

Total word count: 6,227

Evolution and the social psychology of leadership:

The mismatch hypothesis

Mark Van Vugt, University of Kent

Dominic D. P. Johnson, University of Edinburgh

Robert B. Kaiser, Kaplan DeVries Inc.

Rick O’Gorman, Sheffield Hallam University

Please do not cite or circulate manuscript without permission from the authors

Chapter for “Social psychology and leadership” edited by C. Hoyt, D. Forsyth, & A.

Goethals. New York: Praeger Perspectives.

Abstract

An evolutionary perspective on leadership assumes that leadership consists of a constellation of adaptations for solving different coordination problems in human ancestral environments, most notably pertaining to group movement, social cohesion, and intergroup relations. Our evolved leadership psychology influences the way we think about and respond to modern leadership, which creates the potential for a mismatch between leadership requirements in modern versus ancestral environments. This chapter provides some evidence for this mismatch hypothesis and notes some implications for leadership theory and practice.

Evolution and the social psychology of leadership:

The mismatch hypothesis

When Tony Blair stepped down as prime-minister of Britain in 2007 after ten years in office most British voters were glad to see him go. Despite his numerous contributions to reforms of the health care system, education, civil law, and government, he will be mostly remembered for his decision to send British troops into Iraq. Matters of life and death ultimately determine the historical judgment of leadership. In times of crises we turn to leaders to give us comfort, hope, and a sense of direction—and if they fail, they must go.

Leadership failure is common in modern society. Scholars estimate a 60-75% failure rate in business and political leadership with sometimes dire consequences for the welfare of followers (Hogan, Curphy, & Hogan, 1994). Why does modern leadership fail so often and sometimes so spectacularly? There are many possible answers but we focus on one here. Perhaps the failure of modern leadership is a consequence of it sometimes being at odds with aspects of our evolved leadership psychology (Van Vugt, Hogan, & Kaiser, in press).

It is argued that we have a “natural way” of thinking about and responding to leadership which has been shaped by several million years of human evolution. But because modern human environments are so dramatically different from ancestral environments in which leadership and followership evolved this creates the potential for a mismatch. As a result, the way leaders and followers interact in modern societies might not always produce adaptive outcomes. This mismatch hypothesis can explain many counter-intuitive findings in leadership research with various implications for leadership theory and practice.

Evolutionary Social Psychology

Evolutionary social psychology has its roots in social psychology, evolutionary psychology, and evolutionary biology (Schaller, Simpson & Kenrick, 2006). Evolutionary social psychology (ESP) is based on the Darwinian assumption that human psychology is the product of evolution through natural selection in the same way that natural selection has shaped human physiology. Because the environment in which humans evolved was primarily social – humans are first and foremost a group living species (Dunbar, 2004) -- ESP proposes that the human mind is essentially social, comprising many functional psychological adaptations specifically designed to solve particular adaptive problems of ancestral group life. Examples of such adaptations include parental care, language, social cooperation, and social intelligence (Buss, 2005; Van Vugt & Schaller, in press). Individuals possessing these traits would have been better equipped to extract valuable resources from group life needed for their survival and reproduction. This then enabled these traits to spread through the population and reach fixation. Here we entertain the possibility that leadership and followership have evolved as adaptive solutions to a range of group problems.

Evolutionary Origins of Leadership

The human species is estimated to be 2 to 2.5 million years old. For most of this period, humans probably lived in small kin-based bands in savannah-type environments (Dunbar, 2004; Johnson & Earle, 2000). These family-level groups were connected to others, forming clans and tribes that came together at seasonal gatherings to exchange mates, goods, and information (Richerson & Boyd, 2006). For ancestral humans, group life was the best survival strategy in a hostile environment in which predation must have been high and resources scarce (Foley, 1997).

Collective action in the form of hunting, sharing food, and defending the group may have provided a buffer against these threats and this presumably created a niche for leadership to organize group activities (Van Vugt, 2006). For instance, in planning a group hunt people must decide who will join the hunting party, where they will go, when they go and when they return. Such decisions create coordination problems and these can be better solved if an individual initiates and coordinates the group-decision making process. In recent papers (Van Vugt, 2006; Van Vugt, Hogan, & Kaiser, in press) we have identified three ancestral coordination problems for which leadership would have been critical, that is, group movement (e.g., hunting), group cohesion (e.g., promoting cooperation, managing conflict), and intergroup politics (e.g., warfare, peacemaking).

There is some suggestion that leadership predates humans. The phylogenetic evidence suggests that pre-adaptations for leadership and followership are found in quite primitive social species like the waggle-dance in honey bees and flying formations in migrating bird species (Van Vugt, 2006). These examples suggest that species lacking complex cognitive capacities can display followership using a decision rule as simple as “follow the one who moves first.”

Leadership is also observed in our closest genetic relative, the chimpanzee, with whom we shared a common ancestor approximately 5-7 million years ago. Chimpanzees live in fission-fusion societies of around 30-50 individuals in a large territory. They frequently form coalitions with each other for activities like hunting and foraging, internal politics and protecting territory boundaries, and leadership is prominently displayed in these situations by usually the most dominant troop member, the alpha male (Boehm, 1999; De Waal, 1996).

Environment of Evolutionary Adaptedness

The social complexity of leadership most likely increased with the arrival of early humans some 2 million years ago. This period marks the beginning of the Pleistocene period which ended as recently as 13,000 years ago with the agricultural revolution. This period is sometimes referred to as the Environment of Evolutionary Adaptedness or EEA for humans (Foley, 1997; Van Vugt, Hogan, & Kaiser, in press).¹ Modern hunter-gatherer societies such as the !Kung San of the Kalahari desert, the Shoshone of the American Great Basin, the Yanomamö of the Amazon river basin, the Inuit of the Arctic coasts, and the Aborigines in Northern Australia may provide the best model we have for human social organization in this stage (Boehm, 1999; Chagnon, 1997; Johnson & Earle, 2000).

Extrapolating from this evidence, conditions in the EEA were largely egalitarian and there was no formal leadership structure. There were so-called Big Men, often the best hunters or warriors in the band, who could exercise disproportionate influence on group decision-making within and sometimes even outside their domain of expertise but their power was severely curtailed (Diamond, 1997; Johnson & Earle, 2000). Attempts by Big Men to dominate group discussion—dominance is a legacy of our primate past-- were met with fierce resistance from the rest of the group. Anthropologists talk about a reversal of the dominance hierarchy to indicate that, unlike in nonhuman primates, subdominants can band together and limit a leader's power through various strategies--so-called levelling mechanisms (Boehm, 1999). For instance, to keep overbearing leaders in place they can use instruments like gossip, ridicule, criticism, ostracism, and the threat of punishment and sometimes

¹ The term *environment of evolutionary adaptedness* refers to the environment to which a particular evolved mechanism is adapted. Evolutionary psychology proposes that the majority of human psychological mechanisms are adapted to reproductive problems frequently encountered in Pleistocene environments in which humans spend 95% of their history. These problems include those of mating, parenting, social coordination and cooperation.

even assassination (Boehm, 1999). Across evolutionary time these levelling mechanisms may have paved the way for a more democratic, participatory group decision-making process in which dominance hierarchies were replaced by a more consensual leader-follower decision structure (Van Vugt, Hogan, & Kaiser, in press).

The Mismatch Hypothesis

We believe that the EEA reflects our natural way of thinking about and responding to leadership with substantial implications for modern leadership theory and practice. If humans are mostly adapted to Pleistocene environments this means that some aspects of our evolved leadership and followership psychology may not be very well adjusted to modern environments. Remember that human psychological mechanisms evolved because they produced reproductive and survival benefits in ancestral environments. Because genetic evolution tends to be a slow cumulative process such mechanisms might not produce adaptive behaviours in modern environments, particularly if these environments differ in important ways. This logic applies particularly to human activities because our social and physical environments have changed dramatically in the last 13,000 years or so since the agricultural revolution (Diamond, 1997).

The discrepancy between modern and ancestral environments potentially creates a *mismatch* between aspects of our evolved psychology and challenges of modern society and this may have substantial implications for a range of social traits such leadership. Mismatch theory is an evolutionarily informed concept. It applies to all organisms possessing traits (including behavioral, emotional, and biological) that have been passed down through generations favored by natural selection because of their adaptive function in a given environment. Yet the evolutionary environment may be quite unlike the current environment. Therefore, traits that were adaptive in

ancestral times are no longer adaptive in the new environment. As Pinker writes “our ordeals come from a mismatch between the sources of our passions in evolutionary history and the goals we set for ourselves today” (2002; p. 219)

We illustrate this mismatch hypothesis with two examples from human psychology that can be interpreted as supportive evidence. One classic example is the fear of snakes and spiders, which were common threats for humans in ancestral environments. Yet in modern societies like the US they kill less than 20 individuals per year, most of whom are owners of dangerous snakes and spiders. In contrast, car accidents kill about 40,000 to 50,000 people a year in the US (NHTSA, 2005; http://www.martinfrost.ws/htmlfiles/sept2006/usroad_deaths.html). (National Safety Council, 2000). Yet decades of research has shown that fear of snakes and spiders is more readily learned than fear of more lethal, recent, dangers such as cars, guns, or electrical appliances (Ohman & Mineka, 2001).

Another example of a potential mismatch is our trust in strangers (Hagen & Hammerstein, 2006; Burnham & Johnson, 2005). Lab research shows that people readily cooperate with anonymous strangers in one-shot prisoner dilemma games (De Cremer & Van Vugt, 2002). This defies fundamental assumptions of economic and evolutionary theory--people are expected to maximize their personal pay-offs in anonymous exchanges because their altruism could be exploited. However, one-off encounters with complete strangers were presumably very rare for ancestral humans. They probably mostly interacted with family members and therefore did not evolve the cognitive machinery to deal with novel situations like interacting with complete strangers. Our research shows that people are more likely to trust strangers if they look familiar--for instance, if they share the same facial features, speak the same language, or wear the same clothes (Park, Schaller, & Van Vugt, in press). Thus

behaviours that were adaptive in ancestral environments – sharing resources with people who looked and behaved like you -- may have potentially maladaptive consequences in present society.

Contemporary Evidence for Ancestral Leadership Psychology

Our leadership psychology evolved over several million years during which time people lived in small, kin-based egalitarian bands in which leadership was informal, consensual, and situational. Since the agricultural period there has been a steady increase in the size and complexity of societies. Simple band structures have been replaced by complex social structures of chiefdoms, states, nations, and empires in which thousands or even millions of people must live and work peacefully together. Such problems, brand new on an evolutionary time scale, create new leadership challenges to which our evolved leadership psychology may not be well adjusted (Van Vugt, Hogan, & Kaiser, in press).

Here we review evidence for the influence of our ancestral past in the way we evaluate and respond to modern leadership challenges. To the extent that these challenges are evolutionary novel there might be the potential of a mismatch with negative implications for leadership practice and group welfare.

Prototypical Band Leadership

Since humans evolved in small scale societies without any formal leadership structure, and near-equal power relations between (adult male) group members it should be reflected in the way modern humans evaluate leadership. In particular, there should be universal agreement on what followers regard as positive leadership qualities and these qualities should closely match the prototype of band leadership. The GLOBE-project data are useful to test this hypothesis (<http://www.thunderbird.edu/wwwfiles/ms/globe/>). In a study of leadership in 61

cultures GLOBE-researchers found that leaders, across many cultures, were described using certain terms, many of which were positive. Examples are integrity—good leaders can be trusted; fairness—good leaders are just and equitable; diplomatic—good leaders handle conflict well; decisiveness—good leaders make sound and timely decisions; intelligence and competence—good leaders contribute to the group's performance; and, finally, vision—good leaders can describe a desirable future (Den Hartog et al., 1999; see also Epitropaki & Martin, 2004; Hogan & Kaiser, 2005; Lord & Maher, 1993). These leader prototypes closely match the perception of respected Big Men in traditional band societies (Boehm, 1999; Johnson & Earle, 2000; Sahlin, 1963).

Dominance is the Anti-thesis of Leadership

An important aspect of band leadership is that, except in special circumstances, one band member cannot tell others to do something they do not want to do. Members of hunter-gather societies are fiercely autonomous and it is not uncommon for them to ignore or disobey a person who assumes too much power and authority. Anthropologists report that the rank-and-file sometimes simply ignore chiefs who issue commands as opposed to making suggestions (Freeman, 1970). If a chief becomes too bossy group members sometimes literally “vote with their feet” and leave the overbearing individual behind (Moore, 1972).

Echoing our ancestral past there should be a general aversion against bossy, self-centered leaders in modern environments. Again, the GLOBE project data are useful here. Tyranny, dominance, and selfishness are universally regarded as negative leader attributes (Den Hartog et al, 1999; Epitropaki & Martin, 2004; Hogan & Kaiser, 2005). But why do such leaders emerge in modern organizations? One explanation derived from the mismatch hypothesis is that, unlike in traditional Big

Men societies, in modern organizations leaders often do not emerge from the bottom up but are imposed on a group by people higher up the hierarchy. Top down selection may produce leaders with other types of qualities and therefore we sometimes find examples of leaders and managers who are the anti-thesis of good leadership (Hogan & Kaiser, 2005). Indeed hiring decisions for executive leaders are more likely to be successful if subordinates of the position are given an active role in the hiring process (Sessa, Kaiser, Taylor, & Campbell, 1998). Herein lies an important lesson for leadership practice.

Leadership is Prestige-based

In hunter-gatherer societies who gets to lead is determined by one's ability to help the group move towards specific goals. For instance, the best hunter exercises more influence on hunting decisions and the best warrior on warfare decisions. Positions of power and influence are often attained through leading-by-example, putting the concept of leadership firmly within the domain of prestige (Henrich & Gil-White, 2001). This prestige theory suggests that leaders are innovators who allow other individuals—followers--to learn from them and in return they earn prestige, which is paid out in greater reproductive opportunities.

The prestige dimension of leadership is echoed in modern life with effects that are sometimes beneficial, sometimes detrimental. In the world of business, politics and warfare individuals who have shown great expertise within that domain are more likely to be endorsed as leaders. Low task ability often automatically disqualifies people from certain leadership positions (Palmer, 1962). In modern complex environments the emphasis on task skills may backfire, however, because leadership roles are arguably more varied and complex, involving such diverse activities as coaching, communicating, motivating, problem solving, planning, decision-making,

figurehead, and so forth. Thus there is the potential for a mismatch when an individual has gained status by demonstrating skill in one domain but upon promotion to a leadership position must be skilled in a number of other, possibly unrelated domains (cf. Berger's expectation-states theory, 1977).

Good examples of prestige-based leadership can be found in sports and politics. In team sports like football (soccer) the best players earn a lot of prestige, giving them an edge in the competition for management jobs when they retire from active play. Yet there is little or no evidence to suggest that good players actually make good managers. Quite the contrary, some of the best managers in English football--Ferguson at Manchester United, Wenger at Arsenal, Eriksson at Manchester City--were mediocre football players themselves and began their management career at an early age. Similarly in ancestral warfare good warriors often made good commanders by leading from the front in battles and raids. Today, however, good soldiers often falter once elevated to the entangling webs of Washington politics.

Leadership in Intergroup Relations

In traditional societies an important function of leadership is to manage relationships with neighboring groups. Forming alliances with other bands and clans is essential for exchanging resources and defending territories against mutual enemies. Raiding and warfare were indeed common threats in ancestral environments, leading to the extinction of many bands and societies (Keeley, 1996; Van Vugt, De Cremer, & Janssen, 2007). In traditional societies that frequently experience intergroup conflict (e.g., Yanomamö in the Amazon Basin) there is evidence of a more authoritarian leadership structure with Big Men roles often being occupied by fierce warriors (Chagnon, 1997). Intergroup conflict requires a highly coordinated

group and some degree of coercion might be necessary to maintain group unity paving the way for a more aggressive leader (Van Vugt, 2007).

The tribal function of ancestral leadership still plays a role in modern society with sometimes devastating consequences because the scale of warfare has grown dramatically. There is good evidence for changing leadership perceptions during intergroup conflict (Hogg, 2001). During intergroup threats groups prefer ingroup over outgroup leaders even when it is clear to all that the latter are more competent (De Cremer & Van Vugt, 2002). Leaders have been known to strengthen their power base by starting a conflict with another group (Rabbie & Bekkers, 1978). Intergroup threats increase the support for prototypical leaders who share the norms and values of the ingroup (Hogg, 2001). And when reminded of their mortality people are more likely to endorse a charismatic leader (Cohen et al., 2004). In analyzing the US-presidential elections McCann (1992) discovered that at times of crises Americans voters were more supportive of a hawkish president. Finally, the well-known rally phenomenon describes how leader's approval ratings can spike dramatically when a nation is under attack, as with FDR after Pearl harbour and George W. Bush after 9/11 (Johnson & Tierney, 2006).

Although it could have been adaptive in small scale ancestral societies to endorse a more aggressive leader at times of war, this might not be the case anymore because the costs of modern warfare are so much greater—even for the winning side. Hawkish leaders can increase the probability of war without increasing the probability of reaping any benefits. