Leadership

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Abstract

Historically, research on human leadership has been the sole domain of the social sciences, and has focused on the formalized role leaders have come to play in modern institutions. However, an independent yet parallel body of work has recently emerged in biology, where evolutionary theory is being used to investigate the origins and function of leader–follower dynamics in nonhuman animals. In recent years, interdisciplinary scholars in evolutionary psychology have attempted to merge these previously disparate research traditions, investigating whether the leader–follower relationships that evolved to help our species overcome challenges in the past holds insights for leadership strategies in our modern world. In this essay, we investigate the feasibility of such an interdisciplinary approach, the obstacles it faces, and the promise it holds for the future of leadership research.

INTRODUCTION

The breadth of ways leadership has been examined over the last century reflects the impressive number of disciplines that have taken interest in the topic. Any serious consideration of behavior among social organisms must, at some point, contend with questions about the leader–follower relationship and, as a consequence, the phenomenon has been studied across several different species, including humans. Historically, empirical work on leadership in human and nonhuman animals has been divided along disciplinary lines, with social psychology focusing on the former and evolutionary biology on the latter. In recent years, however, leadership research has caught the attention of evolutionary psychologists, and the result has been an increase in studies attempting to blend these previously disparate research traditions.

While the fusion of biological and social approaches is commonly touted as the "next step" in the study of human leadership, evolutionary psychologists must contend with deep theoretical differences between biological and social approaches that have resulted in distinct research traditions. The primary purpose of this essay will be to discuss the assumptions surrounding research on human and animal leadership, how those assumptions impact the way in

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which data are collected and interpreted, and what that means for current and future trends toward the evolutionary study of human leadership.

SOCIAL PSYCHOLOGY: TRADITIONAL APPROACHES TO HUMAN LEADERSHIP

Leaders have been a feature of human societies throughout history, yet formal research on leadership remained sparse until the beginning of the twentieth century. During this time, the West and the United States in particular saw a rise in the hierarchical business model and a centralization of the political system which brought with it a focus on the individuals at the top of this organizational structure. For many social scientists, studying leadership was an important step in understanding institutional success. As Hogan and Kaiser (2005) noted, "leadership solves the problem of how to organize collective effort and is thus the key to organizational effectiveness" (p.169). It is thus not surprising that human leadership studies have found their strongest footing in journals and departments dedicated to organizational management. While generating a wealth of empirical data on leaders in their working environments, leadership research on humans continues to struggle with ambiguous definitions, theoretical inconsistency, and contradictory results (Derue, Nahrgang, Wellman, & Humphrey, 2011). In many ways, these problems may stem from assumptions about what leadership is, and what purpose it is meant to serve.

From the 1950s until today, work on leadership in the social sciences has been dominated by research attempting to find a link between leader behaviors and group performance. In these studies, a leader's "effectiveness" is commonly operationalized using measures of either objective group success (e.g., firm profit), or the level of support received from peers, subordinates, and supervisors (e.g., satisfaction with firm performance). A common research design looks for correlations between measures of effectiveness and the type of behavior or "style" (e.g., McGregor, 1960) the leader most commonly employs, with some studies incorporating situational mediators.

Leadership styles are most commonly ascertained by distributing a survey or questionnaire to members of an organization or working unit, asking them to rate their supervisor's behavior through a series of measures preselected by the researcher. Traditionally the focus has been on behaviors associated with a leader's control over aspects of followers' work environment including rewards and punishment, resources, training, and the level of input the leader has in decision-making. Although field studies of this type remain one of the most commonly employed methods for leadership research, their design carries several, often unrecognized, assumptions (Hunter, Bedell-Avers, & Mumford, 2007).

First, by asking subordinates to rate their superiors on measures of leadership, researchers inherently equated managers with leaders, regardless of whether this view is shared by the subordinate. Second, scholars tend to operationalize "leadership" as those actions undertaken by someone in a leadership position. Such a broad and ambiguous interpretation has resulted in leadership being measured along several dimensions including task-oriented (e.g., planning and organizing), relation-oriented (e.g., supporting and empowering followers), and change-oriented (e.g., envisioning and advocating innovation) behaviors. Often questionnaires differ both in the behaviors they focused on and the way in which those behaviors are measured. As Yukl (2012) stated, "the bewildering variety of behavior constructs used for leadership research makes it difficult to compare and integrate findings" (p. 66). In many ways, these assumptions reflect the twentieth century focus on institutional leadership, rather than leadership that may arise from unrestricted social interactions. Such problems drove Hunter and others to argue that, "research must first be more explicit in their operationalization and justification for what a leader is and why, precisely, a given sample represents 'leaders'" (2007, p. 438).

It would be misleading to say that the entire leadership field can be captured by the description above. As James Hunt, senior editor for *Leadership Quarterly* recently stated, "the field is literally exploding with new developments and it has moved far beyond the view of a hierarchical, top-down order-giving man or white hat on a white horse hero who saves the town" (Hunt, 2005, p. 1). Nonetheless, the discipline's theoretical traditions and continued focus on institutionalized leaders may be obscuring other more informal leader–follower processes arising from social interactions outside the formal hierarchy.

One promising exception has arisen from the cognitive revolution of the 1970s and the success of attribution theory. Attribution theory is primarily concerned with how people's interpretation of events can impact their subsequent behavior. Work by Lord and his associates (Lord, 1985) found two mental processes of attribution—recognition and inferential—which they believed to be involved in an individual's assessment of leadership. Recognition processes are related to the prototypes of leadership held by individuals (Rosch, 1978). The higher the degree of overlap between an actor and an observer's prototypic expectations, the greater the chance of a leader attribution being made. In instances where overlap is low, leaders may be viewed as less legitimate or effective regardless of objective achievement or their formal title (Chemers, 2000). Inferential processes cause individuals to attribute the success or failure of a group to the performance of the leader, regardless of differences in leadership style (Staw, 1975). Thus, a subordinate may view their superior as a "good" leader simply because the group

is succeeding, regardless of whether the leader is making any objective contribution to that success. Attribution theory represents one of the first attempts to understand leadership as a product of human psychology, rather than simply the actions and consequences of individuals at the top of a social hierarchy. As we will come to show in the next section, these psychological biases may be no accident, deriving from a much more innate leader–follower dynamic, forged by evolution to meet the unique social challenges of our species.

EVOLUTIONARY PSYCHOLOGY: NEW APPROACHES TO NONHUMAN AND HUMAN LEADERSHIP

It may be difficult to envision leadership in animals. They do not have sophisticated language to persuade one another, many species lack the cognitive capacity to plan or strategize about the future, and in many cases (such as flocks of birds or schools of fish), individuals may only be aware of the actions of their immediate neighbors. How then can biologists speak about animal leadership? This section will examine an alternative interpretation of leadership than those commonly seen in the social science literature, a theory of leadership that operates through psychological mechanisms designed to facilitate survival, rather than an institutionalized hierarchy of power. But first, it is important to understand how human and other animals' psychology can be shaped by evolution.

Evolutionary Psychology in a Nutshell

Darwin's (1909) theory of evolution posits that if a population displays variation in a given trait, and if offspring can inherit those traits from their parents, then the variants of a trait that improve survival or reproduction in a given environment will increase in frequency from one generation to the next. Variants that hindered survival or reproduction will diminish over time, as they are transmitted to offspring at lower rates relative to their more productive counterparts. An inherited characteristic that, within the time period in which it evolves, improves an individual's ability to survive and reproduce compared with an alternative variation of the trait is referred to as an *adaptation*. However, the process of natural selection can also produce *by-products*. By-products can be thought of as the consequence of adaptive traits that serve no function in their own right (e.g., calcium evolved as the material for bones because of its structural advantages, but the fact that it causes bones to be white is a by-product of calcium's chemical structure).

Although an evolutionary framework is commonly applied to explain anatomical or physiological traits in a species, it is of no less importance in

understanding how the brains of humans and nonhuman animals developed to process information and generate behavioral strategies. Utilizing the definition offered by Confer and her colleagues, the psychological mechanisms that are generated by natural selection can be understood as, "information-processing circuits that take in delimited units of information and transform that information into functional output designed to solve a particular adaptive problem" (2010, p. 111). These inputs can be thought of as social or environmental signals and the outputs are emotional or behavioral responses to those signals. The mechanism itself can be understood as the neural/physiological pathway that defines the nature of the relationship between the two.

There are two main levels at which evolutionary approaches can be applied to understand psychological phenomena. The first considers the ultimate function of a behavior or cognitive ability—*why* the psychological trait exists—based on the fitness benefits it is thought to confer on its possessor. The second approach looks at proximate physiological mechanisms that cause it to occur—*how* the trait actually functions to provide a benefit. Although generally considered complementary, proximate levels of analysis can have important implications for comparative studies, as behaviors that appear alike and offer similar fitness benefits may be governed by different cognitive mechanisms across species. Now that we have outlined the logic of the evolutionary approach, we can examine how it has been applied to study leadership in nonhuman animals.

