and actions are strong. Hence, judgment is central to the enterprise. However, once probability judgments have been made, leaders still need to make choices among those options that have been identified. Developed by Kahneman and Tversky in the 1970s, prospect theory emerged in the 1980s as a leading psychological theory of decision making under conditions of risk and uncertainty. Prospect theory characterizes decision making as a two-phase process. First, individuals edit or frame options. Second, decision makers choose among the available options.[33]

Prospective outcomes are framed vis-à-vis a reference point, thus establishing a psychological domain of gains (outcomes above the reference point) and of losses (outcomes below the reference point), where the reference point most often is the status quo.[34] The framing of prospective outcomes produces important behavioral effects. Whereas expected utility theory assumes that a person's utility for a particular good is a function of the net amount of that good possessed, prospect theory maintains that people are more sensitive to their relative position[35] and changes in their endowment, and that choice is driven by a strong psychological aversion to loss. For most people, the pain of loss is greater than the pleasure experienced by a gain of similar magnitude. Consequently, they will accept greater risks when trying to avoid losses than they will to achieve similar gains. Because most people are risk

32. Kahneman and Tversky 1973; Tversky and Kahneman 1971, 1973, 1974, 1983.
33. Kahneman and Tversky 1979.
34. Tversky and Kahneman 1986.
35. Jones et al. 1998

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acceptant in the domain of loss but risk averse in the domain of gains, reframing an identical outcome in terms of a loss rather than a gain routinely leads to a reversal in preferences and corresponding choice.

Political scientists were quick to recognize that prospect theory might explain a number of foreign policy regularities. Thus, Janice Stein suggested that loss aversion could explain escalation in limited wars, while Jack Levy used prospect theory to deduce a number of IR propositions.[36] Empirical studies subsequently provided support for these theoretical ruminations.[37]

As the discussion demonstrates, careful empirical work in the subfield of political psychology and related research in behavioral economics has been ongoing, incremental, and cumulative. The data are unambiguous. Heuristics and biases are not anomalies but pervasive. Moreover, they often are systematic and thus cannot be waved away as "noise"—for example, randomly distributed errors that either "wash out" or can be controlled for easily through proper statistical technique.

Predictably, the success of behavioral research in documenting widespread and systematic deviations from the normative standards of synoptic rationality has sparked increased interest in the use of the experimental method in IR.[38] As the ease and costs of conducting survey experiments have declined precipitously, particularly with the near ubiquitous use of on-line platforms, scholars increasingly integrate these experiments into their research designs, generating new streams of data. But the benefits of controlled experimental design often raise questions of external validity that are best answered through additional experiments, case and field studies, interviews, and large-*N* studies.[39] Although experiments are common in the subfield of political psychology,[40] the method is neutral with regard to theoretical orientation. For example, experiments are used widely in the subfield of American politics to test and refine rational choice models of voting behavior.[41]

If the experimental method is not exclusive to behavioral research, neither is it necessary for progress. Some of the most innovative avenues of behavioral research make use of genetic data using rather straightforward tools of statistical analysis.[42] Thus, we should be careful not to conflate behavioral IR's substantive or theoretical focus with the experimental method itself. While these aspects of analysis often overlap, they are distinct.

36. Stein 1993, 21; and Levy 1997, 93–94. Also see Jervis 1992, 192–202.
37. See Berejekian 1997; Davis 2000; Farnham 1992; McDermott 1992; Taliaferro 2004.
38. Hudson and Butler 2010; Mintz, Yang and McDermott 2011.
39. Stein 2017.
40. From 2013 to 2017, 30 percent of political psychology submissions to a leading IR journal made use of experiments. The ratio was 4 percent for all submissions. See Kertzer and Tingley 2018, 5.
41. Experiments of voting behavior date to the 1950s. Eldersveld 1956. For a recent review, see Arceneaux 2005.
42. See, for example, Fowler, Baker, and Dawes 2008; Hatemi et al. 2010; and Hatemi et al. 2011.

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Biology, Evolution, and Human Psychology

The special issue of *IO* was largely silent on the most revolutionary work in behavioral science. This is not surprising, given that few political scientists feel at home in the disciplines and methods of neuroscience, evolutionary biology, behavioral genetics, and epigenetics. It is nonetheless regrettable because new imaging technologies allow us to "see" the brain at work, while rapid and inexpensive gene sequencing has opened the fields of genetics and epigenetics to behavioral science. Now able to probe a level beneath individual behavior, innovative research in these fields provides new insights into important sources of heterogeneity across otherwise similarly situated individuals and groups. This offers fresh perspectives on established questions in international relations[43] and new approaches to questions regarding aggregation and disaggregation, or the links between individual and group attributes, that have plagued behavioral research.[44] To introduce these new interdisciplinary approaches and demonstrate their potential, we return to a topic that has long concerned political psychologists, namely the role of emotions in decision making.

Emotions and Rationality

Emotions were traditionally regarded as hindrances to optimal decision making. The related belief that feelings are distinct from cognition was betrayed by Trump's ghostwriter when discussing the president's cognitive style: "He feels things and he thinks that the things he feels are thoughts."[45] Especially in times of crisis, "cool" rationality is preferred to "hot headed," emotional and impulsive action—hence the widespread fear that an emotional president poses a serious threat to world peace.[46]

However, the association of emotions with "hot" and reason with "cold" cognition, and the more general juxtaposition of emotional and rational decision making, has been refuted by neuroscience. Although Jonathan Mercer pointed to the incoherence of the approach over a decade ago,[47] even behaviorally oriented scholars find it difficult to jettison the outmoded juxtaposition, framing the problem as one of emotions getting in the way of optimal decision making.[48] While certain intense emotions such as lust or hate at times confound productive decision making (although often in quite systematic fashion), in most situations, emotions are essential to sound, indeed rational, decision making.[49] Simply reducing emotions to intervening variables that inhibit rational responses to environmental stimuli narrows our focus and obscures more than it explains.

43. See, for example, Rosen 2005.
44. Powell 2017; Stein 2017.
45. Davis et al. 2017.
46. See, for example, Chris Buckley and Austin Ramzy, "China's State Media Slams Trump's 'Emotional Venting' on Twitter," *New York Times*, 2 August 2017, A5.
47. Mercer 2005.
48. Hermann 2017, S80; Renshon, Lee, and Tingley 2017, S213,
49. McDermott 2004b.

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The intimate link between emotions and rationality is suggested by the economic notion of "preferences," which implies that individuals "like" some things more than other things.[50] To argue that I prefer one option to another is to imply some affective component to the ordering of options.[51] Rational choice models do not provide plausible explanations for the origins of preferences. By contrast, most neuroscientific and genetic approaches are theoretically grounded in evolutionary models and do provide parsimonious explanations consistent with mounting evidence.[52]

Psychological and neurological studies provide data supporting the argument that preferences either are independent of, or at least do not require, prior cognitive assessments of utility.[53] Moreover, it appears that the sections of the brain responsible for economic decision making are distinct from those activated when individuals contemplate political choice. Although the number of studies included was small, a recent review concluded that the neuroeconomic framework "is not well suited to understanding political choice."[54] Additional areas of neuroscience relevant for scholars interested in the origins of preferences include investigations into how risk perception changes over the lifespan. As individuals age, changes in the influence of emotions, motivation, and energy level on decision making appear to decrease their sensitivity to anticipated loss.[55] Writ large, psychological and neurological data suggest that preferences can be the product of the individual's phylogenetic (evolutionary) and ontogenetic (developmental) history, including processes of acculturation and familiarization.[56]

IR scholars may find it difficult to understand how scholars working in these disciplines know what they claim. While a thorough discussion lies outside the scope of this review,[57] the last decade witnessed enormous progress in understanding the nature and structure of emotional processing as a result of impressive advances in measurement. This includes the ability to undertake widespread hormonal and genetic analyses quickly and inexpensively. Wider use of magnetic resonance imaging (MRI) has produced a much more precise and sophisticated identification of which emotions influence particular political judgments by mapping areas of the brain that show activation when individuals confront specific decisions. These new endocrinological, genetic, and neuroscientific methods complement related research that uses more familiar tools. For example, a multidisciplinary team recently created a

50. The original idea of utility was linked closely to the pleasure derived from an outcome. See Bernoulli 1954.

51. The affective component may be the result of the social setting of choice. See Sen 1973, 252–53.

52. Ben-Ner and Putterman 2000; Bueno de Mesquita and McDermott 2004; McDermott, Fowler, and Smirnov 2008; Slovic 1995, 364.

53. See Kunst-Wilson and Zajonc 1980; Zajonc 1980, 1984; and Zajonc and Markus 1982. Zajonc's arguments are not without their critics. See, for example, Lazarus 1982, 1984.

54. Krastev et al. 2016

55. Samanez-Larkin and Knutson 2015.

56. Examples include Landau-Wells and Saxe 2020; McDermott, Fowler, and Smirnov 2008; Mennella 2014; Norton et al. 2005.

57. Interested readers are referred to McDermott 2004c.

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database of linguistic representations of emotions for 2,474 languages. Using established statistical techniques, they document widespread variation in the emotional semantics of twenty language families. The feelings individuals from various linguistic groups associate with emotion words are often quite different, even when the terms are treated as essentially equivalent in translation dictionaries. The documented variation, however, is systematic and suggestive of a common psychophysiological structure shared by all human beings.[58] Augmenting such established research programs with neuroimaging data promises a better understanding of the underlying causal mechanisms that link stimuli to behavior by way of emotions and cognition.[59]

Regardless of method, what is clear is that emotions do not require cognition. The converse, however, is not the case. Clinical studies provide strong evidence that an individual's ability to engage in "rational" decision making, in the sense implied by models of subjective expected utility, breaks down when emotional faculties are impaired. Reviewing the case histories of large numbers of patients who have experienced brain trauma, Antonio Damasio and his colleagues have made a strong case for the primacy of emotion in decision making. In particular, patients with lesions on their ventromedial prefrontal cortex exhibit an impaired ability to access and integrate emotions into decision tasks. Without access to emotional information, patients demonstrate a clear inability to make decisions necessary for negotiating their everyday lives. Without emotions to guide their cost-benefit calculations, otherwise intelligent people with no impairments of memory, alertness, or language skills often engage in a form of infinite regress, and consequently are unable to make decisions. When they do decide, a seeming inability to envision the future consequences of current choices leads these individuals to opt for short-term gratification at the expense of longer-term gain, leading to serious problems such as addiction.[60] Far from constituting a hindrance, emotions are a precondition for effective reasoning.[61]

Emotions sometimes lead us astray, although these patterns are often predictable. Even processes that are typically understood to be primarily cognitive in nature can be affected by emotional phenomena. The "availability heuristic" helps account for people's tendency to base their probability judgments on the ease and speed with which they can recall or imagine similar events.[62] Although frequently occurring events may indeed be more readily available for recall, several factors influence the ease or speed with which an image comes to mind that may be unrelated to the objective likelihood of an event. Vivid events are more readily available as guides

58. Jackson et al. 2019. The findings are largely consistent with hypotheses developed by Ekman and Friesen 1971. For a discussion of the language dependence of cognition and its importance for the study of IR, see Davis 2005.

59. Landau-Wells and Saxe 2020.

60. See Damasio 1996; and Damasio et al. 1994. Also, Bechara et al. 1997; and Bechara, Tranel, and Damasio 2000.

61. Vogel 1997, 1269.

62. Tversky and Kahneman 1973.

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to judgment than dry or abstract (one might say, forgettable) data.[63] And experiences that are linked to strong emotions are readily available as judgmental cues.[64]

For example, between 2005 and 2015, jihadi terrorists killed ninety-four people inside the borders of the United States.[65] During the same period, over 300,000 individuals were shot dead in "routine" gun violence.[66] Yet in 2016, 38.5 percent of Americans were "afraid" or "very afraid" of personally falling victim to a terrorist attack in the US. Gun violence was not among their top ten fears.[67]

Emotions are also central to how we learn. Whereas standard learning theories assume that beliefs are updated regardless of whether the individual views new information positively or negatively, neuroscientific studies find that the brain reacts differently to desirable and undesirable information. People are more likely to incorporate good news than bad news into their beliefs about the world. In particular, humans tend to update beliefs about themselves more readily in response to positive than negative information.[68] Because emotions can be functional as well as dysfunctional, understanding the origins and effects of different types of emotions on preferences, decision making, and social behavior would appear to be a fruitful avenue of study for students of foreign policy, a position long maintained by political psychologists such as Richard Ned Lebow.[69]

Applying studies of mood-congruent memory retrieval to foreign policy decision making, McDermott hypothesizes that a leader's choice of historical analogy in decision making will reflect her current mood. A general mood of fear would trigger memory of events where the experience of similar emotions was strong.[70] Mood also affects probability estimates, with happy individuals overestimating the likelihood of positive outcomes; the same individuals also overestimate the probability of negative outcomes when sad. Relatedly, affective appraisals influence risk assessments in various ways. Angry individuals tend to be more risk seeking whereas fearful ones are more risk averse.[71] Oftentimes emotional appraisals influence evaluations of unrelated factors. For example, if we have a positive view of some technology, say artificial intelligence, we are likely to underestimate the associated risks to society.[72] The effects of mood on cooperation and conflict in strategic situations, where outcomes are the product of interdependent choice, are less direct, with studies suggesting that happy individuals tend to apply simple decision heuristics—including social norms

63. See Borgida and Nisbett 1977, 258; and Lichtenstein et al. 1978, 551.
64. Loewenstein et al. 2001, 267.
65. Bergen et al. 2017.
66. Qiu 2015.
67. Wilkinson College 2016.
68. Kuzmanovic and Rigoux 2017; Sharot and Garrett 2016.
69. In addition to his earlier work, see Lebow 2008, 2010.
70. McDermott 2004b. The relevant studies on memory come from Bower 1981, 1983; and Schwarz 1990, 2000.
71. Lerner and Keltner 2001.
72. See Johnson and Tversky 1983; Lerner and Keltner 2000; Loewenstein et al. 2001; Slovic 1987, 1999. This insight helps provide an explanation for the aversion to value trade-offs that Jervis 1976, 441–72 documented.

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—when deciding whether to cooperate with others, whereas a negative mood leads to thinking that is more consistent with the dictates of rational choice.[73]

Evolutionary Legacy

From an evolutionary standpoint, we would expect the neural pathways leading from emotions to decisions to be shorter and faster than those for reasoning and rational choice. In simple spatial biological terms, efferents (neural fibers) from the peripheral senses largely flow straight into the amygdala, the seat of emotional processing, which then determines whether something is important enough to be sent on to the prefrontal cortex for further analysis. In other words, the brain's gatekeeper is emotional, and does not lie in the domain of higher-order abstract reasoning.[74] Rational analysis becomes engaged only after a person feels emotionally safe and physically secure. This makes sense from an evolutionary perspective. When survival depends on fight-or-flight decisions, it helps when these reactions are unmediated and spontaneous. People often experience an affective reaction before they even know what they are reacting to. For example, the fear produced by unexpected noises often precedes the identification of the source of the noise.[75]

Zajonc demonstrated that our memory of emotional reactions can be dissociated from, and is often better than, our memory of the details of the situation that produced the emotions. Hence, we can often remember that we did not like a particular individual or movie even though we cannot remember why.[76] The implications for foreign policy and diplomacy are large, for example, where long-standing or iterated relationships between given individuals can have subtle but profound influences on both the likelihood of success in diplomatic outcomes.

Researchers have begun to uncover the neurological bases of such phenomena, aided by advances in methods such as hormonal assays, genotyping, and brain imaging. Damasio postulates that sensory information is physically embodied in the form of emotional associations that influence subsequent decisions by providing a feeling for what is good and bad, or likely to produce pleasure or pain. When an individual encounters a situation similar to one from the past, these "somatic markers" provide a rapid source of information on which people or outcomes should be approached and which should be avoided.[77] This insight, developed from novel work with patients with brain lesions, provides an interesting evidentiary basis for the powerful pull of historical analogies. Part of the reason people gravitate toward analogies based on salient events from their political youth is not simply because these were novel, first-time experiences, but also because such novelty brought a particular kind of emotional

73. Hertel et al. 2000.
74. Anderson and Phelps 2000; LeDoux 1996, 2012.
75. Damasio 1996, 159.
76. Bargh 1984; Zajonc 1980.
77. Damasio 1996.

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and intellectual excitement. The somatic marker not only reinforces the touchstone event—the memory of which arouses positive feelings, even if the specific event was negative—but also evokes broader associated positive memories of youth itself.[78]

Genetic Bases of Behavior

Survival enhances the prospect that an individual's genes will be passed on to the next generation. With the inclusion of political traits in a number of large data sets of twins, technological advances in genetic sequencing, and a dramatic reduction in the cost of genetic analyses, numerous studies addressing the genetic bases of social behavior have been published in the last decade.[79] Consequently, a research program devoted to uncovering the causes and consequences of heterogeneity among decision makers cannot ignore the possible genetic bases of social behavior. With access to large sets of individual-level genetic information, scholars are beginning to evaluate new data from this deeper level of analysis to explore the genetic bases of individual differences.[80] The fields of behavioral genetics and behavioral epigenetics constitute the cutting edge of behavioral social science.

Although the paucity and expense of genetic data predisposed political scientists either to ignore the potential biological sources of individual traits and preferences (variation treated as exogenously given) or to stress their environmental determinants, the current wave of genetic research seeks to establish which aspects of individual variation of interest to the discipline have biological roots. Because specific genes, hormone levels, developmental characteristics, patterns of brain activity, and physiological responses systematically correlate with certain social and political attitudes and behaviors, it seems reasonable to assume that biology's causal role in producing political outcomes is greater than zero, at least in some areas. Integrating biological approaches with established conceptual frameworks and research programs reliant on environmental determinants would appear to be a more fruitful avenue for progress than replacing environmental with biological determinism.[81]

Starting from the premise that behavior results from a complex interaction of biology and environment, we can imagine numerous pathways by which genetic factors might influence behavior. Outside of a very few diseases where genes exert a determinative effect such as Huntington's, genetic influences tend to be polygenic and multifactorial. This means that many genes operate in concert across complex pathways, which interact in a reciprocal manner with environmental influences, including unique developmental experiences. No single gene is going to explain

78. Bower 1981.
79. Hatemi and McDermott 2012.
80. For studies that find a significant correlation between candidate genes and such political variables as ideological orientation and participation in elections, see Fowler, Baker, and Dawes 2008; Hatemi et al. 2010; and Hatemi et al. 2011.
81. See Smith and Hibbing 2007.

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any complex social and political trait. However, in aggregate, heritable influences can, and do, influence a vast array of complex political and social choices, preferences, and behaviors. That investigations of these phenomena are in their early days should not preclude but rather encourage further investigation.

Though the field of behavioral genetics is truly in its infancy, researchers have already produced findings with potential application to IR. For example, many studies of cooperation and conflict focus on individuals' propensity to trust others. The provision of public goods is held to be more effective when levels of "generalized" or "social" trust are higher.[82] With higher levels of trust, the efficiency of social and economic transactions is improved as the costs of monitoring compliance and punishing defection are reduced.[83] The dominant approach to understanding variations in individuals' basic inclination to trust others has focused on environmental features, in particular processes of socialization.[84] Using a twin study research design, Sturgis and his colleagues were able to estimate the additive genetic, shared environmental, and unique environmental components of an individual's degree of trust. They found that an additive genetic factor accounted for most of the variance in a multi-item trust scale, whereas the environmental influences experienced in common by sibling pairs produced no discernable effects.[85]

Although it may appear daunting for IR scholars who do not have a background in these disciplines, there are various ways of contributing to this kind of research. First, IR scholars in graduate school can take classes or other training in other disciplines. Similarly, the growing number of postdoctoral fellowships for political scientists in cognitive neuroscience or behavioral genetics labs offers a very effective opportunity not only to learn substantive aspects of a field, but also to develop life-long professional networks across disciplines. Second, more established IR scholars can collaborate with colleagues in other disciplines with whom they share substantive interests. Multidisciplinary teams can benefit everyone: political scientists can offer interesting and important theoretical insights and potential avenues of exploration to individuals or groups who possess technical skills or advanced equipment seeking meaningful questions to explore. A third way to undertake such work involves using data generated by other disciplines, often for other purposes such as medical studies, to investigate political questions. Importantly, this strategy will require a different norm of authorship and citation, since these groups typically expect co-authorship in return for the use of their data.

Behavioral Epigenetics

A focus on genetics helps correct for the overwhelming tendency of social science to attribute behavioral variation to transient environmental factors alone. If social science

82. Fehr and Gintis 2007.
83. Mansbridge 1999.
84. Uslaner 2002.
85. Sturgis et al. 2010.

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has tended to privilege nurture over nature, the new field of behavioral epigenetics starts from the premise that behavior emerges from factors at the interface between genes and environment. The focus is not only on what genes you have but also on how environmental factors can influence gene expression, which in turn can affect processes such as hormone release, thereby influencing downstream behavior.[86] Anyone who doubts the power of such cascades need only look to adolescents in the throes of relationship rupture, those who have just given birth, or individuals going through menopause or senescence to see their impact. Seen from this perspective, the social environment is both cause and product of genetically influenced behaviors.[87]

Epigenetics refers to processes, whether internally driven by something like disease, or environmentally imposed in various ways including pollutants, whereby genetic information is made available or unavailable for use in other biological processes. Simply put, epigenetic factors can "turn on" or "turn off" genes with subsequent effects that eventually can influence behavior. Through a process called "histone acetylation," DNA segments become more accessible, gene expression is enhanced, and the production of proteins associated with those genes is increased. By contrast, the process of "methylation" inhibits access to DNA segments, decreases gene expression, and subsequently reduces the production of associated proteins. These processes are ongoing, interactive, and multidirectional. For at least a subset of genes, environmental influences and experience can lead to methylation, demethylation, and remethylation. The result is persistent functional change in the nervous system.[88] This is one of many mechanisms by which environmental forces interact with biological ones and transmit various tendencies across generations. For example, women who were pregnant in the Dutch famine at the end of the Second World War gave birth to children who displayed much higher rates of diabetes, and this effect appears to exert itself across at least two generations.[89] Similarly, the incidence of mental illness has been shown to be higher among the offspring of women who as children experienced the trauma of warfare.[90]

Studies of variations in the behavior of mother rats toward their offspring have discovered that reduced exposure to the frequent licking and grooming that is characteristic of mother rat behavior toward newborn pups leads to highly methylated DNA segments within cells of the brain's hippocampus. This produced a decrease in the production of a protein associated with stress regulation. The result was adult rats who behaved more fearfully when exposed to stress than those rats who had more attentive mothers.[91] Analogous effects have been documented in humans. The

86. For examples of the various causal pathways, see Boomsma et al. 1999; and Ebstein et al. 2010.
87. McDermott and Hatemi 2014.
88. Other epigenetic processes—such as histone methylation, phosphorylation, or ubiquitination—are also involved in gene expression, but not yet well understood. For an accessible overview, see Powledge 2011.
89. Painter et al. 2008.
90. Santavirta, Santavira, and Gilman 2017.
91. Murgatroyd et al. 2009; Weaver 2007; Weaver et al. 2004.

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hippocampal cells of adults who experienced abuse as children also exhibit methylation in the region of the DNA association with the production of the protein (glucocorticoid receptor) that helps regulate stress.[92]

Social science is only beginning to contemplate the ways in which epigenetic mechanisms can help explain phenomena of interest. Take, for example, the risk propensity of a given social actor. Whereas rational choice theorists derive behavioral expectation based on an assignment of an actor "type"—risk acceptant or risk averse—behavioral economics would postulate the actor's likely risk propensity through an analysis of the decisional frame, with actors expected to be risk averse to gains but risk seeking with respect to losses.[93] By contrast, epigenetics might help us understand why some individuals fail to conform to these otherwise systematic and robust behavioral tendencies, exhibiting an apparently anomalous proclivity to engage in risky behavior.[94]

Whether the explanations generated with reference to such processes bring insights beyond those of existing social science models is an open question. Early studies of epigenetic effects on social preferences have uncovered effects of limited durability.[95] Even when positive, the correlation between single genes and social traits often accounts for only a small part of the observed variance.[96] Nonetheless, genetic effects at the level of the individual may augment the insights of political psychology and behavioral economics for explaining individual choice in a variety of social and political domains. Widely shared traumatic events, such as exposure to sustained violent conflict or environmental deprivation, may produce persistent epigenetic effects on members of a group that in turn may help explain subsequent societal outcomes. Linking variations in the physical and social environment to individual genetic expression and downstream behavioral regularities in both individuals and groups, epigenetics allows us to dispense with simplistic nature-versus-nurture debates and suggests numerous paths facilitating fruitful dialogue between social constructivists and biological science.[97]

Toward a Common Research Agenda for Behavioral and Rational IR Theory

Behavioral IR builds on empirical regularities that are at odds with the normative strictures of rational choice models, but it does not deny the human capacity for rational analysis. Here we join calls for collaboration between scholars representing each tradition. We structure the discussion around four topics that allow one to simultaneously "cut in" and "cut across" the various dimensions of a common research

92. McGowan et al. 2009.
93. Kahneman and Tversky 1979.
94. See Palumbo et al. 2018.
95. See, for example, Hatemi et al. 2013.
96. See Duncan and Keller 2011.
97. Davis, forthcoming.

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agenda. In each, the focus is on identifying the appropriate scope conditions for decision-making models.

Norms

Although a fully developed theory of framing remains elusive, prospect theoretical research finds that social norms—defined here as standards of behavior for actors of a given identity in a certain situation—often provide the reference points against which prospective gains and losses are identified. Some norms, such as those surrounding fairness, have been shown to be particularly powerful across a wide swath of cross-cultural and disciplinary contexts.[98] Trades that are considered to be unfair, for example, even in territorial negotiations, are summarily rejected, even when they should be considered acceptable from a rational or economic perspective.[99] Compliance has been found to reflect framing effects, with individuals more likely to comply with norms if compliance is perceived in terms of forgoing gains, and less likely to comply when compliance is seen as portending loss.[100]

Extrapolating such findings to important areas of concern to scholars of IR leads to a number of interesting propositions that should be subject to empirical investigation.[101] For example, in the field of international trade, where member state violations of the WTO's free trade rules can trigger proceedings under the Dispute Settlement Understanding and ultimately result in costly sanctions, we would expect fewer predatory trade practices in pursuit of unilateral gains than we would trade rule violations directed at recovering from or avoiding prospective losses.[102] If confirmed, such a finding would bolster the argument that states' support for the norm of free trade always was conditioned by a concomitant commitment to domestic welfare.[103]

Political psychology is agnostic with regard to many debates surrounding the *emergence* of specific norms, although some theorists have suggested the evolutionary origins of preferences.[104] What behavioral research does suggest is that humans may be predisposed to the establishment of norms that ameliorate potential sources of social conflict, a finding that should be of interests to all sides of those debates.[105]

98. Henrich et al. 2010.
99. Ross and Ward 1995.
100. See, for example, Schepanski and Shearer 1995. For a review of this literature, see Pickhardt and Prinz 2014.
101. For a similar claim from the field of international law, see van Aaken and Broude 2020.
102. Of particular interest would be the distribution of violations in cases where large economies could engage in low-risk predatory trade vis-à-vis small economies, whose limited legal capacity undermines the credibility of threats to initiate DSU proceedings. On the latter point, see Bush and Reinhardt 2000; 2003, 158.
103. Ruggie 1982, 379.
104. Bueno de Mesquita and McDermott 2004.
105. See, variously, Fehr and Schmidt 2015; Poteete, Janssen and Ostrom 2010; Rabin 1993; Thaler 2016, 1593; and Van den Assem, van Dolder, and Thaler 2012.

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Institutions

Behavioral research suggests a somewhat different understanding of institutions' role in international politics than what functionalist and rational choice theories offer. The basic argument of the rational camp is that institutions—understood here as complexes of rules, norms, principles, and procedures—enhance welfare in situations where cooperation is inhibited by the fear of cheating. In situations where trust is lacking, institutions foster cooperation by increasing transparency, providing credible information, promoting communication, and providing solutions to coordination problems, thus reducing transaction costs.[106] From the behavioral perspective, institutions are often conceived to follow from trust rather than compensate for its absence.[107] And whereas rationalist models stress the role of institutions in redressing structural impediments to cooperation, behavioral models stress the potential of institutions to reduce the effects of cognitive, emotional, and neurological impediments on optimal individual choice.

The standard example is the ability of firms to increase employee retirement savings through well-structured choice architectures. Participation in automatic retirement savings plans increases if participation is presented as the baseline and nonparticipation requires employees to actively opt out, and when employees can commit to save a percentage of future pay increases at the time of employment.[108] In this way, small changes in the presentation of options can produce big shifts in outcome and the potential applications extend far beyond the structuring of economic choices.[109] For example, organ donation rates are similarly increased by instituting an opt-out as opposed to an opt-in system.[110] In addition, knowing that individuals have an aversion to extremity, choice architects can add extreme options to the menu, making it more likely that an otherwise unattractive choice will appear moderate by comparison.[111] Similarly, it may be possible to overcome aversion to concessions by allowing people to make a choice among options rather than to insist they accept an outcome that is forced on them.[112] When institutions are misaligned with the human psychological architecture, they often fail to fulfill the social transaction and informational functions for which they were ostensibly designed.[113]

Extending these insights to the field of international politics, scholars have begun to explore how the framing of treaty clauses affects the likelihood that states will accept them.[114] For example, Jean Galbraith argues that states' willingness to accept the International Court of Justice's jurisdiction would have been higher had

106. Keohane 1984.
107. Rathbun 2011. See also Mercer 2005, 94–97.
108. For a review of the findings, see Choi et al. 2004.
109. Thaler and Benartzi 2004; Thaler and Sunstein 2009.
110. Shepherd, O'Carroll, and Ferguson 2014.
111. Simonson and Tversky 1992.
112. Arrow et al. 1995; Ross and Ward 1995.
113. McDermott and Hatemi 2014.
114. Teichman and Zamir 2020.

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the statute been formulated in a way that presented it as the default option. When universal jurisdiction is the goal, opt-out clauses are likely to be more effective than opt-in.[115]

Another insight provided by behavioral research relates to institutional reform. The Coasian assumptions behind many rationalist understandings of institutions suggest states will modify existing institutions when pareto improvements are possible. However, behavioral economics leads to a less sanguine perspective on prospects for institutional improvement. From this perspective, institutional inertia need not reflect disproportionate returns to a small group, but the psychologically generated pressures of habit and stasis. Especially under conditions of uncertainty, the endowment effect will lead states to place a higher subjective value on existing arrangements than would be predicted even if transactions costs were zero.[116] The successful rational redesign of existing institutions in pursuit of pareto improving outcomes may thus depend on first understanding the psychological dynamics that bias actors in favor of the status quo.[117]

Framing effects may also play a role in explaining varying degrees of compliance with the behavioral standards of those international institutions that offer material benefits to their members. Researchers have found that increases in worker productivity are greater and more sustained when bonus payments are made up front, with their continuation conditional on meeting improved performance measures, than when promised at the end the end of the year if the targets are met. The immediate payout of a bonus creates a reference point, induces loss aversion, and thus spurs increased employee effort.[118] By extension, one would expect rates of compliance to be greater in those international institutions where the benefits of membership are immediate, and only lost in the event of noncompliance, than in those institutions where the benefits of membership are realized in the future after some period of compliance. It is easy to see such dynamics operate counterproductively in the area of global climate change, where states are asked to make immediate large sacrifices for uncertain and unknown potential benefits in the future. Current and potential future asymmetries in sacrifices and benefits reduce the prospects for compliance.

Bargaining and Third-Party Mediation

Fundamental propositions of behavioral economics also have important implications for how we think about bargaining, mediation, and the various forms of influence routinely applied both unilaterally and via multilateral institutions in an effort to influence the course of negotiations, or compel compliance with international obligations. The ongoing dispute over North Korea's nuclear ambitions is illustrative.

115. Galbraith 2013.
116. For the underlying logic, see Russel and Thaler 1985.
117. Hart and Moore 2008.
118. Hossain and List 2012.

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The Joint Comprehensive Plan of Action, the international agreement that closed off Iran's route to developing nuclear weapons, is often held to be a model for negotiations with North Korea. In the dispute with Iran, the challenge for the permanent members of the UN Security Council plus Germany was to put together a package of sanctions sufficient to convince Teheran to forgo its nuclear weapons program. That is, the question confronting the international community was the price at which Tehran was no longer willing to pay to *acquire* nuclear weapons. The problem in North Korea, however, is establishing a price for which Pyongyang would be willing to *relinquish* an existing nuclear arsenal.

For standard economic models, the price to acquire an object should be the same as the price demanded to relinquish it. But from the perspective of behavioral economics, North Korea is likely to demand more to give up its existing nuclear capability than it would have accepted to forgo the program in the first place. Because of the endowment effect, North Korea values the weapons it now has more than it once valued the prospect of acquiring them.[119]

This basic insight provides clues with respect to the relative effectiveness of threats and promises at different stages of a negotiation or dispute. Because people are risk averse when contemplating gains but risk acceptant when trying to avoid loss, threats of punishment will likely prove more effective when trying to deter the acquisition of territory or weapons than they will when used to compel the state to give up something it has already acquired. Whereas most rational negotiation models would regard efforts to decrease the utility of North Korea's nuclear capability through the imposition of negative sanctions as essentially equivalent to a strategy based on enhancing the benefits of denuclearization with promised rewards for denuclearization, a behavioral approach to negotiations would counsel a strategy biased toward promised rewards.[120] Because loss aversion induces risk-acceptant behavior, the North Korean leader is likely to prove relatively insensitive to bargaining strategies that seek to compel disarmament by increasing the costs and risks of maintaining a nuclear program.

Baselines

Political psychology and behavioral economics often suggest quite different baselines for evaluating behavior than do models based on rational models of choice, especially under conditions of risk and uncertainty.

Take, for example, the principle of military necessity, part of the larger notion of *jus in bello*, central to International Humanitarian Law (IHL). The principle of military necessity combined with the requirement of proportionality requires military commanders to weigh the intended military advantages to be achieved through a contemplated attack against the possible harm to civilians. Recognizing the inherent

119. Kahneman, Knetsch, and Thaler 1991.
120. Davis 2000.

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subjective component in any such assessments, jurists have suggested the standard of the "reasonable military commander" as the normative baseline for evaluating conduct in battle.[121]

As Tomer Broude has argued, the empirical findings of behavioral research on decision making under conditions of risk confound a straightforward application of the reasonable commander standard. Studies of framing effects suggest that commanders will make different choices depending on whether a proposed course of action is framed in a way that highlights the number of persons who likely will be killed or those who likely will be saved. If military commanders react to frames in ways consistent with prospect theory, then we would expect them to be relatively risk seeking when options are framed in terms of preventing additional deaths and risk averse when framed in terms of possible lives saved, even when the outcomes associated with various courses of action are essentially the same.[122]

The ongoing global "war on terror" provides additional examples for which political psychology would condition the normative standards suggested by theories of rational choice. Take, for example, a hypothetical case in which commanders receive intelligence estimates that important terrorists are held up in a farmhouse that is under constant aerial observation by unmanned drones. Bayesian models of choice would demand that a reasonable commander "update" prior estimates of the intelligence report's validity based on how information about those entering and exiting the house discriminates between the intelligence estimates and other sources and interpretations of the evidence. But because the identities and intentions of those coming and going cannot be established conclusively by aerial observation, the observations themselves must be interpreted before the commander can use them to update an assessment of the farmhouse's military value. In this example, drawing clear-cut inferences that can be used to update probability assessments is impossible. Cognitive consistency models would lead us to expect that ambiguities inherent in such observations will be reduced as commanders assimilate these to pre-existing beliefs. The implication is that commanders' prior beliefs, and not their skills as Bayesian decision makers, will be crucial to explaining combat choices.[123]

Conclusion

Building on its roots in cognitive psychology, the future of behavioral IR will, and should, involve building links to research in the fields of biology, neuroscience, physiology, genetics, and the related study of epigenetic processes. Indeed, by providing different tools, measures, and strategies, these disciplines offer novel ways

121. Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia (International Criminal Tribune for the Former Yugoslavia 8 June 2000), par. 50.

122. Broude 2015, 1151–56; Broude and Levy 2020.

123. For a good discussion of the issues, see the preface to Jervis 2017, lxvii–lxix.

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of studying variation among and between groups and individuals. In particular, considering genetic and epigenetic influences on behavior holds promise for advancing our understanding of within-individual variation as a complement to studies of variation between individuals or groups. Systematic changes across an individual's lifespan, specifically those caused by the aging process itself, fit within this area. Combining genetic with environmental data offers unique opportunities for truly novel forms of investigation as it opens IR scholars to a micro-level of analysis as well as the possibility of causal links to higher levels.

Fundamentally, behavioral research shifts the question of interest for scholars of international relations from *whether* actors are rational to *how* they think and *when or under what conditions* thoughts produce behavior. In the first instance empirical, the findings of behavioral science raise broader normative and philosophical questions that go to the heart of the practice and study of international relations, and suggest the need for a broader dialogue that includes political and legal theorists. As our understanding of neural processes improves, will we begin to use averaged brain data to help determine policy and law? Maintaining the notion of autonomous citizens possessing free will is confounded when choice is not only a function of the individual's preexisting preferences and available alternatives, but also subject to manipulation by those who understand how to evoke preferences and manipulate alternatives.[124] To the extent that rationality depends on emotions, which to some extent are "hard wired"—both by virtue of our shared DNA and the particular ways in which the environment conditions an individual's genes—we are forced to confront deep philosophical questions about personal responsibility.[125] If our cognitive limitations and the environments within which we find ourselves are beyond our control, it becomes harder to argue that we are responsible for our actions.[126] And if our emotional and cognitive systems are essential not only to rational but also moral choices, how should we judge those with "impaired" faculties?[127] As a first start, we should study the choices of such individuals when they have been admitted to positions of political responsibility.

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124. For various takes on the question, see Friedman and Friedman 1980; Shafir, Simonson, and Tversky 1993; and Sunstein and Thaler 2003.
125. McDermott and Hatemi 2018.
126. Davis 2013.
127. Greene et al. 2001; Koster-Hale et al. 2013; Young et al. 2010.

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