CHAPTER THREE

Political Cognition as Social Cognition: Are We All Political Sophisticates?

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Participation in national-level politics has been the focus of much of the political behavior literature. From seminal works such as *The People's Choice* (Lazarsfeld, Berelson, and Gaudet 1948), *The American Voter* (Campbell et al. 1960), *Public Opinion and American Democracy* (Key 1961), and *An Economic Theory of Democracy* (Downs 1957) to more contemporary work such as *The Nature and Origins of Mass Opinion* (Zaller 1992), the theoretical focus and empirical examples have drawn from national politics. Politics, however, can have a broader meaning than competition among candidates, officeholders, and parties at the national level. We can follow Aristotle's (1996) claim, originally made circa 350 B.C., that "man is by nature a political animal" and observe the evidence for his contention in family politics, office politics, church politics, neighborhood politics, and the politics existing in any assemblage of humans.

MACHIAVELLIAN INTELLIGENCE: SOCIAL COGNITION AS POLITICAL COGNITION

Some cognitive scientists, evolutionary psychologists, and primatologists have agreed with Aristotle and argued that the very nature of our intelligence is political. In a seminal paper about social cognition, Nicholas Humphrey (1976) argued that although Robinson Crusoe's task of survival on the desert island was technically challenging, the really hard problems came from the arrival of Man Friday. This line of reasoning, sometimes called the Machiavellian intelligence hypothesis (Byrne and Whiten 1988; Whiten and Byrne 1997), contends that managing the problems of the social world requires a far greater level of intellect because contexts change rapidly (see de Waal 1998). The evolution of affective

states is thought to have facilitated cooperation and thus complex social structures (Lewis, Amini, and Lannon 2000), but monitoring the emotional and mental states of others requires a constant vigilance (Chance and Mead 1953). It is believed that the demands of increasingly complex social environments drove a cognitive arms race with competitive pressures leading to larger neo-cortices capable of navigating the politics of larger tribal groupings (Barton and Dunbar 1997; Dunbar 1993). One theory arising from this literature is that Robinson Crusoe's mental capacity for solving the technical problems of his mere survival evolved as an incidental benefit from the mental capacity for solving the more complex social problems that he faced (Humphrey 1976; Whiten and Byrne 1988; but see Oakley 1964).

Because there are so many different problems that result from social living, it has been argued that social intelligence is not a monolithic phenomenon but, rather, a collection of intelligences that evolved to solve particular problems in the social environment (Gigerenzer 1997; Cosmides and Tooby 2002). Andrew Whiten and Richard Byrne (1997) note that the social intelligence exhibited by primates reflects a delicate subtlety requiring at least a basic ability to manipulate the behavioral, emotional, and mental states of others and label this intelligence Machiavellian, not because it is callous but because it is subtle. Thus, for animals in a complex social environment, theorizing about the intentional states of others is one particularly important task of social cognition (Premack and Woodruff 1978; Dennett 1987).

Whereas imitation (Rizzolatti et al. 1999; Rizzolatti and Craighero 2004), symbolic thinking (Deacon 1997), language (Pinker 1994, 1999), normative judgment (Brosnan and de Waal 2003; compare Wynne 2004), and culture (Byrne et al. 2004) have all been described as kinds of social cognition emerging in primates, the argument made in the Machiavellian intelligence theories is that these capacities evolved in response to the need for a kind of political cognition. But this conceptualization of political cognition involves intimate relationships with those we encounter daily, not thinking about candidates in national elections.

The theory of this chapter is that the kinds of political cognition that political scientists usually study, namely, thoughts about values, policies, coalitions, and leaders on the state, national, or international level, have co-opted the mental apparatus evolved for solving the problems of "everyday politics" (Humphrey 1976). This conjecture follows the tradition of evolutionary arguments tracing back to Charles Darwin's (1996/[1859]) claim that "an organ originally constructed for one purpose . . . may be converted into one for a wholly different purpose."

To support this conjecture, this chapter sweeps through a diverse literature about the potential biological foundations of political attitudes and behaviors. I begin with a discussion of one proposed foundation for social cognition: mirror neurons. These neurons appear to allow us to model the actions, emotions, and thoughts of others and have been implicated in many roles that are essential for social thinking. I then discuss two important kinds of social thinking: automatic social evaluation and "theory of mind," which allows humans to understand the intentions of others. I go on to discuss how these two functional mechanisms have been connected to neuroanatomy through the default state network theory. I then describe evidence from recent functional brain imaging experiments implicating the default state network in sophisticated thinking about national politics and briefly review the major claims of the traditional political science literature about political sophistication. I argue that political scientists need to take values more seriously in their work on political sophistication and present a potential biological basis for political values and attitudes.

It is important to appreciate that not all attitudes are the consequences of deliberate or conscious choices, however, and so I distinguish between implicit and explicit attitudes. I end with a discussion of the role of coalitional cognition and social networks in political attitudes, both implicit and explicit. Evolutionary pressure generated by competition among coalitions and the individuals within those coalitions sparked more powerful cognitive capacities. The development of the mirror neuron appears to have been a critical early step in the direction of Machiavellian intelligence.

MIRROR NEURONS AS BASES FOR SOCIAL COGNITION

The recent discovery of so-called mirror neurons has presented a potential foundation for understanding the neural substrates of more complex social thinking (Gallese, Keysers, and Rizzolatti 2004). One method for studying neural function is to insert a probe directly into the neural tissue of a living animal and monitor the flow of electricity through a neuron or group of neurons. Although quite invasive, this method allows a researcher to investigate the function of particular neurons in live animals with a very high temporal resolution. In the mid-nineties, on a hot summer day in Italy, a graduate student of the neuroscientist Vitorio Gallese had inserted the probes into the premotor cortex of a macaque monkey in order to study the neural activity corresponding to manipulating objects. After preparing the monkey for the experiment, the student went out for

an ice cream cone. When he returned, he noticed that each time he licked the ice cream cone, the neurons in the monkey's premotor cortex fired. This was intriguing, given that the monkey was not making any motor movements.

Further study revealed a set of 92 neurons in the premotor cortex that were active both when the monkey performed an action and when the experimenter performed the same action (Gallese et al. 1996; Rizzolatti et al. 1996). These neurons were described as mirror neurons because of their apparent ability to represent the action of another. Additional research soon identified clusters of mirror neurons in a number of different locations in the brain (Rizzolatti and Craighero 2004). Evidence that these neurons were providing mental representations of the action increased when it was discovered that neurons representing the final part of a motor sequence continued to fire when the final portion of the sequence was hidden from the monkey's view (Umilta et al. 2001).

Although macaque monkeys are capable of representing the actions of others, they are not believed to be capable of imitation. Edward L. Thorndike (1898) defined *imitation* as the capacity to learn to do an action by seeing it done and was famous for his "Thorndike boxes." Animals put into the boxes could only escape by means of a series of lever pulls. Cats and dogs could learn the sequence of events needed to escape, but he concluded that it was by trial and error, not by observation or by imitation. The consensus among ethologists is that imitation exists only in humans and probably in apes (Byrne 1995; Whiten and Ham 1992; Visalberghi and Fragaszy 2001). Thus, although the mirror neurons appear to lay a foundation for imitation, they do not guarantee it (Rizzolatti and Craighero 2004).

Mirror neurons, however, appear to do more than merely facilitate action representation. There is evidence to suggest that they play a crucial role in emotion. The expression "when you smile, the whole world smiles with you" appears to have some basis in fact. When subjects are shown subliminal images of smiling or angry faces, their facial muscles respond with smile-like or anger-like movements despite their having no conscious awareness of the stimuli (Dimberg, Thunberg, and Elmehed 2000). It is believed that the ability to represent the emotional states of others facilitates bonding and cooperation in mammals (Lewis, Amini, and Lannon 2000), and mirror neurons may play a crucial role.

Paul Ekman (1992) has identified six basic emotions that are universally recognized and have distinct facial expressions. Note that the regions of the brain that are implicated in the expression of each of these emotions have been connected to the perception of the same emotion. Feeling fear

is frequently associated with activity in the amygdala, but the amygdala is also associated with the perception of fearful faces (Adolphs et al. 1994). Similarly, feeling disgusted will activate the insula, which is also activated when you observe another person experiencing disgust (Krolak-Salmon et al. 2003; Calder et al. 2000; Phillips et al. 1998; Wicker et al. 2003). Brain imaging studies of subjects looking at surprised faces activate the parahippocampal region (Schroeder et al. 2004), which also is activated when a person perceives novel information (Tulving et al. 1996). The evidence regarding sadness, happiness, and anger is less clear. Perceiving happiness in others, however, has been associated with the basal ganglia (Morris et al. 1996), a region that is also implicated in reward detection (Bartels and Zeki 2000; Knutson et al. 2001; Breiter et al. 1997). And the perception of sadness has been correlated with activation in the temporal lobe and the amygdala (Blair et al. 1999). Anger is particularly interesting because subjects have amygdala (fear?) activations when the angry gaze is directed at them (Sato et al. 2004), but experienced anger appears to most typically activate the orbital frontal cortex (Murphy, Nimmo-Smith, and Lawrence 2003).

The lesion and imaging evidence are suggestive, but more conclusive proof of the role of mirror neurons in processing of emotions has been found in direct neural recoding experiments carried out in macaque monkeys. Mirror neuron activation was observed when the monkeys both made and viewed facial expressions connected with affiliative, aversive, and fearful emotions (Ferrari et al. 2003). And imaging experiments performed with humans who were asked to express, imitate, and observe emotional displays found activations in overlapping regions (Carr et al. 2003). Note that, owing to the invasiveness of direct recording, mirror neurons have not yet been directly observed in humans (see chapter 4). The imaging evidence and the conservative nature of evolution suggest, however, that the existence of mirror neurons in humans is the most parsimonious explanation currently available.

Emotions have such strong physiological roots that the neuroscientist Antonio Damasio (1999, 2003) distinguishes emotions (described by him as changes in body and brain states triggered by the content of perception) from feelings (changes in brain states that reach sufficient intensity to be perceived by conscious awareness). The physiological roots of emotion serve regulatory purposes (for example, increasing heart rate) that support survival. But in social animals, emotions can also play an important communicative role. That the same neurons are activated when I feel fear as when I observe you feeling fear illustrates the importance of mirror neurons for social functioning.

Mirror neurons have also been linked with the facility for language. Broca's area is one of the most frequently studied regions of the brain, in part, because of its long association with language functions (Broca 1999/[1861]). Giacomo Rizzolatti (one of the discoverers of mirror neurons) and Michael Arbib (1998; see also Arbib and Bota 2003) have contended that mirror neurons found in the macaque monkey's F5 region correspond to the Broca's area in humans. Evelyne Kohler and colleagues (2002) found that neurons in F5 are activated not only when an action is seen but when it is heard, suggesting that these neurons are representing an abstraction of the action. Mirror neurons appear to have intriguing characteristics. They are activated not only during action but also during the observation of action. And they seem to facilitate the abstraction of an action into a more general representation.

Thus mirror neurons may pose a solution to the "symbol grounding" problem (Harnad 1990) identified in John Searle's (1980) famous "Chinese room" thought experiment. I discuss Searle's argument more thoroughly below, but the difficulty of learning Chinese from a Chinese-only dictionary gives one a hint of where Searle is heading. In the argument of Rizzolatti and Arbib, mirror neurons have the potential to abstract from the particulars of observation and action to a more general representation, the kind that allows for symbols and eventually language.

THEORY OF MIND

Apes may share imitation with humans, but some contend that gorillas and chimpanzees share a more impressive characteristic with us humans: theory of mind (Premack and Woodruff 1978; but see Heyes 1998). Theory of mind is the capacity to represent the intentional states of others. A wide variety of mammals appear to be capable of simultaneous emotional responses that resonate with those of their fellow mammals (Lewis, Amini, and Lannon 2000). But comprehending the intention of another is a far rarer characteristic and is not even found in all humans. For example, it is believed that some autistic people do not have theory of mind (Frith and Frith 1999).

I can fire canonical neurons in the premotor areas and achieve a particular motor sequence. Mirror neurons will fire both when I am performing the action and when I am observing you performing the action. In order to imitate, I must abstract a bit from merely observing and imagine myself in the role of the actor. But for theory of mind, I need to comprehend not only what you are doing, but why you are doing it. Believing that there is a why, in this sense, is what Daniel Dennett (1987) calls taking

the "intentional stance" toward something. Dennett has argued that we can take different stances toward entities: the physical stance, wherein this entity does what it does because it obeys scientific laws; the design stance, wherein this entity does what it does because it was designed to do that; and the intentional stance, wherein this entity does what it does because it wants to. Many believe that mirror neurons are crucial for our theory of mind (Williams et al. 2001; Schulkin 2000; Gallese and Goldman 1998; Rizzolatti and Craighero 2004) and other types of social cognition (Dapretto et al. 2006). The connections among mirror neurons, the functional organization of the brain, and such high-order tasks as theory of mind, however, are still being worked out.

A classic example of theory of mind is the "Sally/Ann" task. Sally walks into a room and puts her ball into a basket. Ann walks into the room finds the ball and puts it into a box. When Sally walks back into the room, where will she look for the ball? An autistic person, lacking theory of mind, will say that Sally will look in the box. That is where the ball is and she will look there. The medial frontal cortex of the brain, located behind the center of the forehead, is activated in a variety of contexts where the subject is required to understand the intention of another actor. It has been postulated that the medial prefrontal cortex evolved from being a center representing actions (Frith and Frith 1999) to a location for representing our intentions and then to a location representing the intentions of others (Frith 2002). Problems in the medial prefrontal cortex appear to preclude autistic patients from being able to perform this task (Williams et al. 2001).

The medial frontal lobes' role in theory of mind has been supported with lesion studies (Rowe et al. 2001; but see Bird et al. 2004) and experiments using functional imaging in both healthy subjects (Fletcher et al. 1995) and patients with Asperberger's Syndome, a type of typically high-functioning autism (Happe et al. 1996). More recent imaging work has shown the medial frontal region to be active during so-called trust and reciprocity games from the economics literature (McCabe et al. 2001) and in other games of strategy such as rock, paper, scissors (Gallagher et al. 2002). It has also been implicated in non-verbal theory of mind tasks such as choosing the appropriate next panel in a comic strip without speech (Brunet et al. 2000).

THE DEFAULT STATE NETWORK

The medial frontal lobe has been also proposed as a part of the "default state network," another role that appears to be related to the theory of

mind. The usual setup in a functional brain imaging experiment is that the researcher wants the subject to perform some task so that inferences can be made about the neural substrates involved in that task. Typically, this task is accompanied by a rest condition in which the subject stares at a blank screen. The resting activation is subtracted from the task activation to yield the portion of the brain that is activated during the task. In a move similar to John Cage's composition of his 1961 piece 4′ 33″, Marcus Raichle and his colleagues (2001) performed a meta-analysis of the rest conditions in a number of imaging studies. Their goal was to identify areas that were active during rest but diminished in activity when the subject performed any task.

The results led Raichle to postulate a default state network involving the medial prefrontal cortex and the medial posterior cortex. A diverse range of brain regions were activated during various tasks, and this default state network consistently reduced its activation when the subject switched from rest to any task. The regions that are implicated in the network have the highest resting metabolic rates in the brain and consume substantial energy resources on a continuous basis (Gusnard and Raichle 2001). Raichle theorized that this network is involved in constantly monitoring one's surroundings for phenomena that require goal-directed attention.

Raichle's theory is particularly intriguing given what is known about the areas that compose his putative default state network. As described above, the medial prefrontal cortex appears to be involved in understanding and predicting the thoughts of others (Frith and Frith 1999). And the medial posterior cortex works implicitly to evaluate the environment (Vogt, Finch, and Olson 1992) and is frequently associated with emotional stimuli (Maddock 1999). Although these regions rarely have true activations above a resting baseline in typical imaging studies, they have been activated during social cognition tasks (Greene et al. 2001; Iacoboni et al. 2004). It has also been postulated that these medial regions are involved in the representation, monitoring, evaluation, and integration of self-referential stimuli, that is, that this region is the location of the "self" (Northoff and Bermpohl 2004). Considering these theories together, we have a picture of network of brain regions that is attempting to understand our social world and relate our self to our place in that world.

The default state network theory fits nicely with the arguments by the primatologists Michael Chance and Alan Mead (1953) about the need for constant monitoring of the social environment in social animals. In his book *Chimpanzee Politics*, Frans de Waal (1998) describes the constantly

shifting alliances among a group of chimpanzees. These alliances are critical to mating opportunities, food sharing, and physical safety, functions that are at the core of survival and that exert strong evolutionary pressures. Chance and Mead argue that the ability to automatically and continuously monitor alliances and potential allies in a social environment would provide an evolutionary advantage. Similarly, John Orbell and his colleagues (2004) recently demonstrated that the capacity to infer the intentional states of others and to send signals so as to manipulate the intentional states of others can facilitate the evolution of a highly cooperative disposition supporting better individual and group outcomes. Thus we can see that the capacities for theory of mind and for social evaluation enable fruitful political cognition in the context of everyday politics.

BRAIN IMAGING, POLITICAL COGNITION, AND POLITICAL SOPHISTICATION

Evidence from recent experiments with functional magnetic resonance imaging (fMRI) suggests that political cognition about national political issues utilizes the neural circuitry that apparently evolved for everyday tribal politics.[1] I and Marco Iacoboni (2004) conducted a set of experiments that examined changes in cerebral blood flow while eighteen subjects responded to questions that were either political or nonpolitical. Twelve of the subjects were college students who were members of the college Republican or Democratic club and were very politically sophisticated. Six were college students who were not politically involved and who had low levels of political knowledge.

While answering questions about national politics, the political sophisticates showed activation above a resting baseline in the medial frontal

1. In chapter 4 Spezio and Adolphs raise a number of concerns about fMRI and its interpretation. With fMRI, we are directly obtaining an incredibly small fluctuation in magnetic signal. From that we are making inferences about changes in the ratio of oxygenated to deoxygenated hemoglobin. And from that we are making inferences about changes in neuronal activity. With the incredibly small signal change and the tremendous variation in human neuroanatomy (consider the differing wrinkle patterns in a box of raisins), it is amazing that we get anything useful. Despite these methodological concerns, we do find statistically and substantively meaningful relationships in the data. And, as in the case of the experiments I report here, we sometimes get apparently reproducible results. The explosion in fMRI research is bringing an explosion of caveats to the method and its interpretation. But that research energy is motivated by the ability to seriously consider previously untestable hypotheses.

and the medial posterior cortices, the main areas of Raichle's default state network and areas that have been implicated in other studies of social cognition. The political novices, however, showed decreases in activity in both of these regions, suggesting that they had to increase their level of explicit cognitive effort in responding to the questions. My interpretation of these results is that political sophisticates are able to automatically use the mental tools that have developed for evaluating everyday politics and apply them to national politics. Political novices, however, do not possess sufficient experience or knowledge about how to apply the values and skills they use to navigate the politics of family and social life to the questions of national politics.

Another experiment showed significant bilateral activations in the inferior frontal lobe in a contrast of the political sophisticates and novices while they looked at political faces and nonpolitical faces. Previous research has suggested the presence of mirror neurons in these regions (Rizzolatti and Craighero 2004), and they have been activated in experiments where people both imitated and observed the faces of others (Carr et al. 2003). The preliminary interpretation of these data is that political sophisticates have a greater empathic connection to political figures than do political novices. Thus political sophistication may have an affective component (Marcus, Neuman, and MacKuen 2000) in addition to the cognitive component, which is most frequently studied by political scientists. Furthermore, the political sophisticates again had activity in the posterior cingulate while viewing political faces, consistent with the theory that they are using a capacity for implicit social evaluation to think about politics.

This kind of difference between political novices and political sophisticates was largely predicted in a paper that Matthew Lieberman and Kevin Ochsner, and I (2003) co-authored. In synthesizing the literature from social psychology, cognitive neuroscience, and political science, we expected that political sophisticates would be able to rely on implicit associations to respond to political problems and political novices would require explicit and controlled cognitive processes. We based our arguments in part on the large body of work in social psychology's "dual-processing" literature (Schneider and Shiffrin 1977; Chaiken and Trope 1999), in part on new work in cognitive neuroscience on attitudes (Lieberman et al. 2002; Lieberman et al. 2001), and in part on the decades of political scientific inquiry into the behavioral and cognitive differences between political sophisticates and political novices (Converse 1964; Zaller 1992).

As Spezio and Adolphs point out in chapter 4, there are good theoretical and empirical reasons to be skeptical of the dual-process models. If

nothing else, we should be concerned that there has been such a large and continuing proliferation of dual-process frameworks, rather than a unification. On the other hand, there are areas of agreement in the nearly thirty years of work covered by this literature.

We may not have a clear sense of what exactly the top is in the top-down (as opposed to the bottom-up) versions of these theories, but many still find it useful to act as if we have some understanding of what that might mean. And even if it is possible that we will someday have adequate accounts that can nicely dispense with notions of executive, controlled, conscious, explicit, or reflective processes, it does not appear that we are quite there yet. These heuristics continue to be informative as they are tempered by the recognition that any boundaries between reflective and reflexive processes (Lieberman, Schreiber, and Ochsner 2003) are fuzzy at best. In the context of political thinking, I contend that these rough distinctions can help illuminate the differences between those who appear to be more sophisticated in their thinking about national politics and their less sophisticated counterparts.

The early work by Phillip Converse (1964) demonstrating that many people who responded to political surveys appeared to have little ideological constraint and to be temporally inconsistent in their responses was troubling to many political scientists. Converse's interpretation was that these political novices held "nonattitudes" and that "large portions of an electorate do not have meaningful beliefs, even on issues that have formed the basis for intense political controversy among elites for substantial periods of time" (245). Chris Achen (1975) claimed that "democratic theory loses its starting point" if Converse is right, and many others shared his concern.

John Zaller's (1992) research elaborated on Converse's findings and posited an information processing model to account for the results. An individual's attentiveness to political messages carried in the media would strongly predict the probability that he or she would receive a given piece of information. If a newly received piece of information was inconsistent with the other considerations already held in the mind of the recipient, then the probability that he or she would accept the new information was diminished. And when asked to respond to an opinion poll, the probability that the person would sample a given message would be influenced by the salience and accessibility of that piece of information. Zaller acknowledged that values and psychology could play a role in the processing of considerations, but his was essentially a parsimonious and powerful information-processing model.

POLITICAL VALUES AND BIOLOGY

More recent scholarship has suggested a more prominent role for values in thinking about national policy and politics. James DeNardo found that "in the face of great complexity, we are all amateur strategists" (1995, 305) and that the difference between novices and experts "is not ideological or political—it is essentially technical" knowledge (237). He found that college students often struggled in vain to apply their values to complex questions of nuclear strategy but that policy experts appeared to be applying the same kinds of value constructs to the problems with the ease afforded by extensive knowledge of how a particular missile system would impact the desired normative outcome. More recently, Mike Alvarez and John Brehm (2002) have argued that political novices are sure of what they value but, unlike experts, are unsure of how to use those values in political choices. They analyzed the structure of responses to a number of survey questions and found that uncertainty about how to apply values was far more prevalent than ambivalent conflict between two values or equivocation in values leading people to unacknowledged policy conflicts.

On the basis of the discussion above about the evolutionary importance of everyday political thinking, it would indeed be strange if most people did not have politically relevant values. We constantly need to appraise the policies we observe, obey, and implement at home, at work, and in our social structures. We frequently make choices about whom to align ourselves with in disputes among our family, friends, co-workers, and acquaintances. Although there is likely to be variation in the capacity people have for the Machiavellian intelligence exhibited in everyday politics, evolutionary pressures appear to have given most people sufficient capability to keep from getting killed or exiled as a consequence of bad choices made in their local political environment.

Thus in terms of evolution and everyday politics, at least, we are all political sophisticates, even if we all do not apply that sophistication to the realm of national politics. Many brilliant political figures have stumbled badly before an unfamiliar social group. This does not mean that they suddenly have nonattitudes but rather that they simply do not know how to apply the values and attitudes that they use regularly to this unfamiliar context.

Psychologists regularly put their lab animals into odd contexts to induce unnatural behaviors. Political scientists do the same thing with their survey respondents. An interesting question is whether humans thinking

about politics (everyday or national) are more like pigeons trained to press a lever or like pigeons flying about their cage. Based on the evidence reviewed in this chapter, I contend that we are more like the pigeons flying in a cage.

Indeed, it appeared from the fMRI data we collected that political sophisticates and political novices were capable of using implicit cognitive mechanisms to respond to questions that were nonpolitical but required the application of social values. In his study of responses to a small set of questions comparing the values liberty, equality, economic security, and social order. William Jacoby (2006) found that around 80 percent of respondents in the general population possess transitive political value rankings. A portion did display some intransitivity in their preference rankings. Some of this intransitivity may be due to measurement error, but political sophistication accounts for a small part of it. The questions were phrased in terms that may not be familiar to those with very low levels of knowledge about national politics but who still might be able to operationalize these concepts in daily living.

The universality of values for which I am arguing has been suggested by a long line of research in psychology (Feldman 2003). The contention is not that everyone shares the same values. Jacoby's work demonstrates a pattern of agreement about the hierarchy of values in the aggregate view of American politics, but he also illustrates tremendous variance underlying that aggregation. The theory, however, is that nearly everyone has values and uses them constantly to approach the problems of life. The seminal work of Milton Rokeach (1973) and the more recent scholarship of Shalom Schwartz (1992, 1994) identify large sets of values from which particular cultures and individuals draw constantly. The difficulty, as far as political scientists are concerned, is in the ability to map from these values to questions of national politics.

One of the few fMRI studies of moral decision making has implicated the same neural structures that appear to underlie political cognition in political sophisticates. Joshua Greene and his colleagues (2001; Greene 2003) studied people responding to a set of moral dilemmas involving either personal or impersonal actions and found that a personal action (pushing an extremely large person off a bridge onto trolley tracks to stop a trolley from killing five people) involved activation in the areas of the default state network, whereas impersonal action (pulling a lever to reroute a train to hit one person on the tracks and thus save five others) did not. This difference helped explain the various moral choices that people indicated (they would pull the lever but not push the person), though logically the situations were equivalent (one person dies so that many

may live). If mirror neurons and our capacity for theory of mind allow us to put ourselves into the shoes of others on occasion, then it is not surprising that we would more strongly identify with the person who is in close proximity (standing next to us on the bridge) than with those who are more remote (standing on the tracks).

If it truly is the intensity of simulation that differentiates the two moral dilemmas, then we have a theory that could explain moral choices in lower primates. Recently, capuchin monkeys have been shown to reject a payment that was "unfair" compared to what one of their fellow monkeys was getting for the same effort (Brosnan and De Waal 2003; but see Wynne 2004). It may be that even the simple monkeys are capable of simulating the payoff they expect for themselves and others and reacting strongly when there are inconsistencies. Jennifer Hochschild's (1981) study *What's Fair?* (which used in-depth interviews of 28 people) revealed a pattern of simulation as her subjects often imagined themselves in the position of others in society. The inconsistencies in her subjects' responses often reflected the inconsistencies in payoffs that occur in an imperfect and unfair society. It may be that our sensitivity to these inconsistencies goes back to our primate ancestors.

Other evidence for an ancient evolutionary pedigree for politically relevant values comes from work in hormones and genetics. Prairie voles are rodents well known for a strong habit of life-long monogamy, whereas the related montane vole is promiscuous throughout its life. These behavioral differences have been correlated to differences in the levels of the hormone oxytocin and differences in brain function associated with the hormone (Young, Wang, and Insel 1998; Winslow et al. 1993). Manipulated decreases in the level of oxytocin in prairie voles correlate with a reduced level of monogamy and bonding. In game theory, variation in levels of this same hormone has been found to correlate with different levels of willingness to trust a partner in a typical economic game (Zak, Kurzban, and Matzner 2004). Across related species the different levels of this hormone appear to impact socially relevant choices, and across individuals within a species, this hormone correlates with different social decisions.

Such a pattern of variation and consistency in hormone levels suggests that a genetic difference might play a role. And, in fact, genetic bases for oxytocin production and receptivity have been identified (Young et al. 1997). As a broader principle we might expect that many social and political values would have a genetic component. Social hierarchy and tribal order certainly vary among primates in a manner suggesting that an inherited characteristic is motivating the patterns.

In humans, recent analysis of genetic data in the form of twin studies has provided evidence for the partial heritability of political attitudes. Analysis of questions asked of monozygotic ("identical") and dizygotic ("fraternal") twins that were raised together or apart suggests that around 32 percent of the variance in political attitudes can be attributed to being genetically heritable (Alford, Funk, and Hibbing 2005). Although at first glance such a high level of heritability might seem surprising, in light of the preceding discussion it is easy to conceive that many politically relevant values may have a genetic component. On the basis of evolutionary principles, we can imagine that prairie voles evolved the habit of monogamous bonding as a survival strategy adaptive to their environment, just as their cousins, the montane voles, evolved a more promiscuous tendency.

We may speculate that genetic variation in oxytocin levels (and other genes and hormones) may be the reason that attitudes about living together and divorce appear to have a genetic heritability (Alford, Funk, and Hibbing 2005). It would be interesting to investigate whether humans who are more analogous to the prairie vole in oxytocin levels are more opposed to divorce and their montane analogues comfortable with living together. These attitudes might be rationalizations for genetically inherited behavioral tendencies, or they may be emotional or cognitive consequences of the inherited hormone level. But it is possible to see how evolutionary pressures could have consequences for feelings, thoughts, and behaviors that would be relevant to policy choices on a national level. Although we may not typically think about the genetic basis for political attitudes, it may well underpin some of the value structure identified by James DeNardo and William Jacoby.

Of course, I am not arguing that all political attitudes are genetic in origin. I contend that genetics is only one factor. According to the data provided by Alford et al. (2005), the environment shared by twins has an apparently small role in shaping political attitudes (about 14 percent), and the unshared environment appears to have a strong influence (about 53 percent). Thus parenting seems to have a smaller function than we might expect in the political attitudes of children, and peers seem to have a greater one (Pinker 2002). The mixture of influences in the broader environment and culture has tremendous sway.

This point is nicely illustrated in a study of fifteen tribal societies playing the economists' ultimatum game (Henrich et al. 2001). Contrary to the rational choice theory's predictions of neoclassical economics, there was substantial variation in the playing of the game across cultures. The norms utilized, however, were often quite comprehensible to anthropologists who were familiar with the contexts in which the tribes lived.

Our primate cousins also appear to have cultural variation among tribes (Byrne et al. 2004; Sternberg and Kaufman 2002). This manifests itself in customs, technologies, and behavior. But we can imagine that strong cultural norms would also exert a reproductive and thus genetic pressure that could vary the distribution of genetic traits in a society.

In fact, the economist Robert Frank (1989) argued that both cheating and cheating detection should be subject to evolutionary pressures. And recently Herbert Gintis has shown that if the punishment of cheaters can evolve in a manner such that individuals receive pleasure from the act of norm enforcement, then such altruistic punishment can sustain norms of cooperation even within large societies (Gintis 2000, 2003; Boyd et al. 2003). More recently, Dominique de Quervain and colleagues (2004) identified the neural basis for altruistic punishment in the dorsal striatum, a place associated with pleasure that is active when people punish norm violators. This line of work provides an example of the way values that play a role in everyday politics can have a genetic and neural basis that is contoured by cultural and other environmental pressures.

Twentieth-century models of political decision making were heavily influenced by behaviorism and the lack of a role for philosophically meaningful choice (Watson 1913; Skinner 1938). In rational choice theory, an individual is expected to transitively rank alternatives according to preferences and to always choose the highest-ranked alternative (Downs 1957). Similarly, in the information processing model of political attitudes that Zaller (1992) presented, the individual's role is consigned to receiving, accepting, and sampling opinions in a largely mechanistic manner. These models are parsimonious, tractable, elegant, and useful, but they also leave little importance to choice as it is commonly understood.

Treating intentionality seriously does not require a resort to Cartesian dualism (Descartes, Miller, and Miller 1983; Descartes and Cress 1979). Daniel Dennett's (2003) recent book *Freedom Evolves* has woven together concepts from cognitive neuroscience and complexity theory to contend that meaningful choice is not philosophically incompatible with a strictly materialist conception. He and others (for example, Kelso 1995) contend that intentionality can be properly viewed as an emergent property (Holland 1995, 1998) of the complex system that is the human brain. Just as a swarm of ants can exhibit an aggregate behavior that is qualitatively different than the decisions of an individual ant, a human brain may be capable of choice even if we assume that the firing of each neuron is a deterministic act. Though much of the argument in this chapter may suggest a reductionist bent, I actually have the opposite agenda. I am contending that taking genetics, neuroscience, and environment seriously

does not mean that we discount the notion of normatively meaningful political attitudes.

In John Searle's (1980) famous "Chinese room" argument, an argument against strong artificial intelligence, he tells a story of a monolingual English speaker in a room with two large batches of slips of paper with Chinese writing on them. The English speaker also has a set of instructions in English for matching one set of the slips of paper with another set. With much practice, the English speaker becomes so adept at the slip manipulation rules that a native Chinese speaker sliding slips of paper under the door of the room and receiving slips in response cannot tell that the English speaker does not understand a word of Chinese. Searle uses this parody of the Turing (1950) test for artificial intelligence to argue that no computer could be considered intelligent in the strong sense of the word because for the computer the symbols are processed syntactically rather than semantically, and so the symbols are meaningless and not grounded in understanding.

Although Zaller uses a broad notion of *considerations* that includes values and culture in some parts of his argument, he essentially contends that political attitudes comprise the output of an information processing system like the Chinese room—output results from systematic processing of the inputs. For a political novice who has little or no knowledge of national politics, responding to political survey questions might be like being the English speaker in the Chinese room during the first day on the job. Survey respondents who cannot identify leading political figures, the policy positions of the major parties, or use ideology as a framework for their political thinking might well be processing meaningless symbols and merely "answering questions" rather than "revealing preferences" (Zaller and Feldman 1992). I contend that for some people, however, the symbols of politics have meaning and are connected to deeply held values; these people are in the Chinese room and they speak Chinese.

Despite his rhetoric about answering questions, Zaller would be justified in noting that he anticipated a role for biological and genetic components of the political decision making process and acknowledged that those could be understood as considerations in his general framework. This, however, would be missing the heart of my critique. In Zaller's information processing framework, these biologically based considerations obtain no normatively or ontologically distinct attention. Rather, they are merely instances of the general notion of considerations. Furthermore, a review of what Zaller deduces from his founding axioms evinces no particular role for biologically rooted considerations and only a minor role for core values. In the Zaller model, one would have little reason

to be concerned if a successful media campaign presented a barrage of considerations that altered a person's expressed policy preference away from some set of core values or biologically rooted attitudes. The political participant is merely answering questions in a manner akin to a machine processing information or the monolingual English speaker sliding slips of Chinese text back under the door.

It has been observed that the level of political knowledge is the most reliable means of differentiating between those who can and those who cannot consistently apply their political values and provide stable political opinions. Often, we political scientists measure political knowledge in terms of the facts that political sophisticates are able to recall (Delli Carpini and Keeter 1996; Zaller 1992). It is important, however, to recognize that facts per se do not help the citizen participate meaningfully in politics. If you know the name of the Indonesian president, whether he has the power to veto legislation, and whether his party controls the legislature, you do not have sufficient knowledge to assess whether he and his policies will conform to your values.