Evolutionary Perspectives on Leadership in Nonhuman Animals

From a fitness perspective, there are many benefits to grouping including decreased risk of predation, increased foraging success, communal defense of resources, or more accurate migration. However, such benefits may only be achieved if individuals are able to maintain some degree of cohesion, either through physical proximity or through signaling at a distance. Even then, any attempt to remain together as a group (especially over longer distances) will require individuals to engage in some degree of coordination in the activities they pursue. Put simply, individuals in the group cannot engage in activities that are so divergent as to compromise cohesion. However, in forfeiting their optimal action to comply with the group, an individual pays a fitness cost referred to by Conradt and Roper as a *consensus cost* (2003). These consensus costs are important to evolutionary theories of leadership because they present a fitness paradox. It is in the best interest of any given member of a group to move the group toward their preferred activity (avoiding the consensus cost), but if all members pursue their own interests, the group risks fragmentation and the grouping benefits are lost. Thus, if groups are to

remain intact, some members must get their way, whereas others must follow. Here, we see the first and most simplistic way leadership is conceptualized in animal groups, as those behaviors that determine the type, timing, direction, or duration of group activities (e.g., Dyer, Johansson, Helbing, Couzin, & Krause, 2009; Guttal & Couzin, 2011). To understand this more fully, let us consider a concrete example.

One of the most common fitness benefits of grouping seen across taxa, and considered to be the origins of grouping in primates (van Schaik, 1983), is the reduction in the risk of predation (Alexander, 1974). This can be due to either increased vigilance or decreased probability of any given individual being the target of attack. Particularly in the latter instance, maintaining proximity to neighbors is necessary for the fitness gains to be achieved. When considering a proximate explanation, staying near others in the group can be understood as an increased fear response to states of isolation (Bergvall, Schäpers, Kjellander, & Weiss, 2011). At some point, however, the consensus cost associated with remaining near others may become too high for an individual (e.g., when an individual deer needs water but the herd is foraging). In these instances, needs such as thirst or hunger may outweigh fear of isolation and the individual will break with the group. If other members are not themselves in a high state of need (are not thirsty or too hungry), the drive to maintain proximity may result in following the departing individual. By the nature of this relationship, any individual with a higher energy need than other members, or simply a lower fear response to isolation (sometimes termed *boldness*), may emerge as a "leader" (at least for a time). This increased need may result from many characteristics including physical traits such as larger body size (King, Johnson, & Van Vugt, 2009). Several authors have used this argument to explain why more consistent leader–follower roles are established in stable social groups where size often correlates with dominance (e.g., King & Cowlishaw, 2009).

Interestingly, decision rules that involve maintaining proximity with conspecifics can produce leadership in groups that have only local knowledge (individuals can only see the activities of their neighbors and not necessarily the activity of the "leader"). Ian Couzin and colleagues have demonstrated the remarkable ability of a few "knowledgeable" fish to lead entire schools of "ignorant" fish to resources, simply because those individuals who did not know the location of the resource stayed close to their neighbors and the information percolated from the "leaders" to the rest of the group (Couzin, Krause, Franks, & Levin, 2005).

At this point, one might wonder how this type of leadership is relevant for humans. At the most basic level, Dyer and his colleagues demonstrated that human groups could exhibit similar leadership and followership behaviors to those discussed above (Dyer *et al.*, 2009). In his work, Dyer showed

how a group of naive individuals could be lead out of a novel room by a few people who knew the location of exits, without the need for verbal communication. In doing so, Dyer highlighted how a person's physical position within a group can impact the level of influence they have over others. Now consider a company where individuals may only interact with a subset of their coworkers. Individuals who are optimally located in this colleague network (perhaps those with the most connections) may have the ability to influence how others think and feel about their job more so than individuals with fewer ties, regardless of their formal position. To a biologist, this type of influence may be interpreted as a form of leadership.

Some authors (e.g., Guastello, 2009) have argued that for the purposes of evolutionary discussion, decision rules associated with staying or leaving a group should not be characterized as an example of an evolved leader–follower relationship. In part, this objection stems from the fact that the mechanism of influence (maintaining proximity) is unrelated to the decision being pursued (followers are not considering the choice of the leader). In this sense, leadership would be viewed as a by-product of grouping behavior rather than an adaptive solution to problems of coordination. Such arguments are valuable to the extent that they remind researchers that phenotypically similar actions, such as one individual displaying the same behavior as a conspecific at different points in time, may have different proximate explanations and thus there may be a need for more precise terminology than "leadership" to avoid confusion. In the section that follows, we expand on the different types of cognitive mechanisms capable of producing leader–follower dynamics and how unique selection pressures can result in the development of more complex leader–follower relationships.

It is worth noting here that despite the propensity for evolutionary psychologists to discuss adaptations independently of one another, cognitive mechanisms should not necessarily be viewed as isolated modules in the brain. While there is some evidence that certain brain regions, as well as subclasses of neurons, serve specific functions (e.g., areas involved in language, and facial neurons associated with individual recognition in mammals; see Sheehan & Tibbetts, 2011), most psychological adaptations draw on multiple cognitive components, including regions of the brain associated with perception and memory. Additionally, these mechanisms do not operate in a vacuum, but rather build and interact in complex ways to produce adaptive behaviors (Buss, 2008; see Confer *et al*., 2010).

As bottom-up environmental factors such as predation and resource availability drive animals to aggregate, new selection pressures can emerge and influence how individuals cope with, and take advantage of, their relative proximity (Van Schaik, 1983). The type of problem a species is faced with

can therefore alter the mechanisms through which leadership operates (Van Vugt, 2006). For example, one potential challenge to living near conspecifics is that it may be difficult for an animal to hide its movements toward, or discovery of, food (e.g., Ratcliffe & Hofstede, 2005). These "cues" are not evolved mechanisms for communication between the "finder" and those around him, but rather a by-product of living in close proximity that can result in a leader–follower conflict. In these instances, followers may be thought of as "social parasites" and their choice to follow may actually run counter to the interests of the "leader" (Sumpter, 2010). However, in some cases, individuals can actually develop specific adaptations for detecting when followership will be most advantageous. Starlings, for example, tend to make decisions about leaving or staying in a food patch based on the observed success of conspecifics (e.g., Templeton & Giraldeau, 1996). Such instances would be an example of an evolved capacity for followership. The models used to represent trade-offs between gaining information from others as opposed to searching for oneself are known as *producer-scrounger models*, and they represent a rich theoretical literature on leader–follower dynamics, including how strategies may be adapted to environmental changes (Sumpter, 2010).

The presence of conspecifics does not always represent a challenge to resource acquisition for leaders. Under certain circumstances, they may actually be of benefit, resulting in an individual's active recruitment of others when food is discovered. In cliff swallows, for example, there is evidence that group members are recruited to swarms of insects because the increased numbers helps the birds track their prey (Brown, Brown, & Shaffer, 1991). This type of behavior is often referred to as *signaling*. Signaling can be understood as "an act or structure that alters the behavior of another organism, which evolved because of that effect, and which is effective because the receiver's response has also evolved" (Maynard Smith & Harper, 2005; cited in Sumpter, 2010 p. 58). Such abilities to sense and interpret cues and signals represent mechanisms that evolved to facilitate the follower side of leadership dynamics. It is possible that the prototypes discussed in attribution theories of social psychology serve a similar purpose—helping people find "good" leaders that will be advantageous to follow.

Evolutionary Perspectives on Leadership in Humans

While all of these examples represent relationships of influence in which individuals are "led" toward a resource, the leader–follower dynamic is governed by different evolved processes shaped by each species' unique evolutionary history (Buss, 2005). While much of the logic outlined in the section above on nonhuman animals may therefore shed light on human leadership,

there are also likely to be evolutionary causes and consequences of leadership and followership behavior that are unique to our own lineage. Identifying the unique cognitive adaptations that may have impacted our species social relations is an important and growing aspect of current research on evolutionary leadership in humans. Some scholars, most notably Gil-White and his colleagues, have proposed that specific adaptations for social learning have been integral in shaping our species' leadership dynamics (Henrich & Gil-White, 2001). In their model of "prestige," Henrich and Gil-White argue that with the advent of the human cognitive capacity for cultural transmission, fitness benefits could be attained by preferentially learning from the most skilled individuals. Unlike more primitive forms of copying found in other species (Boyd & Richerson, 1985), which could be utilized at a distance, social learning in humans was facilitated by increased access to informed or skilled individuals. This created a selection pressure for behaviors aimed at gaining greater access to high performing individuals, including deference. There is some evidence for this effect in hunter–gatherer societies in which outright leaders are rare, but certain individuals wield influence confined to their own areas of expertise (Van Vugt, Hogan, & Kaiser, 2008). Interestingly, trading deference for productivity is not unique to humans. In macaques (Ventura, Majolo, Koyama, Hardie, & Schino, 2006), high performing foragers are preferentially groomed, even if they are low ranking in the dominance hierarchy.

The unique nature of human phylogenetic history may raise questions about the value of studying leadership in other taxa. The complex nature of human cognition and social structure can make isolating the processes that contribute to any behavior incredibly difficult. Cross-species comparative research can control for noise and mediating variables, as well as simplify environmental factors. But there is no guarantee that understanding the ultimate and proximate explanations for leadership in other species will translate directly into understanding leader–follower dynamics in humans, given our own unique evolutionary history (Buss, 2005; Van Vugt, Hogan, & Kaiser, 2008). However, it does offer the promise of identifying fundamental, underlying patterns that transcend species boundaries. When general terms such as "leadership" are abandoned, and the focus is confined to specific behaviors, several interesting patterns may emerge.

In conclusion, current institutionalized leadership roles—while prevalent in today's society—may not reflect the types of behaviors associated with leader–follower dynamics in human evolutionary history and, by extension, the psychological mechanisms that evolved to facilitate them. At times, institutionalized structures may conflict with people's evolved relational standards of fairness, integrity, or competence. The term commonly employed to discuss this phenomenon is *mismatch theory* (Van Vugt *et al*., 2008; King *et al*.,

2009). For example, most organization heads are not selected by subordinates (Sessa, Kaiser, Taylor, & Campbell, 1998), yet higher levels of leadership continuity have been found when groups could elect their own leader. This suggests that distinctions need to be drawn between cultural stereotypes of leadership and perceptions of leadership that may be more innate. An evolutionary approach offers new ways to account for this variation.

FUTURE WORK: UNIQUE CHALLENGES TO EVOLUTIONARY UNDERSTANDINGS OF HUMAN LEADERSHIP

There are many fruitful avenues for future studies on human leadership; here we discuss two promising areas where evolutionary psychology can play an important role. First, there are several differences between the institutionalized role leaders have come to occupy in modern society and the social structure that existed during the Pleistocene era, when many of our cognitive adaptations were thought to evolve (Van Vugt *et al*., 2008). Several authors have argued that evolutionary approaches will help illuminate organizational practices that conflict with evolved mechanisms for mediating social interactions—the problem of evolutionary mismatch (e.g., Johnson, Price, & Van Vugt, 2013; King *et al.,* 2009; Price & Johnson, 2011). In order to conduct such work, however, more research is needed on the relationship between notions of leadership that originate from transmitted culture (Scott-Phillips, Dickins, & West, 2011) and those that arose through adaptation. For example, evidence from primate studies suggests that mechanisms for assessing equality/fairness (Brosnan & de Waal, 2003) and social rank (Ghazanfar & Santos, 2004) have deep evolutionary roots. However, these values may conflict with learned ideas of what constitutes an appropriate leader–subordinate relationship in politics and business. Little is understood about the interaction of learned and evolved behaviors, and much can be gained from work in this area.

The second and potentially related area examines the effects of socialization on the expression of leadership behavior. Several studies have found links between personality traits, such as boldness and leadership (Judge *et al*., 2002). Boldness is often characterized as lower levels of fear in novel situations and thus may correlate with leadership because of an increased propensity to act independently of other group members. However, some studies now show that the level of support a leader receives from his/her subordinates alters the level at which s/he displays leader activities (e.g., Pepinsky, Hemphill, & Shevitz, 1958). Recent literature on animal behavior has a growing interest in how socialization can alter the expression of inherited traits (such as personality), and by extension, can produce a form of "social inheritance" of phenotypic behaviors (for full discussion see

Stamps, 1991). Such research could have important implications for how leaders cope with failure.

Social psychologists and evolutionary biologists hold important insights into two sides of the same coin. On one hand, social psychology helps lend insights into contemporary human experience, including the values and culture that have come to play an integral role in defining our species. On the other hand, evolutionary biology can help uncover the pressures and processes that shaped the way in which the human mind came to interpret the environment, social life, and our place within it. Merging these two disparate traditions is not an easy process, but it is invaluable if our understanding of leadership is to climb out of disciplinary ravines to see the broader landscape of how, when, why and who leads, and who follows.

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DOMINIC JOHNSON SHORT BIOGRAPHY

Dominic Johnson received a DPhil from Oxford University in evolutionary biology, and a PhD from Geneva University in political science. Drawing on both disciplines, he is interested in how new research on evolution, biology, and human nature is challenging theories of international relations, conflict, and cooperation. He has published two books. *Overconfidence and War: The Havoc and Glory of Positive Illusions* (Harvard University Press, 2004) argues that common psychological biases to maintain overly positive images of our capabilities, our control over events, and the future play a key role in the causes of war. *Failing to Win: Perceptions of Victory and Defeat in International Politics* (Harvard University Press, 2006), with Dominic Tierney, examines how and why popular misperceptions commonly create undeserved victories or defeats in international wars and crises. His current work focuses on the role of evolutionary dynamics, evolutionary psychology, and religion in human conflict and cooperation.

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