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Evolutionary Political Psychology: On the Origin and Structure of Heuristics and Biases in Politics

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People decide on political issues using judgmental shortcuts called heuristics. What is the origin of these political heuristics? Traditionally, heuristics have been viewed as learned from the structure of elite debates. This article outlines a different view: that many political heuristics are evolved, biological adaptations that helped our ancestors deal with political problems in small-scale social groups. By analyzing these evolved origins, it becomes possible to develop novel, testable predictions regarding the structure of political heuristics. This argument is illustrated through an extensive review of studies on the structure of the so-called "deservingness" heuristic. The article concludes by outlining four principles that should guide future research on heuristics in political psychology.

KEY WORDS: political psychology, evolutionary psychology, heuristics, deservingness heuristic

From the beginning of research in political psychology, a—if not *the*—fundamental premise for the field has been that citizens lack political knowledge (Converse, 1964; Sniderman, Brody, & Tetlock, 1991; Zaller, 1992). Most citizens lack knowledge about core political actors and institutions and admittedly find politics a complicated affair that is difficult to parse. At the same time, many citizens hold inconsistent political opinions: shifting their positions on the basis of small alterations in the phrasing of a question, succumbing to views that were presented in the media the day before, or simply following what their favored party expresses independent of the content (see, e.g., Zaller, 1992). Converse (1964), in his seminal study, thus concluded that it is more apt to talk about the political "non-attitudes" of citizens rather than about the political attitudes of citizens.

If political ignorance is the first premise of the field of political psychology, the second premise is that this does not preclude individuals from expressing their views on politics. Most telling, researchers can easily get people to express strong views on fictitious policies without much hesitation (Bishop, Tuchfarber, & Oldendick, 1986). From these two premises flows a core question, a key puzzle, for political psychology that has framed research in recent decades: How do citizens form political positions given the deep lack of political knowledge or information? Sniderman, Brody, and Tetlock (1991) pinpointed this question and proposed the now-preferred solution: using heuristics; that is, judgmental shortcuts (see also Lau & Redlawsk, 2006; Lupia & McCubbins, 1998; Popkin, 1994).

Heuristics are rapidly executed rules for decision making that specify a narrow relationship between the available information and preferred decision ("If information X, then decision Y"). Heuristics solve the informational deficit by prompting citizens only to seek out and consider a

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subset of the potentially relevant information. One potential example is that citizens can reduce the complexity of making up their mind on new policies by focusing attention on their preferred party and simply following the party line (and, hence, invoke the decision-making rule: "if my party is in favor, then I am in favor") (Bullock, 2011; see Petersen, Skov, Serritzlew, & Ramsøy, 2013 for a critical discussion). Another example is the so-called deservingness heuristic, which reduces the complexity of deciding on welfare policies by focusing people's attention not on the (potentially complex) policies and programs themselves but rather on the moral character of the recipients. If they are judged to be responsible for their own plight—that is, if they are perceived as "lazy"—people reject welfare benefits for them (and, hence, invoke the rule for decision making: "if the recipients of a welfare program are lazy, then oppose the program"). The notion of heuristics—that is, the utilization of narrow rules for decision making—is one of the most successful theoretical notions in political psychological research and beyond (Druckman, Kuklinski, & Sigelman, 2009). It seems to capture the dynamics of how people actually make up their minds on politics and has led to a prolific literature (Lau & Redlawsk, 2006; Lupia & McCubbins, 1998; Popkin, 1994; Sniderman et al., 1991; see, however, Druckman et al., 2009; Kuklinski & Quirk, 2000).

With one puzzle solved, however, new puzzles have emerged. How are people politically sophisticated enough to devise decision-making rules that enable them to form political opinions and narrowly match specific information to specific opinions while lacking the political sophistication to form these opinions on the basis of careful considerations? In essence, what is the origin of heuristics? In their careful foundational analyses of political heuristics, Sniderman et al. (1991) immediately saw this puzzle. They argued that people learn political heuristics from the environment. And because the political environment is highly structured, people can easily pick up well-functioning heuristics that are "the next-best thing to fully rational democratic decision-making" (Druckman et al., 2009, p. 493).

In this article, I want to lay out a different view on the origin of heuristics in politics. Many of the heuristics used to form political opinions are not something that each citizen *de novo* develops when entering the political world. Just as fish have specialized psychological systems designed for navigating through water and birds have specialized psychological systems designed for navigating in the air, humans have specialized psychological systems—heuristics—designed to navigate through the clashes of interests and values that we refer to as politics.

Neither birds nor fish need to learn their navigation skills; they emerge as part of normal development. This too, the present evidence suggests, is the case for many of the political heuristics that humans use. The human animal is a group-living animal. In order to have survived and reproduced in social groups, many political heuristics evolved through processes of natural selection and are something that naturally emerge in humans in the course of development. To be human is to be a political animal (Hatemi & McDermott, 2011), and to be a political animal is to be equipped with heuristics for political decision making.

Knowing the origins of heuristics matters because origins determine structure. By knowing the origins of heuristics, we can develop precise testable hypotheses regarding the kinds of information that they take as input and the kinds of behaviors they prompt as output. In a nutshell, this is the task of the emerging approach of evolutionary political psychology: using knowledge of the evolutionary origins of heuristics to map and test the structure of political heuristics.[1] To set the stage for this analysis, I will begin by outlining the principles that appear to have guided previous political science research on heuristics. As becomes clear in the course of this article, we must rethink each and every principle (see also Druckman et al., 2009; Kuklinski & Quirk, 2000). In particular, there is no reason

[1] Political psychologists are increasingly considering the role of biological factors. Whereas previous works have introduced genetics, neuroscience, and psychophysiology into the study of political psychology (e.g., Hatemi & McDermott, 2011; Hibbing, Smith, & Alford, 2013), this is the first lengthy introduction to the application of evolutionary psychology to political psychology (see, however, Lopez & McDermott, 2012).

to expect heuristics to be a substitute for "rational decision making." Evolved heuristics are selected to operate in the small-scale political environments of our ancestors. As result, they will bias people's political attitudes toward the solutions that were efficient then rather than now.

Learned Political Heuristics and Their Characteristics

Early work on heuristics in political science was influenced by the corresponding work on heuristics in psychology. In psychology, Chaiken, Liberman, and Eagly (1989) characterized heuristics as "learned knowledge structures" (p. 213) in their influential dual-process model of persuasion. And, indeed, some heuristics are learned in the sense that they require significant effort to acquire through logical deduction or explicit instruction but, through practice, can be applied consciously but effortlessly (like riding a bike or playing the piano). One example, discussed by Gigerenzer (2007), is the decision-making rules used by medical professional for diagnosing diseases. Utilizing statistical correlations between symptoms and specific diseases, these rules have been formulated by medical researchers and are learned and automated by medical students, to be utilized promptly in consultations with patients.

The traditional view on heuristics in the political science literature is that heuristics are "learned" in modern political environments in a similar fashion as heuristics for diagnosing diseases.[2] The general function of heuristics, in this perspective, is to save processing effort without sacrificing decision-making accuracy (Eagly & Chaiken, 1993). In politics, the simplicity of heuristics is expected to allow citizens to reach value-consistent attitudes or vote choices without needing to invest cognitive resources in acquiring political knowledge or thinking through all of the potential alternatives (e.g., Downs, 1957; Lau & Redlawsk, 2006; Sniderman et al., 1991). The party heuristic ("if my party is in favor, then I am in favor") provides a good illustration. To form an opinion on a new policy, people simply need to know the position of their party—they do not need to bother with understanding the actual content.

Given that the presumed function of political heuristics is to reach value-consistent opinions, they are generally expected to be well-matched to the political environment. That is, they are expected to help people form value-consistent attitudes. Not only is this a requirement if they are to fulfill their function, it is also a somewhat uncontroversial assumption to the extent the heuristics are "learned" directly from the same political environment in which they are operating. The party heuristic, for example, works because modern political environments are structured such that parties are constrained to not move too much in ideological space; people choose parties on the basis of their own ideological worldviews and, hence, even after careful scrutiny, they agree on most novel policies with their party (Sniderman & Bullock, 2004).

Finally, on the basis of the above principles, the extant research on political heuristics has argued that the number of political heuristics is few. As pinpointed by Sniderman et al. (1991): "The very factors that militate against the plausibility of supposing that they know much about politics—their lack of attention to politics and the like—similarly militate against the plausibility of supposing that they will be clever at working our shortcuts in judgment to compensate for their lack of political information" (p. 28). In other words, because people utilize political heuristics to compensate for their lack of political knowledge, they cannot have the means available to learn a large number of heuristics from the political environment.

[2] What is specifically meant when it is said that a heuristic is "learned" is, however, often left unspecified in terms of the psychological process. Throughout the article, I will refer to "learning" in quotation marks to indicate that this serves as a placeholder for an unspecified process (for further discussion, see Cosmides & Tooby, 2003). Just like decision-making rules for diagnosing diseases, "learned" political heuristics could be acquired through instruction and automated through continuous training or logically deduced by the self and subsequently automated through training.

These principles reflected the state-of-the-art psychological research at the time when heuristics were introduced into the political science disciplines. Since that time, however, insights into human psychology have progressed. While the early pioneers in psychological research on heuristics described their theories as "dual-process theories" and, hence, emphasized how heuristic decision-making processes were something different from processes of systematic, reasoning-based decision making, recent dual-process psychologists have argued that these pioneers in fact separated two types of the same fundamental process and missed the existence of the truly alternative process (see Evans, 2008, pp. 267–268): that some heuristics are not "learned" (in the sense of being acquired through logical deduction or explicit instruction) and then automated. Instead, some heuristics emerge reliably as effortlessly operating decision-making tools during normal development independently of general intelligence or working memory constraints.

There are many examples (see, e.g., Buss, 2005). Here, I will just refer to one: the so-called McGurk effect, which refers to a heuristic use of visual cues to process auditory information (McGurk & MacDonald, 1976). If people are provided with both auditory information in the form of a spoken utterance and visual information in the form of a person's lips forming another utterance, people's hearing of the spoken utterance changes toward the utterance formed by the lips. This effect has been demonstrated cross-culturally (for discussion, see Chen & Massaro, 2004) and is highly automatic (Soto-Faraco, Navarra, & Alsius, 2004). To see for yourself, find one of the many available demonstration videos on the Internet: when you close your eyes and rely exclusively on the auditory information, you hear one thing—but when you open them and begin to rely on the visual information in the video, you hear another. Because we evolved in a world in which face-to-face communication was the norm and where there was consistency between visual and auditory information, our brains seem geared toward using visual information to interpret noisy auditory signals. This is not something that we have to be explicitly instructed to or logically deduce. This is also the case, I will argue, for many political heuristics—and many there are.

The Natural History of Politics: A Short Version

Why is it likely that political heuristics are something that we are naturally endowed with? To appreciate this, we need to take a step back and consider the human past.

The Evolution of Human Social Life

The genus *Homo*—our modern *Homo sapiens* lineage—evolved around 1.8 million years ago with the withdrawal of forests in East Africa and the emergence of the savannah terrain. Around 4 million years prior to that, our lineage and that of our closest cousins—what would eventually be the genus *Pan* (i.e., chimpanzees and bonobos)—split into two separate lineages. Over the course of these 4 million years, the key features of the genus *Homo* evolved and/or were refined, including bipedal walking, retractable thumbs, increased reliance on large game animals as a high-quality source of nutrition, changes in the configuration of teeth to reflect a dietary shift from raw food to food prepared over fire, increased skull size and many others (for an introduction to human evolution, see Boyd & Silk, 2009).

These physiological changes can easily be determined from the fossil record and reflect massive changes—but less easily detectable in the fossil record—in our ancestors' cognitive apparatus and social environments (Kaplan, Hill, Lancaster, & Hurtado, 2000). For several millions of years and almost certainly prior to the split with the lineage leading to the genus *Pan* (the lineage of chimpanzees and bonobos), our ancestors lived in social groups. The physiological changes observed above most likely reflect a shift in the patterns of interaction within and between these

groups toward that which has been termed the "hyper-sociality" of humans (Bowles & Gintis, 2011). Increased reliance on large game as a calorie source reflects increased within-group cooperation skills to orchestrate collective hunting whereby different individuals perform different, well-specified roles. With this, questions—or, more accurately, problems—such as "How do we coordinate the different roles?" and "Who will lead the expedition?" arise. Furthermore, a reliance on food packages that are both collectively obtained and too large for a single individual or family to monopolize leads to distributive problems: "How do we share the meat?" and "Is anyone taking more than their fair share?" The use of fire to prepare the meat (and, hence, the selection for teeth designed to chew) similarly cannot have evolved without a coevolution of new social patterns (Wrangham, 2009). Fire must be maintained, which requires a further division of labor whereby someone attends to the fire while others acquire the food to be prepared. Problems such as "How do we determine who performs which role?" and "What are the consequences if one does not fulfill their role?" emerge. Similarly, the evolution of retractable thumbs must have coevolved with increased abilities to manipulate tools as well as increased communication and learning skills such that knowledge about tool manufacturing is passed from individual to individual in order to create the increasingly complex tools observed over the course of human evolution. With this, problems of exchange become increasingly complicated, as the exchange of knowledge requires the exchange of different currencies. While you can repay a shared piece of meat today with a similar piece of meat tomorrow, you cannot repay a piece of information by recollecting the same information the next day. Problems such as "How do I incentivize others to bring me their unique knowledge?" and "In what other currencies can I repay the favor?" therefore emerge. But it is not merely within-group social interaction that intensified in its coevolution with human physiology; between-group interactions must also have intensified. The evolution of bipedal walking has increased the territories of early human groups and the distance of their expeditions. With these comes increased interaction with other human groups, and problems related to between-group relationships intensify: "Do these other groups pose a threat?" "Do they have resources that we can conquer—or that we can harvest through collaborative relationships?"

In other words, the evolution of human physiology has been tightly coupled to the evolution of human sociality, which again reflects the evolution of human psychology. Identifying and solving the above problems requires the existence of sophisticated psychological processes. In this light, it is hardly surprising that all of these physiological changes co-occurred with an enlargement of skulls and, hence, the size of the human brain (Kaplan et al., 2000). This observation also aligns with the finding that, across species, there is a tight relationship between the size of the neocortex (i.e., the most recent parts of the brain, which are tied to conscious reasoning and critical reflection) and group size (Dunbar, 1998). If a species naturally forms larger groups, it tends to have a larger brain (with the solitary but large-brained orangutans as the dramatic outlier). Group life—with its constant computations about how *who* did *what* to *whom* and *why*—requires sophisticated social cognitive skills, and the enlargement of the human brain is likely, in part, to reflect the occurrence of increasingly complicated social challenges.

The Complexity of Ancestral Social Life

Ancestral life was a social life. But what kind of social life was it? Classical political philosophers debated this intensely. Hobbes characterized ancestral life as "nasty, brutish and short," whereas Rousseau talked about the "noble savage." Substituting philosophical arguments with data, recent anthropological and archaeological evidence suggests that both were right. Not in the sense that the correct answer is somewhere in between but in the sense that social life—then as today—oscillated (from time to time and region to region) between the extremes of high levels of violence and high levels of care.

The likely complexity of ancestral social environments is reflected in the list of so-called human universals (Brown, 1991; Pinker, 2003). This has been compiled by anthropologists to reflect the traits that have been found in every human society studied and includes a variety of traits such as territoriality, conflict, family, food sharing, group living, empathy, dominance/submission, cooperation, coalitions, collective decision making, etiquette, rituals, and weapons. According to the anthropological data, neither prosocial nor antisocial traits are recent phenomena.

One illustration of ancestral prosociality from the fossil record relates to the existence of hominine skeletal remains dating back as far as 1.77 million years ago showing signs of both severe physical disabilities and years of survival with those disabilities. The inference drawn by archaeologists is that someone must have cared for these disabled individuals (Hublin, 2009), and, hence, this fossil evidence possibly reflects the existence of highly cooperative traits in humans in deep prehistory. Similarly, analyses of campsites and the dispersion of fossil remains of hunted game show that food-sharing practices among humans were definitely elaborately evolved 400,000 years ago (Stiner, Barkai, & Gopher, 2009) and most likely much prior to that (De Waal, 1996).

At the same time, this evidence of widespread prosociality is joined by other fossil evidence suggesting the widespread existence of violence and war. For example, skeletal evidence shows strong signs of weapon-inflicted trauma and death (Walker, 2001). Similarly, the strong presence of war (i.e., collective behavior directly targeted at killing members of other collectives of conspecifics) in both chimpanzees, modern humans, and the anthropological record suggests that war between groups could have been a recurrent feature of hominid environments even prior to the split between *Homo* and *Pan* (Wrangham, 1999). At the same time, while chimpanzees immediately attack outgroup members on sight if they outnumber them (Wrangham, 1999), the archaeological record suggests that humans have also evolved strategies for peaceful between-group cooperation. Between-group trading, for example, has most likely been a recurrent feature of ancestral environments, and archaeologists have uncovered how tools made at one site also appear in sites several hundred kilometers away, which has been interpreted as evidence of prehistoric trade lines (Boyd & Silk, 2009).

In other words, there is ample reason to believe that the social environments of ancestral humans were just as complicated as the social environments of today. The human species evolved in environments in which our ancestors depended on others for caring, sharing, and protection. At the same, our ancestors could not be assured that others would provide this—or instead seek to selfishly exploit them. If all were "noble savages" ancestrally, navigating through social environments would have been easy. Because this was not the case—because it has been necessary to constantly judge the strategies of others—the human mind must be designed to navigate through a social world ridden by the combinatorial explosion of potential situations and responses. These social dependencies and clashes of interests also made ancestral environments political.

From Ancestral Politics to Modern Politics

Problems such as "Who is in my group?"; "Who should I share with?"; "Whom can I ask to share with me?"; "How should we deal with norm-violators within our group?"; and "How should we approach other groups?" would have been recurring, and our ancestors would have needed to solve them in order to survive and reproduce. Importantly, these problems are essentially political problems. If we strip modern political debates of their legal complexities, these are the exact basic questions around which they revolve (Haidt, 2012; Hibbing et al., 2013; Petersen, 2009). These problems reflect questions concerning the distribution of costs and benefits within and between groups and, at the core, central political debates about immigration, race relations, criminal justice, social welfare, and foreign policy pose the exact same questions. If politics is indeed a matter of "the allocation of values for a

society" (Easton, 1953) or "Who gets what?" (Lasswell, 1936), as it has been classically defined, politics has been a feature of human sociality for hundreds of thousands of years.

Yet while ancestral life was also a political life, there are acute differences between the scale of politics then and now. We evolved as hunters and gatherers with Stone Age technology in small-scale groups. The research cited above on the relationship between brain size and group size suggests that the human brain (given its size) is adapted to a life in groups of around 150 individuals (Dunbar, 1998). Based on observations of present-day forager societies and models of optimal foraging strategies, anthropological research similarly suggests that our human ancestors lived in groups of between 25 and 200 individuals (Kelly, 1995). These numbers show that ancestral politics was a small-scale phenomenon. When our ancestors would have passed judgment on a thief, they would have been standing face-to-face to with the individual, they would have grown up with the individual, they would have known their parents, and so forth.

Modern politics, in contrast, is a large-scale phenomenon. Today, we live in mass societies of millions rather than small groups. In this context, we pass political judgment not on individuals but on entire groups (e.g., criminals, immigrants, social welfare recipients). Even if we know a few exemplars from personal acquaintance, we cannot in principle know and never will meet each and every person affected; hence, we depend on information from others, including political elites and media.

Not only are mass politics highly different from small-scale politics, the transition from small-scale to mass society also occurred very recently and incredibly rapidly in human evolution. Our ancestors lived as hunters and gatherers in small-scale groups on the savannah until our lineage migrated out of Africa some 60,000 years ago. Still, after this emigration, our ancestors continued to live as nomadic foragers. This first changed with the advent of agriculture around 10,000 years ago. Agriculture is a game changer in human politics, because it requires a sedentary life and allows for a more stable flow of calories, thereby sustaining a larger population. In effect, this provides the prerequisites for the emergence of mass politics. Anthropologists have argued how the emergence of agriculture sets an autocatalytic process in motion, where increased population sizes eventually leads to the emergence of states in order to increase control and establish order (see Johnson & Earle, 2000).

Figure 1 provides empirical data on the emergence of both agriculture and states across a large sample (n = 171) of countries across all parts of the world (for detailed data description, see Petersen & Skaaning, 2010). Specifically, it shows the distribution of the timing—in years before the present—of the emergence of agriculture and states, defined as the existence of a political level above the level of chieftains. As seen in Panel A, agriculture emerged slightly more than 10,000 years ago (in Mesopotamia), then slowly spread around the world. A small number of modern countries first turned to agricultural within the last 250 years. As documented in Panel B, however, the emergence of states and, hence, mass politics is an extremely recent phenomenon—even compared to the emergence of agriculture. The first states emerged around 5000 years ago, and the territories of almost 35% of modern countries were stateless until 250 years ago. Compared to the previous 1.8 million years of evolution within small-scale groups, mass politics has only been with our species for a fleeting moment. If evolution has structured the political heuristics of humans, these heuristics will be designed for small-scale politics.

Engineering Political Heuristics: The Evolutionary Origins of Psychological Structure

The prehistory of politics is of fundamental importance to political scientists and political psychologists because any recurrent adaptive challenge of the past serves as a selection pressure on the human decision-making architecture. That is, if the ability of human ancestors to solve the recurrent problems specified above has had any (however miniscule) effect on their reproduction, this

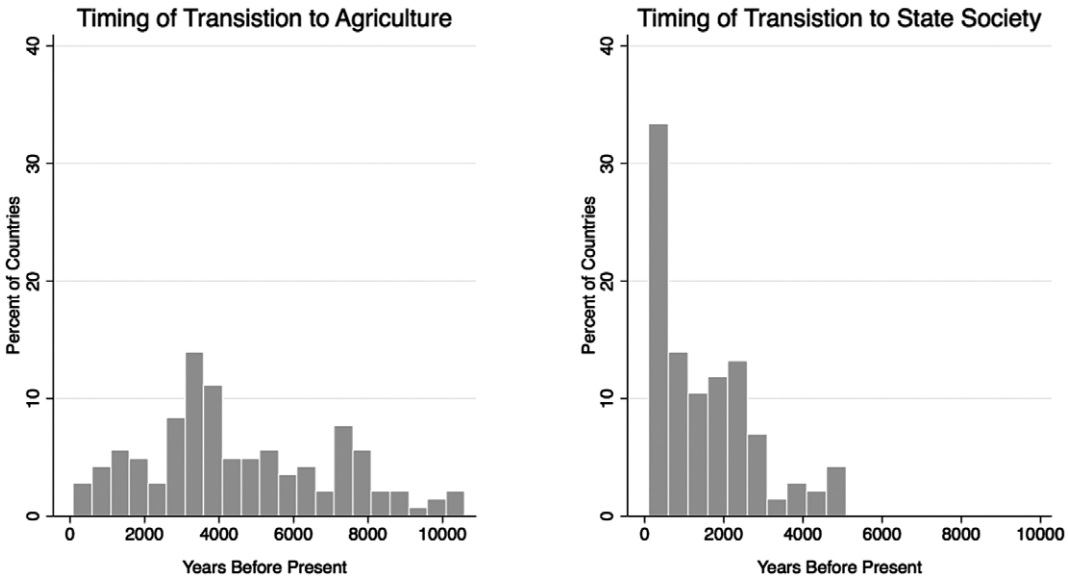

Figure 1. The timing of the transition of territories to agricultural production and state societies. N = 171. Reanalyses of data from Petersen and Skaaning (2010). The units are territories occupied by modern countries and the graphs display the distribution of when (in years before present) agriculture and state-level societies, respectively, emerged in the territory.

would have structured human cognition and the political heuristics it contains through processes of natural selection. To develop the premises for and implications of this argument, this section reviews what natural selection is, how it in general "designs" cognitive systems, and how this can in turn help us understand political heuristics.

Natural Selection

Natural selection is the inevitable outcome of the key feature of life: error-prone reproduction. Descendants are never perfect copies; mutations occur. Organisms with mutations that increase reproduction—or, to use another term, mutations that increase the fitness of the organism—will leave more offspring than other organisms. Over generations, these mutated genes will spread through the population of organisms and, if sufficiently fitness-enhancing, will become universal. In evolutionary biology terms, there is a selection pressure for the relevant genes.

What kinds of mutations are selected? This depends on the environment of the organism. To take an obvious example, mutations that increase an organism's ability to extract oxygen (ceteris paribus, a fitness-enhancing mutation) in air-filled environments (the environment of, e.g., humans) will not necessarily be beneficial in water-filled environments (the environment of, e.g., fish). Fitness and selection pressures are, in other words, environment specific. Consequently, natural selection drives the design of organisms into greater alignment with the specific environment in which the population is situated. This is not the outcome of any intentional processes or any foresight. It is the automatic, mechanistic outcome of fact that organisms (or, more precisely, their genes) reproduce and, in the process of reproduction, mutate. In the words of Dawkins (1996), natural selection is a fully "blind" process of biological engineering.

How does natural selection adapt organisms to their environment? One might intuitively suspect that the most fitness-enhancing trait would be a trait that focused any and all attention of an organism on reproduction. Yet while the ultimate cause of an organism's architecture relates to reproduction,

getting from conception to reproduction is, for any organism, a path filled with an incredible number of specific steps that must be taken in an incredibly narrow order for successful reproduction to ensue. Each of these steps contains highly specific adaptive problems—that is, problems whose solution influences the likelihood and amount of successful reproduction—that must be solved (Tooby & Cosmides, 1992).

One simple illustration is that a necessary condition for reproduction is for the organism to survive until reproductive age. Consequently, genetic designs that increase the likelihood of survival will, ceteris paribus, usually be fitness-enhancing and, hence, selected in spite of the fact that the designs do not directly address a reproductive problem in the colloquial sense. This analysis can be extended almost infinitely, and reproduction is essentially a Babushka doll of adaptive problems nested within adaptive problems. For example, in order to survive to reproductive age, the human child must extract resources from the parents, learn which plants and animals are edible, learn to take ecologically appropriate precautions, avoid malicious individuals, form friendships to have backup in situations of need and so forth. Most of these problems continue (and some intensify) after reproductive age and are then joined by the problem of actually acquiring a mate, which involves its own set of exceptionally difficult problems, such as correctly reading the mating intentions of the opposite sex, fighting off competitors, and increasing your mate value in their eyes. And after the transition to parenthood, these problems are again joined by yet other sets of problems and, as described in the preceding section, many of these problems would have been political in nature.

In short, natural selection cannot have selected for organisms motivated simply by an imperative of "go reproduce!" because such an organism would not know how to get there.

Psychological Adaptations: Systems for Representation and Systems for Motivation

Natural selection promotes features that are specifically designed to solve a particular adaptive problem in a particular environment. These features—the selected solutions—are called adaptations. Adaptations have dedicated functions and are well-designed to carry out those functions (Williams, 1966). The heart is a physiological adaptation that is designed with the function to pump blood. The eyes are physiological adaptations that are designed with the function to provide the brain with visual information concerning the external world. Pumping blood and getting visual information into the brain are important functions. The eyes, however, also provide an illustration of another type of adaptation: Psychological adaptations. The function of the eyes is to provide information that can be subsequently judged and provide a basis for decision making. This is not a physiological function but rather a psychological or cognitive one. Many of the adaptive problems referred to above similarly require that psychological functions are reliably executed. For example, to avoid people with malicious intents, adaptations designed to predict those intentions from observable cues are needed and, upon detection, these adaptations need to interlock with adaptations designed to facilitate avoidance behavior.

More generally, the solution to many adaptive problems requires organisms taking a specific set of actions (let us call it X) in a particular type of situation (let us call it Y). How does natural selection solve this great engineering problem of designing organisms to take action X in situation Y? We can break this task down into two subtasks (Tooby, Cosmides, & Barrett, 2005). One subtask is representational, that is, about generating an accurate internal representation of the particular situation facing the organism and, hence, identifying whether the situation is Y or Z—or rather Q. Another subtask is motivational, that is, about getting the organism to take that very specific action (within the universe of almost unlimited types of actions) that provides a fitness-increasing—adaptive—response given the particular individual and environmental contingencies and, hence, facilitate the behavior X if the situation is indeed Y.

Essentially, when thinking about how natural selection has influenced the psychological apparatus of humans and any other organisms—that is, shaped the structure of the representational and motivational systems—the question we should ask ourselves becomes: how could you design a robot that could solve the two tasks of representation (the problem of identifying situation Y) and motivation (the problem of eliciting behavior X in situation Y)? Speaking metaphorically, natural selection obviously cannot intervene and nudge the organism toward the correct fitness-enhancing trajectory. Everything that is vital to reproductive success must be preprogrammed (including mechanisms for the developmental and environmental calibration of traits) before the organism is set loose. Let us consider the consequences in greater detail.

Accurate representations are vital (Kurzban, 2012); first, because inaccurate representations often can imply death. When a lion is approaching you, you must accurately detect the situation and its inherent danger. Second, because inaccurate representations—even if not lethal—will involve opportunity costs. Inaccurately overestimating the sexual interest of a potential mate, for example, involves the opportunity cost of not pursuing other, more realistic opportunities. At the same time, accurate representations are difficult to obtain. Often, the true nature of the adaptive problem is first revealed with certainty when it is too late. You can only be certain that the movement in the long grass was indeed a predatory cat once it has jumped out to attack; similarly, you can only be certain that the potential mate was not attracted to you once they went home without you. Adaptive problems must be detected and solved before becoming problems. Consequently, natural selection has had to "solve" the engineering feat of building representational systems that are able to make predictions about the situation ("Is this X?") under informational uncertainty from indirect cues.

The current consensus in cognitive and developmental psychology is that there is only one efficient solution to this problem: the evolution of content-rich representational systems (Delton & Sell, 2014; Tooby & Cosmides, 1992).[3] Efficiently identifying situations with adaptive significance requires that our minds are equipped with related concepts, such as "predator," "mate," "edible object," "cooperation partner," "leader," "kin," "cheater," "enemy," and so forth, complete with lists of the cues that activate the concept for representing the situation (and evolved mechanisms for adding—"learning"—further cues to the concept). This might be the most fundamental insight from evolutionary psychology, but it is also an exceptionally difficult point to grasp. Some of the central difficulties in appreciating the role of evolved, cognitive categories comes from: (1) "instinct blindness" (Cosmides & Tooby, 1994); that is, that under our effortless stream of conscious are myriads of evolved, computational processes constantly at work but which are invisible to us; (2) the fact that evolved systems certainly do not have to be present at birth—some of the evolved, representational systems are present at birth, others emerge later in particular life phases, as is the case with physiological adaptations such as female breasts and teeth; and (3) that evolved cognitive categories do not necessarily manifest themselves (i.e., become active) across all individuals or cultures (for detailed discussion, see Buss & Greiling, 1999; Tooby & Cosmides, 1992). Because of these conceptual difficulties, it is key that the existence of evolved, content-rich representational systems is supported by enormous amounts of evidence, including studies of prepared learning in nonhuman animals (Seligman, 1970), studies of preverbal infants (Thomsen & Carey, 2013), studies of split-brain patients (Gazzaniga, 2014), and studies of artificial intelligence (Carruthers, 2005).[4]

[3] The notion of content-rich representational systems has been referred to using many different terms such as cognitive modules, cognitive templates, core cognition, prepared learning, and cognitive schemata.

[4] The existence of such evolved, content-rich representational systems forms the core of most dominant theories within mainstream psychology. The discussion within psychology is mainly about whether it makes sense to divide the mind into evolved and systems, as dual process theorists would argue (Evans, 2008), or whether every bit of human cognition is permeated with evolved systems (Tooby & Cosmides, 1992). From a folk-psychological perspective, however, it might seem as though everything can be achieved if an organism was simply equipped with an elaborate capacity for generating associations (i.e., a general capacity for "learning"). However, any organism that is prepared to look for specific kinds of associations rather than other associations will outperform—and, hence, be selected—organisms that are simply designed

An illustration of the existence of representational systems with political relevance comes from analyses of the adaptive problem of resource conflict. As described above, conflicts of interest over resources (such as food and mates, and immaterial resources, such as status) have been ancestrally recurrent. Evolutionary biologists and animal behavior researchers have developed sophisticated models for adaptive behavior in such conflicts. The best-validated model is the asymmetric war-of-attrition model, which basically argues that any organism in a conflict situation should gauge the relative fighting ability of its opponent (Hammerstein & Parker, 1982). If this is gauged as lower, then an escalation of the conflict is adaptive; if gauged as higher, then a withdrawal is adaptive. This model has been validated across a range of different species, including frogs and spiders (Kelly, 2008)—and have recently been applied to humans (Petersen, Sznycer, Sell, Cosmides, & Tooby, 2013; Sell, Tooby, & Cosmides, 2009). For humans—in particular, under ancestral circumstances with limited weapon technology—a key feature of fighting ability must have been physical strength. Hence, in order to solve the problem of adaptive conflict behavior, there is reason to expect humans to have evolved dedicated representational systems to gauge the physical strength of others. This has indeed been validated. Humans are exceptionally good at accurately predicting the physical strength of even ethnically and racially different others from a range of cues in the body, face (Sell, Cosmides, Tooby, Sznycer, von Rueden, & Gurven, 2009), and voice (Sell et al., 2010). Even preverbal infants utilize physical size to predict who prevails in conflicts (Thomsen, Frankenhuis, Ingold-Smith, & Carey, 2011). And—reflecting the key role of physical strength under ancestral circumstances—representations of physical strength seem to serve as overarching representations of relative fighting ability such that people represent another person as physically stronger if this person carries a weapon (Fessler, Holbrook, & Snyder, 2012) or if they themselves are physically restrained (Fessler & Holbrook, 2013a) and as physically weaker if they themselves are in a group of friends (Fessler & Holbrook, 2013b). In sum, to solve the adaptive problem of whether a conflict situation involves a stronger or weaker opponent, humans are predicted to have representational systems for estimating relative strength, and this is indeed the case. Similar testable hypotheses about required representational systems can be made for any of the other adaptive problems that have been identified in relation to ancestral small-scale politics.

The existence of evolved representational systems allows the organism to identify the adaptive problems inherent in a situation. Yet problems do not merely need to be identified, they must be solved. That is, the representational systems must convey their representations to other systems capable of propelling the organism to take the specific action that helps solve the adaptive problem at hand. Obvious examples of such motivational systems are the emotions, with all of the cognitive and physiological changes they induce (Cosmides & Tooby, 2000). As sophisticated adaptations, emotions do not merely motivate the individual to take a particular action, they optimize the individual for taking that action. This should not be all too unfamiliar to political psychologists. For example, research addressing the role of anxiety in politics has specifically been arguing and demonstrating that the emotion of anxiety does not just make people avoid the object of anxiety but also prepares people to update their habitual response to these objects by increasing the processing of information, increasing information searches, and decreasing their reliance on previously formed

to memorize whichever cues lead to pleasure and which led to pain on a former occasion. There are multiple reasons for this. One is that being prepared to associate snakes with danger is a much more adaptive strategy than waiting for the association to form after you have been bitten. Another relates to generalizability. While an organism might form an association between "harm" and the features of the situation involving the snake, it is exceptionally difficult to know which specific features of the situation that the organism should generalize as signifying danger on future occasions. If the snake was green, should the organism associate danger with all green animals? Should it associate danger with only green snake-like things? That is, the organism must be prepared to tune in to particular cues (in this case, the snake "form") to adaptively form associations and adaptively avoid danger. It is not that people don't have any ability to form novel associations (e.g., between cars and danger); rather, it is that they are so much better at and quicker to form associations that have been adaptive to form over the course of human evolutionary history (see, e.g., Barrett & Broesch, 2012).

habits (Marcus, Neuman, & MacKuen, 2000). Further illustration comes from research on the psychology underlying the adaptive solution of conflict situations. Hence, as argued above, this requires a representation of the relative fighting ability of the self and the opponent. Importantly, however, it also requires that these representations guide behavior by serving as input to motivational systems that will regulate aggression upwards or downwards, depending on whether the self is represented as stronger or weaker than the opponent. Recent research has identified anger as a key emotion in this regard (Sell et al., 2009). When a weaker individual seeks to claim a resource from a stronger self, anger in the self is triggered, and, as a result, a range of processes is activated which further the goal of incentivizing withdrawal. When angry, for example, people are likely to signal the value of a resource to them (and, hence, their willingness to fight), derogate the strength of the other, signaling fighting ability (both verbally and by displaying physical cues of strength, such as size and facial masculinity) and ultimately engage in direct cost imposition (Sell, 2011); all processes that serve to get a weaker person to withdraw from the resource.

Representational and motivational systems work together to enable organisms to solve specific adaptive problems. Each representational system and each motivational system is a dedicated adaptation with a particular function in the process of solving the adaptive problems. As an inevitable outcome of natural selection, adaptations are designed to carry out the functions and solve the problems they evolved to solve. Consequently, one can use evolutionary theory to construct testable hypotheses on the structure of representational and motivational systems by identifying the representational and motivational functions needed to be carried out in order to solve a particular adaptive problem (Tooby & Cosmides, 1990). This is essentially the contribution of evolutionary theory to the study of human psychology: providing a toolkit to build hypotheses from a coherent and well-validated set of first principles.

Some Political Heuristics Are Psychological Adaptations

When a researcher identifies a "heuristic"—a fast and frugal decision-making rule—this rule could be acquired like the decision-making rules of medical professionals described earlier in the article. Yet it could also be a decision-making rule that emerges from the interactions between evolved representational and motivational systems. In such a case, the representational systems determine the input that the heuristic utilizes and the motivational systems determine the output it delivers. The structure of the heuristic would, in other words, be provided by psychological adaptations and, because of the fit between adaptations and past environments, the evolved origins—that is, the past environment to which they are adapted—would provide the ultimate cause of this structure.

Is there reason to believe this to be the case in politics? Yes. In essence, the combined insights from the preceding sections provide a strong basis supporting this hypothesis. Given our knowledge of the structure of ancestral social environments, politics has constituted a recurrent set of adaptive problems of human evolutionary history. Given the inevitability of natural selection, representational and motivational systems for solving these adaptive problems must exist. And, by implication, we can come to develop testable predictions regarding the structure of political heuristics by analyzing their evolved origins.

Obviously, getting from a specific genetic mutation to representational and motivational systems is not trivial. Consequently, the evolution of heuristics is a slow process that requires consistent selection pressures over lengthy periods of time. When selection pressures are particularly strong, new genetic mutations can spread quickly throughout the population, but very few of the adaptations that are politically relevant are likely to rest on just one or a few genetic mutations (see Hatemi, Byrne, & McDermott, 2012). This has two interrelated consequences. First, only evolutionarily recurrent adaptive problems can be expected to have selected for relevant representational systems.

Second, the cues that these representational systems are geared toward using when making inferences to situations and problems are the cues that would have been recurrently available and predictive over human evolutionary history. Essentially, the basic prediction from an evolutionary perspective on the structure of human representational and motivational systems is that these systems will make inferences on the basis of the specific cues that were statistically predictive of an adaptive problem over human evolutionary history and motivate behavior that were solutions to this problem under ancestral conditions (Tooby & Cosmides, 1990).

Given that mass politics is an exceptionally recent phenomenon in human evolutionary history, this strongly suggests that any evolved political heuristic is designed for small-scale politics, not mass politics. These heuristics should be designed to extract cues that were relevant in small-scale political situations and motivate behavior that would further one's political interests under such conditions. Given that the operations of the underlying systems will often be highly automated, there is no reason to expect that the mismatch in terms of scale between small-scale and large-scale politics precludes the systems from being activated in mass politics (for a thorough discussion, see Petersen & Aarøe, 2012). Whenever cues are available in modern mass politics that resemble the cues that were available under ancestral conditions, the relevant representational and motivational systems should be activated and produce inferences and behavior (Petersen, 2012).

An example of this relates to the above-described representational and motivational adaptations designed to navigate conflict situations. Physical strength was ancestrally important in these situations. In contemporary politics, however, outcomes are determined by the number of seats in parliament held by different factions, not physical strength. Still, physical strength continues to guide political behavior. Physically stronger males are more inclined to support war as a solution to international conflicts (Sell et al., 2009), they are more supportive of dominating other groups (Price, Kang, Dunn, & Hopkins, 2011), and they are more self-interested in terms of their political opinions on issues of redistribution (Petersen et al., 2013). For wealthy males, opposition to redistributing wealth to the poor increases with strength. For males who are poor, higher strength increases support for acquiring wealth from the rich (i.e., redistribution). The structure of the heuristics that guide intuitions about political conflict reflects, in other words, an origin in which resources were to be seized and defended, in part through physical force and, hence, people come to reason as though modern political conflicts pose the same demands.

An Illustration: The Origin and Structure of the Deservingness Heuristic

One of the political heuristics that has been most studied from an evolutionary perspective is the deservingness heuristic. In politics, as briefly described in the introduction, the deservingness heuristic is the psychological tendency of people to base their opinions about welfare programs on the efforts of the recipients. Specifically, the heuristic motivates people to support welfare benefits to recipients who are represented as victims of bad luck and reject benefits to recipients who are represented as lazy.

In this section, I utilize research on the deservingness heuristic to illustrate the application of the above insights to the study of heuristics. The goals are twofold: First, to demonstrate how it is possible to embed the political science literature on the deservingness heuristic within a corpus of interdisciplinary knowledge about the psychology and evolution of help giving, thereby lending added credibility to important key observations in political science studies about, for example, the role of effort perceptions in deservingness judgments. In the face of the so-called "replication crises" that run through modern social science (Pashler & Wagenmakers, 2012), consilient scientific knowledge offers one of the best guides toward which phenomena are credible and which are not and, hence, the production of this knowledge constitutes an important enterprise unto itself. Second, the evolutionary perspective gives rise to a range of new predictions that differ from the predictions

Table 1. Overview of Reported Tests on the Structure of the Deservingness Heuristic

Test	Question	Countries	Studies
#1	Is the deservingness heuristic applied universally to social welfare issues?	Forty-nine countries around the world	Petersen et al., 2012
#2	Do the same psychological systems underlie the deservingness heuristic in the domain of social welfare issues as in the domain of everyday life?	United States, Denmark	Petersen, 2012
#3	What are the emotional outputs of the deservingness heuristic?	United States, Denmark	Petersen et al., 2012; Petersen & Aarøe, 2013
#4	What are the informational inputs to the deservingness heuristic?	United States, Denmark, Peru	Gilens, 1999; Dahl-Nielsen, 2011; Petersen et al., 2012; Petersen & Aarøe, 2013
#5	Is the deservingness heuristic designed to treat sickness as a cue of being deserving?	United States, Denmark, Japan	Jensen & Petersen, 2014
#6	Does the deservingness promote ideological consistency—or does it crowd out ideological considerations?	Denmark	Petersen et al., 2012; Petersen, Slothuus, Stubager, & Togeby, 2011
#7	Does the deservingness heuristics crowd out cultural considerations?	United States, Denmark	Aarøe & Petersen, 2014
#8	Do we assume and self-servingly exploit the existence of the deservingness heuristic in others?	Denmark	Aarøe & Petersen, 2013; Petersen, Aarøe, Jensen, & Curry, 2014

previously offered in political science regarding the structure of the deservingness heuristic. By considering the evolved origins of heuristics, we can, in other words, gain novel insights into their structure. Table 1 provides an overview of the tests reported in the present review.

Classical Views on the Deservingness Heuristic

One of the most comprehensive overviews of the factors serving as input to the deservingness heuristic in the domain of social welfare comes from Oorschot (2000). According to Oorschot, people view welfare recipients as deserving of welfare benefits if they (1) are not in control of their own plight, (2) have a high level of need, (3) have contributed to society previously or can be expected to do so in the future, (4) share the same group identity, and (5) express great gratitude. These underlying factors of deservingness constitute strong determinants of social welfare attitudes. As Gilens (1999) demonstrates, the single best predictor of opposition to welfare spending among Americans is agreement with the statement "welfare recipients are undeserving" (p. 93).

Thirty years ago, as argued in preceding sections, psychologists predominantly referred to "learning" when explaining the origins of heuristics. This learning perspective has also influenced how political scientists explain the origins of the deservingness heuristic in the context of social welfare. Gilens (1999), for one, argues that the heuristic's use of effort cues is an example of cultural learning and emerges in highly individualistic cultures such as the United States. Rothstein (1998) argues that the heuristic is learned from certain institutional arrangements. Specifically, it is argued that liberal welfare states with extensive means testing make people think about welfare in terms of whether recipients fulfill the necessary criteria and, hence, deserve the benefits. Finally, Skitka and Tetlock (1993) point to the hypothesis that the heuristic could be part of a conservative ideological script and, hence, linked to an individual's political ideology.

These "learning"-oriented explanations all entail specific predictions of how or where the deservingness heuristic operates. If the deservingness heuristic is part of a "learned" conservative script or something that is picked up from the structure of welfare programs, then this heuristic is specifically tied to politics. Moreover, if the heuristic is "learned" as part of a conservative script, the

effects of the heuristic should be aligned with the effects of other factors related to ideology. In essence, the deservingness heuristic should help ideologues reach the conclusion prescribed by their ideology. Finally, the most general prediction from a "learning"-oriented account is that the heuristic is only used by *some* people in *some* societies. It should mainly be utilized to reason about welfare politics by conservatives, by individuals in liberal welfare states with many means-oriented programs, and/or by individuals in highly individualistic cultures.

The Evolved Origin and Structure of the Deservingness Heuristic

If taking interdisciplinary evidence seriously, it becomes difficult to view the deservingness heuristic as a heuristic that is specific to some individuals or cultures or to modern mass politics. Social psychologists have documented how people make help-giving judgments on the basis of deservingness-related factors across a whole range of situations from about whether or not to lend a friend exam notes to whether or not to help a person who is about to fall down on the subway tracks (Weiner, 1995). Psychologists have studied and verified this structure of help-giving judgments across numerous cultures, including the United States (Weiner, 1995), Canada (Meyer & Mulherin, 1980), Japan (cf. Weiner, 1995), and Germany (Appelbaum, 2002). This provides a prima facie case that the deservingness heuristic has deeper psychological roots. In particular, the ancestral nature of foraging seems important in this regard (Petersen, Snzycer, Cosmides, & Tooby, 2012).

Humans evolved as foragers and the foraging niche to which we have adapted is, in some sense, extremely narrow. Both archaeological and anthropological evidence suggest we evolved to specialize with respect to the largest, highest-quality and most nutrient-dense food resources available (Kaplan et al., 2000). Such resources are extremely difficult to acquire and, hence, our ancestors would have experienced high random variance in hunting success. Studies of present-day foragers, for example, show that they more often than not return empty-handed from hunts (Hill & Hawkes, 1983; Hawkes, O'Connell, Jones, Oftedal, & Blumenschine, 1991). Factors such as the longevity of parental care in humans (and the corresponding need to provide for a large number of individuals) and the large, energy-consuming human brain makes humans especially dependent on a large, regular flow of calories (Kaplan et al., 2000). Hence, the random variance in foraging success has constituted an enormous adaptive problem for our ancestors. This problem is magnified by the fact that the flow of calories can be obstructed for a number of reasons other than random variance, such as illness or injury.

At the same time, the specialized foraging niche of humans implies that successful hunting would provide immense amounts of calories—more than any single individual and his family could consume at once. By implication, then, the random variation in food resources could be buffered by storing excess resources from the occasional successful trip. On the Pleistocene savannah, however, it would have been physically impossible to store meat. Still, food could be "stored" in an alternative manner: in the form of reciprocal social obligations (Cosmides & Tooby, 1992). If a successful hunter shared excess meat with other families and could expect the favor returned on future occasions, the flow of calories could be regularized.

Formal modelling of evolutionary processes demonstrates how reciprocal social exchange represents an adaptive solution to the resource variance problem (Axelrod & Hamilton, 1981; Trivers, 1971) and evolution is predicted to have selected for psychological machinery to facilitate reciprocal sharing (Cosmides & Tooby, 1992). In line with this explanation for the evolution of social exchange, numerous studies have shown that both nonhuman primates and human foragers are more inclined to share a resource if the acquisition of the resource is under the influence of random variance (Cashdan, 1980; de Waal, 1996; Kaplan & Hill, 1985).

Importantly, food sharing is only adaptive to the extent it is indeed reciprocal; that is, if those who receive also give (Cosmides & Tooby, 1992; Trivers, 1971). The challenge is that the existence

of sharing creates a selective pressure for the evolution of *cheaters*; that is, parasitic organisms that strategically take more than they give. Specifically, cheaters are organisms that strategically lower the costs spent on food acquisition and exploit the sharing motivations of others to thrive off the resources invested in foraging by others. This increases the fitness of the cheater but strongly diminishes the adaptive value of social exchange and, hence, facilitates a selective counterpressure for the evolution of sophisticated mechanisms for detecting cheaters and avoiding exchanges with cheaters. In line with this, detailed cross-cultural experiments have shown that individuals are especially apt at detecting when social exchange rules have been violated (Cosmides & Tooby, 2005), and experiments with economic games show that individuals rapidly cease to share money with others if they do not return the favor (see, e.g., Fehr & Gächter, 2000). Similarly, observational studies of nonhuman primates (de Waal, 1996) and living foragers (Kaplan & Gurven, 2005; Kaplan & Hill, 1985) show that food sharing among nonkin is reciprocal to a significant degree; that is, conditional in the sense that A shares with B if B shares with A.

While avoiding cheaters is important, there is reason to believe that an additional adaptive concern is about recalibrating their motivations, if possible. Hence, it is important to note that social insurance systems only work if there are sufficient participants. The system needs enough people to ensure that despite random variations in success, someone will bring home food. Furthermore, it is important to remember that ancestral groups were small; there were a limited number of available exchange partners. Under these constraints, the crucial adaptive problem has not been to shun cheaters within the group altogether but rather to reeducate them and integrate them into the exchange system (Petersen et al., 2012).

In other words, a range of acute adaptive problems throughout the course of human evolutionary history has been interwoven with requests for help from others. The adaptive targets in such situations have been to (1) meet requests from reciprocators, (2) deny help to cheaters, and (3) potentially to educate cheaters in order to widen and strengthen the social exchange system for mutual insurance. Solving these adaptive problems has required sophisticated systems for representation and motivation. We will return to the detailed structure of these systems below. At this point, suffice it to say that a key system for representation would be one capable of discriminating between cheaters and reciprocators. The relevant cues for such a system to pick up would be the cues that statistically correlated with the recipient reciprocating the help on future occasions over human evolutionary history. In this regard, evolutionary analysis suggests that our minds have been designed to attend especially to cues of effort; that is, the displayed willingness to accrue and exchange resources (Delton, Cosmides, Guemo, Robertson, & Tooby, 2012). Importantly, cues that would have correlated over evolutionary history with such motivations are highly aligned with the list of cues that Oorschot (2000) has identified as input to the deservingness heuristic: the effort spent when accruing resources, the gratitude expressed when receiving benefits, shared group membership, high levels of need (and, hence, higher marginal benefits from help), being a victim of a random event, and so forth (see also Oorschot, 2006, p. 38). Upon the detection of these cues, adaptive motivational systems would motivate to invest help (if facing requests for help from a reciprocator) or deny help and rather reeducate (if facing a cheater).

According to this view, the deservingness heuristic that modern individuals apply to welfare politics is undergirded by evolved representation and motivation systems designed to handle adaptive problems related to cheating in social exchange, for example in the context of ancestral foraging. This heuristic emerges from species-typical systems that all phenotypically normal humans share and, hence, it is not something "learned" in the context of modern mass politics or something confined to mass politics or to individuals in particular modern cultures, welfare states, or of a particular ideological leaning. Rather, this heuristic is something that humans around the world intuitively apply to all help-giving situations. The welfare state is essentially an exchange system for social insurance and welfare debates exhibit cues that fit the heuristic's input conditions

(provisions of benefits, need, expectations of reciprocation). Consequently, our evolved psychological systems for regulating help giving are automatically activated, and our attitudes toward social welfare should essentially be guided by the cues that would disclose whether welfare recipients would have been good, cooperating partners in ancestral face-to-face exchange.

Test 1: The Universality of the Deservingness Heuristic

The first question that immediately arises in response to the evolutionary explanation is whether people in welfare states around the world utilize the deservingness heuristic to form opinions about welfare benefits. If the heuristic originates in species-typical systems, then the prediction is that this is indeed the case. If, however, the heuristic is "learned" in the context of individualistic cultures or elite debates in minimal welfare states, then the prediction would be that the utilization of the heuristic is conditioned by these factors. Only in countries with highly individualistic cultures or minimal welfare states should people form welfare opinions on the basis of whether recipients are lazy or making an effort.

To test this, I utilized one of the most wide-ranging cross-national data sources on political attitudes and values together with a number of colleagues: the World Values survey (see Petersen et al., 2012). Utilizing a massive 54,144 respondents from 49 countries around the world, we analyzed the correlation between perceptions of whether people are in need due to laziness (a key input to the deservingness heuristic) and opposition against government involvement in reducing poverty. The data was analyzed separately for each country, and a consistent pattern emerged. In all 49 countries, we found a positive correlation, and with the sole exception of Venezuela, the correlation was significant at the conventional .05 level. In general, across both individualistic and collectivistic countries (e.g., United States and Japan) and across both countries with small and large welfare states (e.g., South Africa and Norway), there was a positive effect (mean $r = .30$) of deservingness-related perceptions of support for welfare.

Consistent with the evolved origins of the deservingness heuristic, people throughout modernized societies utilize the heuristic to form social welfare attitudes.

Test 2: Social Welfare Attitudes and Everyday Help-Giving Decisions

That people everywhere utilize the deservingness heuristic does not necessarily imply that this heuristic emerges from a dedicated psychology to regulate help-giving decisions. Hence, the next question arises: Is the deservingness heuristic something that is particularly tied to politics, or does it reflect a general set of psychological systems designed for judging cheaters that is used across a range of contexts from everyday life to social welfare? The traditional political science perspective on heuristics would suggest the former: in this perspective, the deservingness heuristic is essentially a tool for political judgment. In contrast, the evolutionary explanation for the deservingness heuristic suggests that the use of the heuristic and the underlying psychological systems are not confined to the political domain. We evolved to face the adaptive problem of cheater detection in ancestral small-scale groups, and it is the representational and motivational systems that evolved to solve this problem that inform our help-giving decisions across contexts today—from everyday life to mass politics.

Discriminating between these expectations requires being able to assess whether two pieces of information (e.g., information about social welfare recipients and recipients of help in everyday contexts) are processed by the same psychological systems or not. While this does not constitute a trivial measurement problem, psychologists have developed and refined an experimental paradigm to allow researchers to do exactly this: the memory confusion protocol (Taylor, Fiske, Etcoff, & Ruderman, 1978). In a recent article (Petersen, 2012a), I utilized this protocol to test whether

cheater-relevant information about recipients in the context of social welfare are processed by the same or different representational systems (for a full description of the paradigm, see Petersen, 2012a).

Large, nationally representative web samples of Danish and American citizens (n > 1000 in each sample) were recruited and randomly assigned to complete one of two versions (i.e., experimental conditions) of the paradigm. In the baseline condition, subjects were presented with individuals who either stated that they had some kind of everyday problem and had received help from a friend or that they were unemployed and had received social welfare benefits from the state. In the treatment condition, subjects were presented with the same individuals, but cheater-relevant information was added to the statements. Essentially, relative to the baseline condition, the treatment condition aimed at activating the cheater-detection systems argued to underlie the deservingness heuristic. Some of the recipients of everyday help and social welfare, respectively, were clearly cheaters. Other recipients of everyday help and social welfare, respectively, were clearly reciprocators. From the former category, a person borrowing exam notes from a classmate said that he preferred to sleep late rather than go to class given that he just as easily could bum off of the others. From the latter category, an unemployed social welfare recipient stated that he lost his job after getting a work-related injury and was doing all he could to return to the labor market.

The results for both conditions across the United States and Denmark were exceptionally consistent—lending further support for the universality of the deservingness heuristic. In the baseline condition where cheater-relevant cues were unavailable, analyses demonstrated that subjects processed the social welfare recipients as different from the recipients of everyday help. This pattern changed fundamentally when the deservingness heuristic was activated. First, subjects in both Denmark and the United States began processing cheaters and reciprocators using different representational systems. Second, and just as importantly, subjects used the same representational systems to process cheaters and reciprocators, respectively, in both the contexts of everyday help and social welfare. There is not, in other words, a particular deservingness heuristic for politics or social welfare. We have an evolved set of representational systems for help giving, and this is the set that we utilize to reason about help giving in all its modern forms, from lending exam notes to social welfare.

Test 3: The Outputs of the Deservingness Heuristic

For adaptive behavior to emerge, representational systems must interact with motivational systems that prompt the individual to meet the adaptive targets of social exchange and, hence, direct resources toward reciprocators and away from cheaters. In a series of tests, colleagues and I (Petersen et al., 2012) focused on the specific nature of the motivational systems involved in the deservingness heuristic and how they reflect the specific ecology in which they were designed to be effective: small-scale social groups.

As argued above, one of nature's key solutions to the motivation problem is emotions, and, hence, an evolutionary perspective on the deservingness heuristic implies that emotions will play a crucial role in the operations of the heuristic. To motivate long-term investments in reciprocators, a likely candidate emotion is compassion. Compassion elicits the motivation to confer benefits on individuals who we value but who are in need and cannot, here and now, reciprocate (Batson, Turk, Shaw, & Klein, 1995). In contrast, when a cheater is identified, there are several potentially relevant emotions. Negative emotions, such as anger, contempt, and disgust, all entail diminished investments in the object of the emotion. At the same time, however, the motivational outputs of these emotions differ on a key dimension. As argued above, there would only be a limited number of potentially valuable social relationships in ancestral small-scale groups. It would be important not just to dismiss strategic cheaters but to reeducate them. Individuals should only feel compelled to shun the target

altogether in severe cases. In line with this, a number of anthropological accounts report that while individuals who do not share sometimes are ostracized, they are allowed to reenter the community if their sharing levels increase (Kaplan & Gurven, 2005). This suggests that the detection of cheaters in a sharing situation should trigger anger rather than disgust and contempt. As argued above, anger is optimally geared for punishment and, as repeatedly demonstrated in experimental economics, punishment—or credible threats hereof—is a key tool for up-regulating cooperative motivations in others (Sell et al., 2009). In contrast to anger, contempt and disgust appear to facilitate avoidance (Haidt, 2003). If exchange partners have been a scarce resource over human evolutionary history, the activation of the motivational systems of disgust and contempt would intensify this scarcity, whereas anger could potentially widen the exchange system.

While an evolutionary perspective highlights anger and compassion as crucial outputs of the deservingness heuristic, a traditional political science perspective provides no particular reason as to why emotions should be important. Furthermore, even if emotions were believed to play a role, a goal of expressing moral disapproval of undeserving recipients could just as easily be reached by expressing contempt and disgust as with anger (see, e.g., Feather, 1999; Weiner, 1995). In fact, the most widely cited theory of emotions with political science, affective intelligence theory (Marcus et al., 2000), treats contempt, disgust, and anger as a single emotion: aversion.

In a first test of whether anger and compassion constituted core motivational systems undergirding the deservingness heuristic, a sample of Danish undergraduates participated in an experiment wherein they were presented with one of three short vignettes (Petersen et al., 2012). The vignettes differed in their degree of deservingness, portraying a social welfare recipient as either lazy or hard-working. Subjects where then asked about their support for providing these benefits to the recipients. They were also asked about their feelings of anger and compassion toward the recipients. As expected, subjects exhibited high support for providing welfare benefits for the hard-working recipient and low support for providing welfare benefits to the lazy recipient. Consistent with the predicted key role of emotions, the emotion measures showed a similar response to the variation in deservingness cues. The hard-working recipient activated high levels of compassion but low levels of anger and vice versa for the lazy recipient, and further analyses suggested that these emotions mediated the effects of deservingness cues on welfare support. This lends support to the notion that compassion and anger are tightly regulated by deservingness cues and constitute a key output of the deservingness heuristic.

A second test focused directly on discerning between anger and the alternative emotions of disgust and contempt as outputs of the deservingness heuristic (Petersen et al., 2012). A nationally representative survey of Danes and a sample of American undergraduates answered, first, a question about their perceptions of whether social welfare recipients are generally lazy or hard-working and, second, questions about their feelings of compassion, anger, disgust, and contempt toward welfare recipients. Consistent with the evolutionary analyses of the origin and structure of the deservingness heuristic, the analyses demonstrated that there were only consistent significant correlations between the deservingness-related perceptions, on the one hand, and anger and compassion, on the other. In both the United States and Denmark, these correlations were substantial (with zero-order correlations ranging from |.36| to |.47| and controlled correlations ranging from |.20| to |.36|). In both countries, perceiving welfare recipients as lazy led to higher anger and lower compassion. The controlled correlations between deservingness perceptions and disgust and contempt were not above |.10| for either country, and no correlations were consistently significant across the countries. Focusing on another alternative emotion, anxiety, this unique relationship between perceptions of laziness and anger and compassion has since been replicated in nationally representative samples in both the United States and Denmark (Petersen & Aarøe, 2013).

In sum, these analyses support the motivational outputs of the deservingness heuristic being narrowly focused on (1) investing in reciprocators through compassion and (2) recalibrating the

behavior of cheaters through anger. The motivational target of the deservingness heuristic is not simply the expression of disapproval or avoidance. The target is recalibration and, hence, a widening of the insurance systems that would have been adaptive in the small-scale world of our ancestors, where exchange partners would have been a limited resource.

Test 4: Competence as Input to the Deservingness Heuristic?

If the output of the deservingness heuristic is anger and compassion, what then is the input? As argued above, important cues would be those that would have statistically correlated over evolutionary history with situations in which a need does not reflect a lack of effort, such as being a victim of an accident, expressing gratitude, or having contributed previously. In the context of welfare recipients, colleagues and I have shown that such cues are picked up and influence opinions automatically; that is, rapidly and without effort (Petersen, Slothuus, Stubager, & Togeby, 2011), suggesting that these cues serve as input to deep-seated representational systems.

Potentially, however, effort cues are not the only cues that could be relevant. If the deservingness heuristic was "learned" in modern, highly technical societies, attending to the competences or skill-set of the recipient could also be potentially important. In the case of competent individuals, the marginal benefit of their work for society will be greater relative to the work of incompetent individuals and, hence, placing extra pressure on the competent could be a rational, judgmental shortcut in modern society. Relatedly, social psychologists have argued that the key dimension underlying help-giving decisions is considerations about "controllability"; that is, whether the needy individual has control over his or her need. In this regard, it has been argued that chronic dispositions related to competence such as intelligence are not something that individuals themselves are responsible for (Weiner, 1995). Hence, if a person is in need because of incompetence, then standard models predict that people will be motivated to provide support.

Evolutionary analyses lead to different expectations. According to this perspective, help-giving decisions are regulated by a logic of social exchange. In an exchange system, competent individuals are better investment objects. If anything, from an evolutionary perspective, people (if given a choice) should be more supportive of helping a competent individual in need than an incompetent individual.

At the same time, however, there is little reason to expect competence to be a key input to representational systems designed to identify cheaters. Ancestrally, a relevant competence cue could be actual foraging success. If cheaters were not making an effort to forage, they would return with less from their expeditions, and, hence, this foraging success could be a relevant cue. Yet evolutionary analysis suggests that this cue is inferior for two reasons (Delton et al., 2012; Petersen et al., 2012). First, the random variation in foraging success makes it difficult to gauge whether an individuals' lack of success stems from lowering the costs spent foraging or from a streak of bad luck. Second, studies of present-day foragers show that individuals differ in their foraging competence (Kaplan & Gurven, 2005); hence, some are consistently less successful than others, without this necessarily being the result of parasitic motivations. A number of studies document that high food producers obtain more mating opportunities and greater offspring survivorship and, hence, seem to be repaid in currencies other than food (Kaplan & Gurven, 2005). Hence, from the perspective of a high producer in a small-scale group with a limited number of available social partners, sharing with incompetents can pay off. Yet emphasizing the key role of motivation cues, this is only the case if these individuals have genuine motivations and, hence, are motivated to repay in another currency. In brief, competence is not an information-rich cue in the context of cheater detection. To the extent the deservingness heuristic emerges from representational and motivational systems related to cheater detection, we should not expect this heuristic to utilize such cues to differentiate between cheaters and reciprocators.

One universal cue of competence—and one often used in social psychological studies—is intelligence (Weiner, 1995). Hence, colleagues and I have focused on perceptions regarding the intelligence of welfare recipients in order to test whether the deservingness heuristic is geared toward utilizing competence cues as input (Petersen et al., 2012). In one classical work on deservingness judgments in welfare attitudes, Gilens (1999) provided preliminary evidence concerning the effects of intelligence perceptions. He examined the partial correlations between support for welfare and stereotypes about the laziness and intelligence of Afro-Americans. Laziness stereotypes alone had a direct effect on welfare support. In a range of samples—including nationally representative samples—in both Denmark and the United States, we have since replicated this lack of an effect of competence on the emotional reactions identified as the output of the heuristic (Petersen et al., 2012; Petersen & Aarøe, 2013). Hence, while perceptions of laziness have strong effects on feelings of anger and compassion toward welfare recipients, perceptions of competence have no direct effect on these feelings. Using an experimental design, this difference in the effects of laziness and competence cues on emotional reactions toward welfare recipients has furthermore been replicated in a Peruvian sample, thereby strengthening both the internal and cross-cultural validity of the relationship (Dahl-Nielsen, 2011). In line with the evolutionary origins of the deservingness heuristic, these studies together provide significant evidence that the representational systems underlying the heuristic are not designed to seek out competence cues.

The fact that competence cues do not serve as input to the deservingness heuristic does not mean that the competence of others plays no role in our help-giving decisions. Competent individuals are less valuable as exchange partners. Indeed, a consistent finding across both an American and a Danish sample is the existence of a two-way interactive effect between perceptions of effort and perceptions of competence on the avoidance-oriented emotion of contempt (Petersen et al., 2012, p. 412). Substantively, this interactive effect expresses that if welfare recipients are seen as lazy, contempt increases strongly with the perception that they are also incompetent. If welfare recipients are seen as cooperatively motivated, however, competence judgment has no effect on contempt. Hence, when needy individuals are neither motivated to reciprocate help nor have valuable skills to offer, they suffer a strong loss of social respect—presumably because they have been of low value as cooperative partners over evolutionary history.

In sum, the deservingness heuristic prompts us to seek out the types of information about recipients of modern-day welfare benefits that were relevant to consider ancestrally. Essentially, when deciding on whether to support welfare benefits to a group or individual, we judged whether the relevant welfare recipients would be good cooperation partners in ancestral, face-to-face interaction.

Test 5: Sickness as Input to the Deservingness Heuristic

If the deservingness heuristic evolved under ancestral, small-scale social circumstances, its structure should reflect those circumstances. In a series of tests, Carsten Jensen and I (Jensen & Petersen, 2014) have focused on a particular type of need in which modern and ancestral circumstances differ widely: health care.

In modern society, the risk factors for the major health-related causes of death are highly correlated with socioeconomic status (Donaldson, 2004; WHO, 2013). This is largely due to the social patterns in different lifestyles. Lifestyle diseases are, however, novel pathological threats that crucially hinge on features that have not existed in the nomadic hunter/gatherer groups, such as sedentary lifestyles, high-population density, and unrivalled access to fat and glucose (Diamond, 2012).

In contrast, archeological and anthropological data suggest that the major pathological conditions requiring health care over the course of human evolutionary history would have been injury due

to accidents and infections from parasites (Sugiyama, 2004). Such pathological conditions are different from modern diseases in terms of how they influence individuals *across* the social hierarchy; even the best hunter cannot guard against parasitic infections or simple accidents (for evidence, see Sugiyama, 2004), and, when disabled by sickness, even the best hunter required care in order for he and his kin to survive (Sugiyama, 2004; Sugiyama & Chacon, 2000). In contrast to the major modern health pathologies, there is reason to believe that, ancestrally, infections and accidental injuries struck randomly and influenced individuals across the social hierarchy with dire consequences for fitness.

Given the random, fluctuating nature of evolutionarily recurrent health problems and the corresponding need for reciprocal help, an evolutionary perspective suggests that the representational systems underlying the deservingness heuristic could be designed to represent sick individuals as noncheaters and provide care in order to motivate them and others to reciprocate when the self was struck by sickness or injury.

A "learning" perspective provides contrasting expectations. Health care problems are no less affected by socioeconomic status—and, hence, no less randomly distributed—than other modern types of risks managed by the welfare state, such as unemployment. From a "learning" perspective, there is no reason to expect people to reason differently about health care than about unemployment. From an evolutionary perspective, these risks are extremely different. Sickness and injury are problems that have always been with our species, whereas unemployment is a modern phenomenon tied to the emergence of capitalist economies. As argued above, our representational systems underlying the deservingness heuristic should be constrained by our evolutionary history to process sick (if, at least, temporarily sick) individuals as valuable investment objects. Evolution has had little time to install corresponding representational constraints regarding unemployment.

In a first test of whether the deservingness heuristic processes sick and unemployed individuals differently, we used implicit association tests (Greenwald, McGhee, & Schwartz, 1998) among a sample of Danish undergraduates (Jensen & Petersen, 2014). The tests examined the implicit associations between, on the one hand, the categories of (1) "sick" versus "healthy" and (2) "unemployed" versus "employed" and, on the other hand, words related to being lucky and unlucky, hereby testing the existence of a content-rich representational system about being sick that included the notion that sick people are the victims of random accidents as would have been the case ancestrally. As expected, at the preconscious level that the implicit association test is designed to measure, we found significant differences in associations. The category "sick" was more likely to be implicitly associated with bad luck than the category "unemployed."

A second test focused on providing cross-national evidence for these representational constraints in the face of sick individuals (Jensen & Petersen, 2014). Hence, we collected nationally representative surveys in three highly different countries with regards to culture and welfare state systems: Denmark, the United States, and Japan. Respondents in each country participated in an experiment in which they were asked to indicate the extent to which they agreed with a number of statements about whether people could control whether they became sick—in one condition—or unemployed—in the other condition. Despite the pronounced differences between these three countries, the results indicate that people are much more likely to associate sickness relative to unemployment with random, uncontrollable causes and, hence, be more supportive of providing benefits to the sick than to the unemployed.

These findings suggest that people both implicitly and explicitly process health care problems as if they were randomly distributed, which has been true over most of the course of human evolutionary history but no longer seems to hold to the same extent. The deservingness heuristic appears constrained by our evolution to tag particular ancestrally relevant needs as deserving. Next, we performed tests focused more directly on this level of psychological constraints (Jensen & Petersen, 2014). We did so by examining the effects of the three major ingredients in public opinion: political

values, self-interest, and media communication. First, while political ideology powerfully shapes people's perceptions as to whether the unemployed are deserving or not, we found no significant effect of ideology on deservingness perceptions related to sick individuals in either Denmark, Japan, or the United States. The underlying biases in how we process sickness seem to place health care outside the bounds of political conflict. Second, across the same three countries, we found that, independently of self-interest, people were more likely to view sick individuals as more deserving than unemployed individuals. Only in the United States, among those who were maximally concerned about becoming unemployed and minimally concerned about becoming ill, did this difference disappear. Nevertheless, these extreme respondents were not more likely to view the unemployed as deserving. Rather, in terms of deservingness, they put the unemployed and the sick on par. These findings on self-interest are important. The effects that we observe are not because people fear becoming sick themselves. Rather, the effects seem to emerge from the structure of human representational systems and a built-in and powerful association between sickness and random accidents. Third, given its deep basis, this association survives explicit media stories to the contrary. Hence, in a final study, Danish political science students participated in an experiment wherein they read a vignette about either an unemployed person or someone requiring health care. The vignettes were framed as either being about someone who was in control of his own need (and, hence, was at fault) or about a person who fell victim to an uncontrollable accident. People support the provision of health care to the sick individual independently of these frames, whereas people's support for the provision of social welfare to unemployed persons was powerfully shaped by the framing.

Consistent with the evolutionary perspective on the origins of the deservingness heuristic, people are highly likely to support health care independently of culture, ideology, self-interest, and media stories. Given the ancestral structure of health care problems, the representational system underlying the deservingness heuristic is biased toward representing sickness as a random accident. Conversely, representations relating to the novel risk of unemployment are less constrained and, hence, the output of the deservingness heuristic is influenced by individual differences in, for example, ideology and self-interest.

Test 6: The Disjunction Between the Deservingness Heuristic and Modern Ideology

The above test demonstrates how the operations of the deservingness heuristic are sometimes aligned with one's political ideology; at least on the issue of unemployment benefits. This could in fact be seen as vindicating the traditional perspective on heuristics in politics: that they are shortcuts that help people generate attitudes that are consistent with their overall ideological views. If political heuristics originate (as all of the evidence above suggests) in our species past, this could not be their evolved function. While political ideologies certainly cater to evolved psychological systems (Haidt, 2012; Hibbing et al., 2013), the precise packing of issue positions in current political ideologies are modern constructions. Furthermore, consistency does not generally seem to be a goal with high fitness values (Kurzban, 2012). In the evolutionary perspective, the deservingness heuristic is instead a cognitive tool for investing resources in individuals who are valuable exchange partners. This function should be carried out independently of culturally learned reasoning patterns, such as ideology.

To investigate directly whether the operation of the deservingness heuristic aligns with ideological reasoning, different sets of colleagues and I have investigated how the availability of cues for the deservingness heuristic influence the role of ideology in opinion formation on welfare issues (Aarøe & Petersen, 2014; Petersen & Aarøe, 2013; Petersen et al., 2011; Petersen et al., 2012). In all of the studies, we utilized vignette approaches and asked the subjects (including several nationally representative samples of Danes, one nationally representative sample of Americans, and one sample of political science undergraduates) to judge the deservingness of a social welfare recipient. The

descriptions of the recipient were experimentally varied such that some descriptions had multiple cues regarding the recipient's deservingness (e.g., very unmotivated to find a job), while other descriptions provided no cues in this regard.

We have consistently found that the representational systems underlying the deservingness heuristic cause individuals to prioritize clear cues about the specific recipient's level of deservingness rather than ideological consistency in their opinion-formation process. That is, independent of their political ideological position, people support social welfare for recipients who appear to be reciprocators but reject social welfare for recipients who appear to be cheaters. When the input to the deservingness heuristic is sufficiently strong, political ideology fails to influence opinion altogether. Rather than the deservingness heuristic being aligned with general political reasoning, it leads people to take whatever opinion is aligned with the cues in front of them, even if that means sacrificing their normal political principles. People only fall back on their political ideology to form opinions in the absence of clear cues.

Test 7: The Reversibility of Cross-National Differences in Welfare Support

Not just individuals differ in their default positions on welfare issues. The populations of different countries also take different average positions on such issues. Americans are traditionally skeptical of high welfare spending, while Europeans in general and Scandinavians in particular support such spending. Such cross-national differences have deep roots in recent history. The differences in actual welfare spending between the United States and Europe became apparent as early as 1870 and have increased steadily since, with Europe spending about twice the percentage of their GDP on subsidies and transfers compared to the United States at the start of the 20th century (Alesina, Glaeser, & Sacerdote, 2001).

If deservingness judgments are "learned" responses originating in contemporary political environments, then these cross-cultural differences ought to be relatively stable. In contrast, the evolutionary perspective suggests that we should, by nature, be designed to assume that some people are cheaters and some reciprocators and that we should be concerned with investing resources in the reciprocators. Our opinions, then, should be flexible rather than stable, depending on the specific information about a specific individual that we receive (see Petersen, 2009). If valid, this should not just make modern citizens unlikely to stick to their political principles in the face of clear deservingness cues but also unlikely to conform to more general cultural stereotypes in such situations.

To test this prediction, Lene Aarøe and I (Aarøe & Petersen, 2014) fielded nationally representative surveys to Americans and Danes, both samples participating in one of the vignette experiments described above. In one of the conditions, subjects were presented with a description of a welfare recipient that did not contain any cheater-relevant information; in another condition, subjects were presented with a welfare recipient that was clearly a cheater (i.e., lazy and not making an effort to find work); and in a third condition, subjects were presented with a recipient that was clearly a reciprocator (i.e., a victim of an accident and making an effort to find a job).

When the subjects were not presented with any direct input to their representational systems for cheater detection, they fell back on cultural stereotypes. Americans followed their general view of welfare recipients as undeserving and opposed the idea of benefits to the welfare recipient, whereas Danes followed their general view of welfare recipients as (somewhat) deserving and support the idea of benefits to the welfare recipient. In the two conditions in which clear cheater-relevant cues were available, however, responses were different. In the condition with the cheater and in that with the reciprocator, the opinions of Americans and Danes become substantially and statistically indistinguishable. Both Americans and Danes opposed providing the cheater with welfare benefits, and Americans and Danes alike supported providing the reciprocator with welfare benefits—and the two

populations expressed equal opposition and support. The descriptions of these welfare recipients were short, no more than two sentences. Yet these two sentences contained enough information to dissolve cross-national differences that have roots stretching more than 100 years back in history. This clearly supports both the psychological salience of the deservingness heuristic and the extreme degree of adaptive flexibility in the opinion formation emerging from it.

Test 8: We Assume the Existence of the Deservingness Heuristic in Others and Strategically Exploit It

If the deservingness heuristic is an evolved feature of human political cognition, the deservingness heuristic is not merely a set of psychological systems that has influenced whether our direct ancestors helped others but also a set of systems that influenced whether others helped our ancestors. The deservingness heuristic has, in essence, been part of the selection environment for the human species.

When a psychological system for regulating resource flows has evolved into existence, we should expect the evolution of psychological systems that motivate the self to exhibit the cues that will target those systems and, hence, divert the flow of resources toward the self (see, e.g., Kurzban, 2012). There is no reason to expect that the deservingness heuristic should be an exception to this rule. If our ancestors could pose themselves as deserving—i.e., exhibit cues that match the input conditions of the deservingness heuristic—they would be at a fitness advantage. Given this, an evolutionary perspective on the deservingness heuristic entails the prediction that when an individual needs help, the individual will automatically assume that the way to recruit help is to appeal to the deservingness heuristic.

Together with colleagues, I have investigated this prediction in the context of an ancestrally highly frequent situation of need: hunger (Aarøe & Petersen, 2013; Petersen, Aarøe, Jensen, & Curry, 2014). As argued above, our ancestors must have regularly experienced temporary hunger, having to appeal to the social exchange system in these situations. A main focus of our studies has been to demonstrate how hunger increases support for sharing systems, including modern form-sharing systems such as the welfare state. In these studies, we have utilized both observational, quasi-experimental, and true experimental methods for studying the effects of hunger. Across all of these methods, we find that hunger significantly increases the support for social welfare.

According to the theoretical argument, hunger increases support for sharing systems such as the welfare state because the hungry self wants *others* to share their resources and, if the deservingness heuristic has indeed been a feature of ancestral environments, hungry individuals should be motivated to exhibit cues that fit this heuristic. Consistent with this, we have found that hungry individuals are more likely to describe welfare recipients using words that depict them as unlucky victims (Petersen et al., 2014), are more motivated to recollect a newspaper article for others if the article depicts welfare recipients as reciprocators rather than cheaters (Aarøe & Petersen, 2013), and are more likely to describe themselves as more friendly and cooperative (Petersen et al., 2014). Essentially, hungry individuals spread information that would appeal to the deservingness heuristic in the minds of others and, in this way, hungry individuals strategically incentivize others to share their resources.

Consistent with this strategic calculus, we also find that while hungry individuals verbally emphasize the importance of sharing, they do not in fact share more with others when they are endowed with actual economic resources in an economic experiment. If anything, hunger makes you cling on to what you can get (Aarøe & Petersen, 2013; see also Briers, Pandelaere, Dewitte, & Warlop, 2006). The verbal support for sharing does not reflect genuine solidarity with others but rather a motivation to get others to share with self—and the specific cognitive system that hungry individuals target in order for this to happen seems to be the deservingness heuristic.

Overview: The Evolved Structure of the Deservingness Heuristic

The above evidence provides support for the deservingness heuristic not being something "learned" from modern welfare state institutions in individualistic cultures or as part of ideological scripts. Rather, the consistent reliance on the deservingness heuristic across countries with different institutions and cultures; that deservingness cues crowd out the effect of cultural differences on support for welfare; that deservingness cues crowd out the effect of individual ideological differences on support for welfare; and the fact that people use the same psychological systems for processing the deservingness of recipients of social welfare and recipients of everyday help suggest that the deservingness heuristic is part of the species-typical psychological architecture of humans. And as with any species-typical feature, the deservingness heuristic must necessarily have its origins in ancestral environments and, in order to be selected, have carried out particular functions within these environments.

By theorizing about these functions, colleagues and I have been able to build testable hypotheses on the structure of the deservingness heuristic and thoroughly test them, providing strong evidence in favor of many of them. Figure 2 provides a graphical depiction of this structure, utilizing the common style of a causal model to show how the involved psychological systems operate and interact.

The evolved function of the deservingness heuristic, we have argued, is to facilitate social exchange as insurance and, to this end, invest resources in individuals who are likely to reciprocate on future occasions and avoid investing resources in cheaters. Consequently, the trigger event activating the psychological systems underlying the deservingness heuristic is a request for help from a given individual (denoted Y in Figure 2). Such requests, first, activate a range of representational systems designed to identify cheaters and reciprocators, respectively, which then begin collecting the available information about the individual. The information that is extracted is the kind of information that would correlate with being a reciprocator over human evolutionary history, such as expressions of gratitude, being truly needy, being part of the same group, that Y has previously

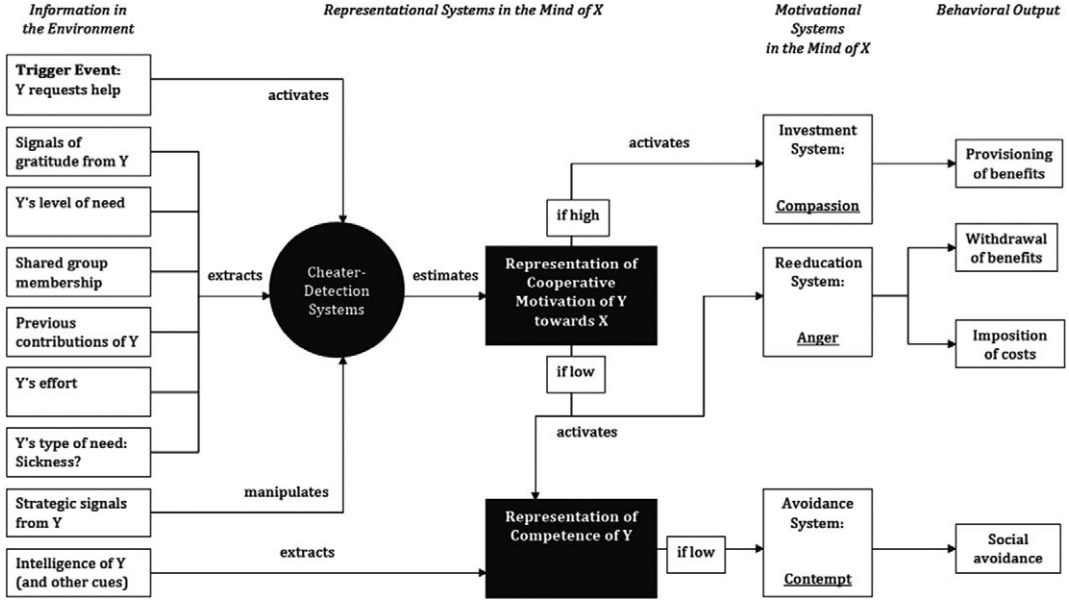

Figure 2. The structure of the deservingness heuristic.

contributed in exchange situations, and that Y makes an effort to alleviate his own need. Furthermore, given the particular structure of ancestral health problems, sickness as the cause of need is one specific cue that the deservingness heuristic treats as a sign that the need is accidental rather than a reflection of a lack of effort.

On the basis of such environmentally extracted cues, the cheater-detection systems build a representation of whether Y is cooperatively motivated toward the decision maker, X. If this motivation is assessed as being high, a signal is sent to activate the particular system designed for social investments, compassion, which motivates the provision of benefits to Y. If the motivation is assessed as being low, two signals are sent. First, the anger system is activated. The function of the deservingness heuristic is to recruit insurance, and the potential insurance partners available in the small-scale social world of our ancestors were limited. The anger system is designed to recalibrate the motivation of cheaters by withdrawing benefits and imposing costs (Petersen, Sell, Tooby, & Cosmides, 2010; Sell et al., 2009) and, hence, potentially recruit the cheater into the social exchange system. Second, another representational system is activated, which is designed to construct representations of the competence of Y. This system extracts relevant information from the environment about Y, including cues about his or her intelligence. If an individual is represented as both a cheater and an incompetent, the marginal benefits of reeducation become increasingly smaller and the evidence suggests that this leads to a motivational shift toward social avoidance implemented by the motivational system of contempt.

The final level of complexity in terms of how the deservingness heuristic functions is that it does not operate in a social vacuum. As we found evidence of in situations of hunger, needy individual themselves will strategically exhibit signals that appeal to the deservingness heuristic and, hence, increase the likelihood that benefits will be delivered.

As far as our evidence suggests, this is the construction of the deservingness heuristic. This heuristic provides considerable structure to the welfare attitudes of modern individuals, enabling them to decide quickly whether to support welfare benefits for specific individuals or groups. But it is not a heuristic that citizens have learned to help themselves reach an ideologically coherent position or to compensate for a lack of detailed political knowledge. Rather, the structure of the heuristic seems optimized to recruit social insurance under ancestral circumstances and, because the cues surrounding modern welfare issues mimic adaptive problems related to insurance, the heuristic is automatically activated in the context of opinion formation on welfare issues. In this manner, by carefully analyzing the evolved origins of the deservingness heuristic, we have reached a deeper understanding of the structure of welfare opinions across modern democracies.

Evolutionary Political Psychology: Principles for an Integrated Study of Heuristics

To sum up the conclusions to be drawn from an evolutionary approach to political psychology, I will close by summarizing four principles that ought to guide the study of political heuristics. I refer to these principles as an "integrated" perspective, which highlights how it seeks to build theoretical expectations by integrating empirical observations across disciplines. I will explicitly contrast these principles with the principles for the study of heuristics derived from extant, nonevolutionary approaches. Both sets of principles are summarized in Table 2.

Principle 1. Many Political Heuristics Are Evolved, Biological Adaptations

This is the fundamental principle. Humans evolved as political animals and, in order to be successful as a species, our minds are required to come naturally equipped with a number of political heuristics. Political heuristics cannot be presumed to be "learned" in the sense of logically deduced or acquired through explicit instruction.

Table 2. An Integrated Perspective: Principles of Evolutionary Political Psychology

Principle	Traditional Perspective on Political Heuristics	Integrated Perspective on Political Heuristics
#1	Political heuristics are "learned"	Many political heuristics are evolved, biological adaptations
#2	The function of political heuristics is to facilitate political opinion-formation	The function of many political heuristics is to solve evolutionarily recurrent adaptive problems
#3	Political heuristics are well-matched to mass political environments	Political heuristics are well-matched to small-scale political environments and may create bias in mass political environments
#4	The number of political heuristics is highly limited	The number of evolved political heuristics is incredibly large

To anyone interested in understanding political heuristics, this should be a welcome message. When in Popper's (1959) "context of discovery"—the context of hypothesis formulation—we are no longer confined to our own fallible intuitions when considering the structure of political heuristics. Instead, we can utilize one of the best validated and most powerful scientific theories of all times to understand the heuristics used by modern citizens: the theory of evolution by natural selection.

In processes of natural selection, origin—and, in particular, the functional requirements related to this origin—determines structure. Hence, by (1) utilizing anthropological and archaeological knowledge to specify the kinds of political challenges our ancestors have faced, (2) considering the nested representational and motivational problems that would have needed to be solved in order to meet these challenges, and (3) considering the evolutionarily recurrent cues available for these systems to process to reach these solutions, we can build testable hypotheses on the structure of political heuristics.

Principle 2. The Function of Many Political Heuristics Is to Solve Evolutionarily Recurrent Adaptive Problems

In the traditional perspective, the function of heuristics is to help citizens formulate value-consistent opinions with minimal cognitive effort. Evolved heuristics, in contrast, have numerous, highly different functions; although the overarching goal of all of them was to help our ancestors survive and reproduce under evolutionarily recurrent conditions. Each heuristic—and its underlying representational and motivational system—is designed by natural selection to solve a particular problem. In this regard, consistency between values and attitudes or between attitudes expressed at certain points in time has most likely not been the most important problems facing our ancestors.

Whenever modern political issues or events exhibit the cues that would have disclosed a problem under ancestral circumstances, we ought to expect the relevant systems to come online. Our minds are built to infer indirectly whether an adaptive problem is present from the cues available, and our mind will presume that the adaptive problem is indeed present if the appropriate set of cues is present. Cues surrounding social welfare debates, such as needy individuals requesting help, activate representational and motivational systems designed for small-scale social exchange (Petersen, 2012a). Similarly, cues surrounding criminal justice debates, such as cost-infliction and malicious intents, activate representational and motivational systems designed for small-scale counterexploitation (Petersen, Sell, Cosmides, & Tooby, 2012).

Principle 3. Political Heuristics Are Well-Matched to Small-Scale Political Environments and May Create Bias in Mass Political Environments

If all political heuristics were indeed acquired from modern political environments, it would make sense to predict that they were well-matched to these environments. Evolved political heuris-

tics are certainly also well-matched. As Principle 2 reflects, they evolved exactly because of their functionality. But they are designed to guide toward the solution of adaptive problems in small-scale ancestral groups, not modern politics. This means that the factors that people will intuitively consider important are those with relevance in small-scale societies, and the solutions that people will intuitively favor are those that worked within such societies.

Consequently, there are no guarantees that the factors and solutions that we intuitively favor are equally relevant to consider in mass societies. Our political views are shaped by factors such as short-term fluctuations in hunger and individual differences in upper-body strength, which hardly seems rational from a modern perspective. Similarly, we intuitively prefer solutions that can be maladaptive from a modern perspective. For example, our evolved psychology of punishment promotes the use of punishment to counter crime but, while punishment seems to be an efficient deterrent in small-scale settings (Fehr & Gächter, 2000), criminal law often fails to achieve this in large-scale societies (Robinson & Darley, 2004). Another example, I have developed in greater detail elsewhere (Petersen, 2012a, pp. 13–14) relates to how our help-giving psychology promotes solutions to modern wealth inequality that might be optimal in small-scale settings but are less effective today.

In this manner, people might have biased views on what is relevant and what works in modern politics. Yet rather than a reflection of inherently irrational voters, people are ecologically rational; that is, designed to be rational in particular environments. Many phenomena that could be seen as indicative of political irrationality (e.g., basing your welfare opinions on whether you just had lunch or not) could reflect that people utilize otherwise functional political heuristics outside of the proper small-scale environments. Importantly—and in contrast to random irrationality—such biases are systematic and predictable. It is possible to build precise, testable hypotheses as to when and how these biased responses will occur by considering the differences between small-scale and large-scale political environments.

Principle 4. The Number of Evolved Political Heuristics Is Incredibly Large

The principles above imply that citizens have many political heuristics available from which to form political judgments. Essentially, for each ancestral political problem, we should expect the existence of heuristics that could be activated and applied in the context of modern mass politics. Problems relating to the formation of coalitions, investment in valuable individuals, caring for the sick, avoiding disease, waging war on outgroups, seeking status, promoting self-interest, constraining the behaviors of others, and a range of other challenges must all have selected for relevant heuristics. For example, we should expect—and some evidence already suggests—that heuristics designed for countering violence and exploitation inform modern opinions on criminal justice (Petersen et al., 2012), that heuristics designed to identify and track coalitions inform modern opinions on race relations (Kurzban, Tooby, & Cosmides, 2001), that heuristics designed for pathogen avoidance influence policy opinions about sex and outgroups (e.g., Faulkner, Schaller, Park, & Duncan, 2004; Inbar, Pizarro, Knobe, & Bloom, 2009), and so forth. In short: Many discoveries of political heuristics await, and the key to their discovery is the dissection of the ancestral, adaptive problems of politics.

One simple, yet important, consequence of the massive multitude of political heuristics is inconsistency. Ancestrally, the cues we faced would be constrained by the real, adaptive problem we were facing. In modern mass politics, we depend on media and political elites for cues and information. Consequently, the cues that are available for our evolved, representational systems will constantly shift, depending on the precise elite messages we are receiving (see, e.g., Arceneaux, 2012). Depending on the specific set of cues available, different heuristics will be activated and deactivated, leading to the oscillation of opinions. Furthermore and even more fundamentally: while

modern political debates are premised on notions of equal treatment and value consistency and, hence, imply that we should treat social welfare recipients equally, for example, the evolved heuristics we have available are specifically designed to treat others differently depending on the specific cues we have available about them (Petersen, 2012b). Cheaters should be handled differently than reciprocators, weaker individuals should be handled differently than stronger individuals, and so forth. Differential treatment—and, hence, attitudinal inconsistencies when available cues differ—is a design feature of our heuristics, not a reasoning flaw.

Conclusion

How do people form opinions in mass politics? However citizens obtain them, it cannot be by utilizing processes requiring high levels of political knowledge. People are simply ignorant about many basic facts about politics. Instead, people utilize judgmental heuristics that allow them to make contingent political inferences (if–then inferences) on the basis of a few items of information. While this answer has gained widespread acceptance within political psychology and political science, the origins of political heuristics have puzzled researchers: How can citizens figure out judgmental shortcuts that efficiently facilitate opinion if they lack political knowledge in the first place? In this article, I have provided a solution to this puzzle and an integrated framework for discovering and analyzing political heuristics.

Many political heuristics are adaptations originating in processes of natural selection that adapted the human mind to solve political problems in ancestral, small-scale groups. Most heuristics are not acquired through logical deduction or explicit instruction, and, hence, there is essentially no puzzle. This is not to say that there are no "learned" political heuristics or that the principles for studying heuristics developed by traditional research is always wrong. Yet these traditional principles probably only apply to a miniscule part of the political heuristics that people have available. Humans are apt to produce political opinions not because of stocks of technical, political knowledge but because the human species is essentially a political species. We evolved in political environments and are naturally endowed with psychological systems for navigating them. By knowing these origins, we can utilize evolutionary theory to build testable hypotheses on the structure of the heuristics that guide the political opinions of modern people.

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REFERENCES

Aarøe, L., & Petersen, M. B. (2013). Hunger games: Fluctuations in blood glucose levels influence social welfare support. *Psychological Science, 24*(12), 2550–2556.

Aarøe, L., & Petersen, M. B. (2014). Crowding out culture: Americans and Scandinavians agree on social welfare in the face of deservingness cues. *Journal of Politics, 76*(3), 684–697.

Alesina, A., Glaeser, E., & Sacerdote, B. (2001). Why doesn't the United States have a European-style welfare state? *Brookings Papers on Economic Activity*, 187–254.

Appelbaum, L. D. (2002). Who deserves help? Students' opinions about the deservingness of different groups living in Germany to receive aid. *Social Justice Research, 15*(3), 201–225.

Arceneaux, K. (2012). Cognitive biases and the strength of political arguments. *American Journal of Political Science, 56*(2), 271–285.

Axelrod, R., & Hamilton, W. (1981). The evolution of cooperation. *Science, 211*, 1390–1396.

Barrett, H. C., & Broesch, J. (2012). Prepared social learning about dangerous animals in children. *Evolution and Human Behavior, 33*(5), 499–508.

Batson, C. D., Turk, C. L., Shaw, L. L., & Klein, T. R. (1995). Information function of empathic emotion: Learning that we value the other's welfare. *Journal of Personality and Social Psychology, 68*(2), 300–313.

Bishop, G. F., Tuchfarber, A. J., & Oldendick, R. W. (1986). Opinions on fictitious issues: The pressure to answer survey questions. *Public Opinion Quarterly, 50*(2), 240–250.

Bowles, S., & Gintis, H. (2011). *A cooperative species: Human reciprocity and its evolution*. Princeton, NJ: Princeton University Press.

Boyd, R., & Silk, J. B. (2009). *How humans evolved*. New York, NY: WW Norton.

Briers, B., Pandelaere, M., Dewitte, S., & Warlop, L. (2006). Hungry for money: The desire for caloric resources increases the desire for financial resources and vice versa. *Psychological Science, 17*, 939–943.

Brown, D. E. (1991). *Human universals*. New York, NY: McGraw-Hill.

Bullock, J. G. (2011). Elite influence on public opinion in an informed electorate. *American Political Science Review, 105*(3), 496–515.

Buss, D. M. (Ed.). (2005). *The handbook of evolutionary psychology*. Hoboken, NJ: John Wiley & Sons.

Buss, D. M., & Greiling, H. (1999). Adaptive individual differences. *Journal of Personality, 67*(2), 209–243.

Carruthers, P. (2005). The case for massively modular models of mind. In R. Stainton (Ed.), *Contemporary debates in cognitive science* (pp. 205–225). Oxford, UK: Blackwell.

Cashdan, E. (1980). Egalitarianism among hunters and gatherers. *American Anthropologist, 82*, 116–120.

Chaiken, S., Liberman, A., & Eagly, A. (1989). Heuristic and systematic processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended Thought* (pp. 212–252). New York, NY: Guilford Press.

Chen, T. H., & Massaro, D. W. (2004). Mandarin speech perception by ear and eye follows a universal principle. *Perception & Psychophysics, 66*(5), 820–836.

Converse, P. E. (1964). The nature of belief systems in mass publics. In D. E. Apter (Ed.), *Ideology and Discontent* (pp. 206–261). New York, NY: Free Press.

Cosmides, L., & Tooby, J. (1992). Cognitive adaptations for social exchange. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The Adapted Mind* (pp. 163–228). Oxford, UK: Oxford University Press.

Cosmides, L., & Tooby, J. (1994). Beyond intuition and instinct blindness: Toward an evolutionarily rigorous cognitive science. *Cognition, 50*(1), 41–77.

Cosmides, L., & Tooby, J. (2000). Evolutionary psychology and the emotions. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions*, 2nd edition (pp. 91–115). New York, NY: Guilford.

Cosmides, L., & Tooby, J. (2003). Evolutionary psychology: Theoretical foundations. *Encyclopedia of Cognitive Science* (pp. 54–64). London: Macmillan.

Cosmides, L., & Tooby, J. (2005). Neurocognitive adaptations designed for social exchange. In D. Buss (Ed.), *Handbook of evolutionary psychology* (pp. 584–627). Hoboken, NJ: John Wiley & Sons.

Dahl-Nielsen, H. (2011). *Processen bag dannelsen af politiske holdninger: et evolutionspykologisk studie af dannelsen af holdningerne til velfærdsstaten i Peru*. Master Thesis, Department of Political Science, Aarhus University.

Dawkins, R. (1996). *The blind watchmaker: Why the evidence of evolution reveals a universe without design*. London, UK: WW Norton.

de Waal, F. (1996). *Good natured: The origins of right and wrong in humans and other animals*. Cambridge, MA: Harvard University Press.

Delton, A. W., Cosmides, L., Guemo, M., Robertson, T. E., & Tooby, J. (2012). The psychosemantics of free riding: Dissecting the architecture of a moral concept. *Journal of Personality and Social Psychology, 102*(6), 1252–1270.

Delton, A. W., & Sell, A. (2014). The co-evolution of concepts and motivation. *Current Directions in Psychological Science, 23*(2), 115–120.

Diamond, J. (2012). *The world until yesterday: What can we learn from traditional societies?* London, UK: Penguin.

Donaldson, M. S. (2004). Nutrition and cancer: A review of the evidence for an anti-cancer diet. *Nutrition Journal 3*(1), 19.

Downs, A. (1957). *An economic theory of democracy*. Boston, MA: Addison Wesley.

Druckman, J. N., Kuklinski, J. H., & Sigelman, L. (2009). The unmet potential of interdisciplinary research: Political psychological approaches to voting and public opinion. *Political Behavior, 31*(4), 485–510.

Dunbar, R. I. M. (1998). The social brain hypothesis. *Evolutionary Anthropology, 6*, 178–190.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.

Easton, D. (1953). *The political system: An inquiry in the state of political science*. New York, NY: Knopf.

Evans, J. S. B. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology, 59*, 255–278.

Faulkner, J., Schaller, M., Park, J. H., & Duncan, L. A. (2004). Evolved disease-avoidance mechanisms and contemporary xenophobic attitudes. *Group Processes & Intergroup Relations, 7*(4), 333–353.

Feather, N. T. (1999). *Values, achievement, and justice: Studies in the psychology of deservingness*. New York, NY: Springer.

Fehr, E., & Gächter, S. (2000). Cooperation and punishment in public goods experiments. *American Economic Review, 90*, 980–994.

Fessler, D. M. T., & Holbrook, C. (2013a). Bound to lose: Physical incapacitation increases the conceptualized size of an antagonist in men. *PLOS ONE 8*(8), e71306.

Fessler, D. M. T., & Holbrook, C. (2013b). Friends shrink foes: The presence of comrades decreases the envisioned physical formidability of an opponent. *Psychological Science, 24*(5), 797–802.

Fessler, D. M. T., Holbrook, C., & Snyder, J. K. (2012). Weapons make the man (larger): Formidability is represented as size and strength in humans. *PLOS ONE 7*(4), e32751.

Gazzaniga, M. (2014). *Who's in charge? Free will and the science of the brain*. London, UK: Constable & Robinson.

Gigerenzer, G. (2007). *Gut feelings: The intelligence of the unconscious*. London, UK: Penguin.

Gilens, M. (1999). *Why Americans hate welfare: Race, media, and the politics of antipoverty policy*. Chicago, IL: University of Chicago Press.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*(6), 1464–1480.

Haidt, J. (2003). The moral emotions. *Handbook of affective sciences* (pp. 852–870). Oxford, UK: Oxford University Press

Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. New York, NY: Random House.

Hammerstein, P., & Parker, G. A. (1982). The asymmetric war of attrition. *Journal of Theoretical Biology, 96*(4), 647–682.

Hatemi, P. K., Byrne, E., & McDermott, R. (2012). Introduction: What is a 'gene'and why does it matter for political science? *Journal of Theoretical Politics, 24*(3), 305–327.

Hatemi, P. K., & McDermott, R. (Eds.). (2011). *Man is by nature a political animal: Evolution, biology, and politics*. Chicago, IL: University of Chicago Press.

Hawkes, K., O'Connell, J. F., Jones, N. B., Oftedal, O. T., & Blumenschine, R. J. (1991). Hunting income patterns among the Hadza: Big game, common goods, foraging goals and the evolution of the human diet. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 334*(1270), 243–251.

Hibbing, J. R., Smith, K. B., & Alford, J. R. (2013). *Predisposed: Liberals, Conservatives, and the biology of political differences*. New York, NY: Routledge.

Hill, K., & Hawkes, K., (1983). Neotropical hunting among the Ache of Eastern Paraguay. In R. Hames & W. Vickers (Eds.), *Adaptations of Native Amazonians* (pp. 139–188). New York, NY: Academic Press.

Hublin, J. J. (2009). The prehistory of compassion. *Proceedings of the National Academy of Sciences, 106*(16), 6429–6430.

Inbar, Y., Pizarro, D. A., Knobe, J., & Bloom, P. (2009). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion, 9*(3), 435.

Jensen, C., & Petersen, M. B. (2014). Cognitive bias and the politics of health care. Manuscript under review.

Johnson, A., & Earle, T. (2000). *The evolution of human societies: From foraging group to agrarian state*. Stanford, CA: Stanford University Press.

Kaplan, H., & Gurven, M. (2005). The natural history of human food sharing and cooperation: A review and a new multi-individual approach to the negotiation of norms. In H. Gintis, S. Bowles, R. Boyd, & E. Fehr (Eds.), *Moral sentiments and material interests: The foundations of cooperation in economic life* (pp. 75–113). Cambridge, MA: MIT Press.

Kaplan, H., & Hill, K. (1985). Food sharing among Ache foragers: Tests of explanatory hypotheses. *Current Anthropology, 26*(2), 223–246.

Kaplan, H., Hill, K. R., Lancaster, J. B., & Hurtado, A. M. (2000). A theory of human life history evolution: Diet, intelligence, and longevity. *Evolutionary Anthropology, 9*(4), 156–185.

Kelly, C. D. (2008). The interrelationships between resource-holding potential, resource-value and reproductive success in territorial males: How much variation can we explain? *Behavioral Ecology and Sociobiology, 62*, 855–871.

Kelly, R. L. (1995). *The foraging spectrum: Diversity in hunter-gatherer lifeways*. Washington, DC: Smithsonian Institution Press.

Kuklinski, J. H., & Quirk, P. J. (2000). Reconsidering the rational public: Cognition, heuristics, and mass opinion. In A. Lupia, M. D. McCubbins, & S. L. Popkin (Eds.), *Elements of reason: Cognition, choice, and the bounds of rationality* (pp. 153–182). New York, NY: Cambridge University Press.

Kurzban, R. (2012). *Why everyone (else) is a hypocrite: Evolution and the modular mind*. Princeton, NJ: Princeton University Press.

Kurzban, R., Tooby, J., & Cosmides, L. (2001). Can race be erased? Coalitional computation and social categorization. *Proceedings of the National Academy of Sciences USA, 98*, 15387–15392.

Lasswell, H. D. (1936). *Politics: Who gets what, when, how?* New York, NY: Whittlesey House.

Lau, R. R., & Redlawsk, D. P. (2006). *How voters decide: Information processing in election campaigns*. Cambridge, UK: Cambridge University Press.

Lopez, A. C., & McDermott, R. (2012). Adaptation, heritability, and the emergence of evolutionary political science. *Political Psychology, 33*(3), 343–362.

Lupia, A., & McCubbins, M. (1998). *The democratic dilemma: Can citizens learn what they need to know?* Cambridge, UK: Cambridge University Press.

Marcus, G. E., Neuman, W. R., & MacKuen, M. (2000). *Affective intelligence and political judgment*. Chicago, IL: University of Chicago Press.

McGurk, H., & MacDonald, J. (1976). Hearing lips and seeing voices. *Nature, 264*, 746–748.

Meyer, J. P., & Mulherin, A. (1980). From attribution to helping: An analysis of the mediating effects of affect and expectancy. *Journal of Personality and Social Psychology, 39*(2), 201–209.

Oorschot, W. V. (2000). Who should get what, and why? On deservingness criteria and the conditionality of solidarity among the public. *Policy & Politics, 28*(1), 33–48.

Oorschot, W. V. (2006). Making the difference in social Europe: deservingness perceptions among citizens of European welfare states. *Journal of European social policy, 16*(1), 23–42.

Pashler, H., & Wagenmakers, E. J. (2012). Editors' introduction to the special section on replicability in psychological science: A crisis of confidence? *Perspectives on Psychological Science, 7*(6), 528–530.

Petersen, M. B. (2009). Public opinion and evolved heuristics: The role of category-based inference. *Journal of Cognition and Culture, 9*(3), 367–389.

Petersen, M. B. (2012a). Social welfare as small-scale help: Evolutionary psychology and the deservingness heuristic. *American Journal of Political Science, 56*(1), 1–16.

Petersen, M. B. (2012b). Adaptationism and modern intuitions about criminal justice. *Behavioral and Brain Sciences, 35*(1), 31–32.

Petersen, M. B., & Aarøe, L. (2012). Is the political animal a political ignorant? Applying evolutionary psychology to the study of political attitudes. *Evolutionary Psychology, 10*(5), 802–817.

Petersen, M. B., & Aarøe, L. (2013). Politics in the mind's eye: Imagination as a link between social and political cognition. *American Political Science Review, 107*(2), 275–293.

Petersen, M. B., Aarøe, L., Jensen, N. H., & Curry, O. (2014). Social welfare and the psychology of food-sharing: Short-term hunger increases support for social welfare. *Political Psychology, 35*(6), doi: 10.1111/pops.12062.

Petersen, M. B., Sell, A., Cosmides, L., & Tooby, J. (2012). To punish or repair? Evolutionary psychology and lay intuitions about modern criminal justice. *Evolution and Human Behavior, 33*(6), 682–695.

Petersen, M. B., Sell, A., Tooby, J., & Cosmides, L. (2010). Evolutionary psychology and criminal justice: A recalibrational theory of punishment and reconciliation. In H. Høgh-Olesen (Ed.), *Human morality and sociality* (pp. 72–131). Basingstoke, UK: Palgrave Macmillan.

Petersen, M. B., & Skaaning, S. E. (2010). Ultimate causes of state formation: The significance of biogeography, diffusion, and neolithic revolutions. *Historical Social Research, 35*, 200–226.

Petersen, M. B., Skov, M., Serritzlew, S., & Ramsøy, T. (2013). Motivated reasoning and political parties: Evidence for increased processing in the face of party cues. *Political Behavior, 35*(4), 831–854.

Petersen, M. B., Slothuus, R., Stubager, R., & Togeby, L. (2011). Deservingness versus values in public opinion on welfare: The automaticity of the deservingness heuristic. *European Journal of Political Research, 50*(1), 24–52.

Petersen, M. B., Sznycer, D., Cosmides, L., & Tooby, J. (2012). Who deserves help? Evolutionary psychology, social emotions, and public opinion on welfare. *Political Psychology, 33*(3), 395–418.

Petersen, M. B., Sznycer, D., Sell, A., Cosmides, L., & Tooby, J. (2013). The ancestral logic of politics upper-body strength regulates men's assertion of self-interest over economic redistribution. *Psychological Science, 24*(7), 1098–1103.

Pinker, S. (2003). *The blank slate: The modern denial of human nature*. London, UK: Penguin.

Popkin, S. L. (1994). *The reasoning voter: Communication and persuasion in presidential campaigns*. Chicago, IL: University of Chicago Press.

Popper, K. R. (1959). *The logic of scientific discovery*. London, UK: Hutchinson.

Price, M. E., Kang, J., Dunn, J., & Hopkins, S. (2011). Muscularity and attractiveness as predictors of human egalitarianism. *Personality and Individual Differences, 50*(5), 636–640.

Robinson, P. H., & Darley, J. M. (2004). Does criminal law deter? A behavioural science investigation. *Oxford Journal of Legal Studies, 24*(2), 173–205.

Rothstein, B. (1998). *Just institutions matter: The moral and political logic of the universal welfare state*. Cambridge, UK: Cambridge University Press.

Seligman, M. E. (1970). On the generality of the laws of learning. *Psychological Review, 77*(5), 406.

Sell, A. (2011). Applying adaptationism to human anger: The recalibrational theory. In P. R. Shaver & M. Mikulincer (Eds.), *Human aggression and violence: Causes, manifestations, and consequences* (pp. 53–70). Washington DC: American Psychological Association.

Sell, A., Bryant, G., Cosmides, L., Tooby, J., Sznycer, D., von Rueden, C., & Gurven, M. (2010). Adaptations in humans for assessing physical strength from the voice. *Proceedings of the Royal Society B: Biological Sciences, 277*, 3509–3518.

Sell, A., Cosmides, L., Tooby, J., Sznycer, D., von Rueden, C., & Gurven, M. (2009). Human adaptations for the visual assessment of strength and fighting ability from the body and face. *Proceedings of the Royal Society B: Biological Sciences, 276*, 575–584.

Sell, A., Tooby, J., & Cosmides, L. (2009). Formidability and the logic of human anger. *Proceedings of the National Academy of Sciences, USA, 106*, 15073–15078.

Skitka, L. J., & Tetlock, P. E. (1993). Providing public assistance: Cognitive and motivational processes underlying liberal and conservative policy preferences. *Journal of Personality and Social Psychology, 65*(6), 1205–1233.

Sniderman, P. M., Brody, R. A., & Tetlock, P. E. (1991). *Reasoning and choice: Explorations in political psychology*. Cambridge, MA: Cambridge University Press.

Sniderman, P. M., & Bullock, J. (2004). A consistency theory of public opinion and political choice: The hypothesis of menu dependence. In W. E. Saris & P. M. Sniderman (Eds.), *Studies in public opinion: Attitudes, nonattitudes, measurement error, and change* (pp. 337–357). Princeton NJ: Princeton University Press.

Soto-Faraco, S., Navarra, J., & Alsius, A. (2004). Assessing automaticity in audiovisual speech integration: evidence from the speeded classification task. *Cognition, 92*(3), B13–B23.

Stiner, M. C., Barkai, R., & Gopher, A. (2009). Cooperative hunting and meat sharing 400-200 kya at Qesem Cave, Israel. *Proceedings of the National Academy of Sciences USA, 106*, 13207–13212.

Sugiyama, L. S. (2004). Illness, injury, and disability among Shiwiar forager—horticulturalists: Implications of health-risk buffering for the evolution of human life history. *American Journal of Physical Anthropology, 123*(4), 371–389.

Sugiyama, L. S., & Chacon, R. (2000). Effects of illness and injury on foraging among the Yora and Shiwiar: Pathology risk as adaptive problem. In L. Cronk, N. Chagnon, & W. Irons (Eds.), *Human behavior and adaptation: An anthropological perspective* (pp. 371–395). New York, NY: Aldine De Gruyter.

Taylor, S. E., Fiske, S. T., Etcoff, N., & Ruderman, A. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality and Social Psychologyi 36*(7), 778–793.

Thomsen, L., & Carey, S. (2013). Core cognition of relational models. In M. Banaji & S. Gelman (Eds.), *Navigating the social world: What infants, children and other species can teach us* (pp. 17–22). New York, NY: Oxford University Press.

Thomsen, L., Frankenhuis, W. E., Ingold-Smith, M., & Carey, S. (2011). Big and mighty: Preverbal infants mentally represent social dominance. *Science, 28*, 477–480.

Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology, 11*(4), 375–424.

Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–136). New York, NY: Oxford University Press.

Tooby, J., Cosmides, L., & Barrett, H. C. (2005). Resolving the debate on innate ideas. In P. Carruthers, S. Laurence, & S. Stich (Eds.), *The innate mind: Structure and content* (pp. 305–337). New York, NY: Oxford University Press.

Trivers, R. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology, 46*, 35–57.

Walker, P. L. (2001). A bioarchaeological perspective on the history of violence. *Annual Review of Anthropology, 30*, 573–596.

Weiner, B. (1995). *Judgments of responsibility: A foundation for a theory of social conduct*. New York, NY: Guilford Press.

World Health Organization (WHO). (2013). Factsheet no. 297. Geneva, Switzerland: World Health Organization.

Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought*. Princeton, NJ: Princeton University Press.

Wrangham, R. (2009). *Catching fire: How cooking made us human*. New York, NY: Basic Books.

Wrangham, R. W. (1999). Evolution of coalitionary killing. *American Journal of Physical Anthropology, 110*(s 29), 1–30.

Zaller, J. R. (1992). *The nature and origins of mass opinion*. New York, NY: Cambridge University Press.