The knowledge of these kinds of facts is easy to measure and is believed to correlate well with the kinds of facts that do matter for assessing policies. But the facts that really help political cognition as understood in this chapter are those that allow citizens to map from the values used in everyday politics to the policy choices presented in national politics. Many people who are quite versatile in their ability to map their values onto the political problems they face in their office simply do not have the type of information that would enable them to map their values onto issues of national politics. Similarly, I would expect that the large majority of ideologically constrained political sophisticates studied by Converse (1964) and his followers would be reporting nonattitudes if asked about the politics of Indonesia or another unfamiliar country.

By necessity, we are cognitive misers and cannot have mappings in all political domains that we might encounter. The expected party differential (Downs 1957) that many people calculate for aligning with one or another faction in their work environment is orders of magnitude larger than the change in utility they would obtain from the election of a different U.S. president. With stakes that are potentially so much larger or so much more immediate, it is not surprising that citizens might choose to invest scarce resources in learning how to map their values onto the politics of their office or community rather than the politics of their nation.

My contention in this chapter, and the contention of the Machiavellian intelligence hypothesis, is that most humans (except autistics, for example) are political sophisticates with the innate capacity for highly

complex political cognition. This capacity evolved because of a cognitive arms race that took place over the course of millions of years. Our incentives to obtain information about a particular value to policy mapping are what vary; our capacity for processing that mapping has a far smaller range. There are many kinds of information that help us accomplish such mapping, from logical reasoning to emotional appeals to modeling by trusted friends or experts. Some of this mapping takes place in the form of heuristics (Lupia and McCubbins 1998; Lupia 1994), and some of it takes place in terms of implicit associations.

EXPLICIT AND IMPLICIT ATTITUDES

Heuristics are cognitive shortcuts that enable people to reduce the mental effort needed to accomplish a task. One well-known example is the so-called availability heuristic. In the availability heuristic, people make judgments based on whatever information they happen to recall rather than on the complete set of information they have. This is a shortcut because they do not need to conduct an exhaustive search through all of their memories to form their response. In the dual-processing model that my colleagues and I have described previously and applied to politics (Lieberman, Schreiber, and Ochsner 2003), heuristics are represented in the *reflective* system, as part of a conscious and deliberate symbolic process.

The *reflexive* system, in contrast, plays a subconscious and implicit role in the formation of attitudes. Antereograde amnesiacs (like the main character in the movie *Memento*) are unable to form new long-term declarative memories. But it has been demonstrated that they are still able to change their attitudes (Lieberman et al. 2001). We know that this change does not come about owing to the cognitive dissonance process that Festinger (1957) described, because these people are not able to form new explicit memories. They are, however, still able to form implicit associations and relate positive or negative feedback to the stimuli. Furthermore, neural substructures that differentiate the systems that underlie implicit and explicit attitudes have been identified (Lieberman et al. 2002).

Having distinct neural substrates connected with explicit and implicit attitudes would be a mere curiosity if the attitudes did not have distinct functional properties. But whereas explicit attitudes are consciously constructed using a limited set of chunked symbolic information, implicit attitudes result from an automatic process of association among large numbers of factors that is susceptible to stereotyping bias. Furthermore, a person's implicit and explicit attitudes may be in conflict (Karpinski, Steinman, and Hilton 2005). In many contexts, experts have been found to rely on their suboptimal intuitions of a problem or to replicate novice behavior, even when they are extremely well versed in the explicit rules or formalisms (Kozhevnikov and Hegarty 2001; McCabe and Smith 2000).

The extent to which political experts or voters who are knowledgeable about national politics rely on implicit knowledge rather than explicit knowledge is still an open question. Ideological constraint (Converse 1964), schemas (Axelrod 1973; Conover and Feldman 1984), online tallies (Lodge et al. 1975), considerations (Zaller 1992), and heuristics (Lupia and McCubbins 1998; Lupia 1994) may be relying on implicit information far more than we appreciate. Alexander Todorov and colleagues (2005) recently demonstrated that one-second exposures to the faces of candidates can yield judgments of competence that are quite predictive of electoral outcomes with no further information. Todorov demonstrates that additional information can ameliorate the impact of the instant judgment, but implicit processes and attitudes appear to have more of an effect on political judgment than traditional political science theories anticipate. Furthermore, although some have investigated the interplay between expertise and implicit judgments in other areas (see, for example, Gladwell 2005), this remains an underdeveloped area of research as regards political cognition. The differing natures of implicit and explicit processes have been particularly well studied, however, in racial attitudes (Sears et al. 1997; Dovidio et al. 1997; Phelps et al. 2000).

COALITIONAL COGNITION AND SOCIAL NETWORKS

Racial attitudes are interesting and important kinds of political attitudes, in the broad sense of *political* that I am using. In Jim Sidanius's theory of social dominance orientation (Sidanius and Pratto 1999), racial attitudes are viewed as particular cases of the more general phenomenon of ingroup-outgroup conflict. Sidanius argues that racism in America simply reflects an evolved tendency to give preferences to "us" and to discriminate against "them." His theory is consistent with the core argument of the Machiavellian intelligence hypothesis: that the continuous readjustment of alliances among complex social animals drove the cognitive competition that led to human intelligence.

Interesting evidence supporting the contention that racial attitudes are reflections of a more fundamental cognition of coalitions comes from Rob Kurzban and his colleagues (2001). In a clever experiment, Kurzban showed that although race was a prominent factor in Americans' perceptions of a story about a conflict between two teams that were divided along

racial lines, it was trumped by team membership in a version of the story in which both teams were racially diverse. Kurzban argued that coalition membership was fundamental to evolution and essential to survival in early humans, whereas the recently constructed notion of racial groupings is only able to utilize the cognitive mechanisms evolved for coalition cognition to the extent that it is consistent with the salient coalitions. He further supported the evolutionary claim in a parallel experiment demonstrating that gender, which is evolutionarily important for sexual reproduction, could not be "erased" in the easy manner that race was.

If the processing of coalitions has evolutionary roots and if political attitudes have a genetic basis, one might wonder whether political party identification has an evolutionary origin. The data from Alford et al. (2005) suggest that party identification does not have strong genetic heritability. Only 13 percent of party identification appears to be attributable to genetics. Around 40 percent is attributable to the "shared environment" of twins and the remainder to the "unshared environment."

James Sundquist's (1983) theory of realignment can help us understand why party identification might not be genetically heritable. If political parties are comprised of shifting coalitions and changing social cleavages (Manza and Brooks 1999), then any politically relevant values that you inherited genetically from your parents may not map onto the same political parties. For instance, many whose grandparents were conservative southern Democrats have found themselves in the Republican Party recently. Party allegiance changed as important values came to be better represented by the competing party. Frans de Waal (1998) observed that coalition alignments shifted many times during the lives of the chimpanzees he studied. Similarly, whereas one of America's main coalitional identifications is based on skin color, other societies have been divided more deeply along religious, economic, linguistic, cultural, or other lines (Sidanius and Pratto 1999).

Many children do share party identification with their parents, however. This is partially reflected in the estimate that 40 percent of party identification in twins is due to shared environment. The substantial literature concerning political socialization has attempted to explain why this is so and under what conditions children and parents differ (Campbell et al. 1960; Abramowitz 1983; Luskin, McIver, and Carmines 1989). One explanation is that the connection between values and political attitudes often is made at home but is made via perceptual rather than persuasive processes (see Westholm 1999).

Although we may form many political attitudes in a personal social context (Kaz and Lazarsfeld 1955; Lazarsfeld, Berelson, and Gaudet

1948), mediated and "impersonal" (Mutz 1998) methods of political communication have a major social dimension. The evidence that political sophisticates use a portion of their brain that specializes in automatic, social processing to respond to political questions is consistent with the claim in the political science literature that politics, when meaningful, is personal. Recent work on the importance of social networks has highlighted the personal nature of political thinking. Diana Mutz (2002) has argued that people whose political discussion networks consist of others who are heterogeneous in their political views are less likely to participate in politics. She suggests that the conflicting ideas in the social network cause ambivalence in these individuals and thus reduce their likelihood of participation. Robert Huckfeldt and colleagues (2004) have used a mixture of agent-based modeling and empirical data about political discussion networks to investigate the social nature of political opinion formation. They argue for an "auto-regressive" model in which people both influence and are influenced by others with whom they discuss politics. They find that far more people participate in more heterogeneous political discussion networks than one might anticipate from a typical "contagion" model of spreading ideology. Strong partisans, however, are far more likely than typical respondents to be embedded in homogenous political networks. In Mutz's and Huckfeldt's theories, much political thinking occurs in a social context.

The social network models typically assume some kind of explicit process of attitudinal influence. Yet Curtis Hardin and his colleagues (Sinclair et al. 2005; Lowery, Hardin, and Sinclair 2001) have demonstrated that attitudes can be influenced by implicit processes as well. Using subtle signals about the beliefs of others, they demonstrate that a subject's automatic attitudes can be quickly influenced, especially when the subject likes the other people. This finding runs contrary to the supposition that automatic attitudes are the result of lifelong processes and difficult to alter (Devine 1989).

CONCLUSION

Scholars of political attitudes often conceptualize their field of inquiry as solely the study of opinions about national politics. I contend that political cognition was the driving force behind the cognitive arms race in evolving humans and that modern humans can leverage the resulting cognitive apparatus for thinking about the politics of families, communities, or nations. I believe that this new, broader view of political thinking should motivate political scientists to deepen their connections with scholars

and scholarship in psychology, anthropology, genetics, neuroscience, and sociology. We should strive to align our theories with the work in these fields and develop our data collection methods in ways that facilitate assessing questions we share with these and other fields.

As we do so, I expect that political science will develop theories that are more humane and nuanced. Many current theories of political decision making are unsatisfying in their psychological realism or their normative sensitivity. I believe that the work reviewed in this chapter shows that accounting for the biological foundations of political attitudes can result in conceptualizations that are richer in their implications for moral thinking and more familiar because they comport with our everyday experience.

We humans apparently developed large neocortices so that we could navigate the politics of the complex social world in which we lived. Although we still use those tools to think about everyday politics, it appears that with particular incentives some humans choose to use these tools to apply their values to debates about problems on a national level. If this is the case, we all might be political sophisticates in our daily lives and only need a little guidance about how to be sophisticated in thinking about national politics.

CHAPTER FOUR

Emotional Processing and Political Judgment: Toward Integrating Political Psychology and Decision Neuroscience

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Political psychology and decision neuroscience are interdisciplinary fields aiming at empirically informed and testable models of human judgment and decision making. Although the contexts and scopes of the fields are not identical, they overlap considerably. Moving both fields forward while maximizing their explanatory power and conceptual coherence requires energetic multilevel development (Damasio et al. 2001; Cacioppo et al. 2000). One arena for fruitful interaction, as evidenced in the literature (Lieberman, Schreiber, and Ochsner 2003; Marcus 2000; Morris et al. 2003; Winkielman and Berridge 2003; Marcus et al. 1995) and by the contributions in this volume, is the development of models that take account of the ways emotional processes work in human judgment and decision making, especially in political decisions. Attention to the role of emotional processes is also prominent in yielding progress at the interface between neuroscience and another key decision science, behavioral economics, in the field of neuroeconomics (Sanfey et al. 2003; Camerer 2003; Glimcher 2003).

We argue that the developing field of decision neuroscience, particularly where emotional processes form an intense focus of study, offers political psychology new handles on human behavior and mentation with which to investigate political judgment and decision making. Developing this interdisciplinary effort requires a clear acknowledgment of the theoretical and methodological challenges ahead, along with strategies for answering them. In addition, we articulate a theoretical framework

We express our gratitude to Ted Brader, Milton Lodge, George Marcus, Rose McDermott, Michael Neblo, Darren Schreiber, and two anonymous reviewers for very helpful comments on an earlier draft.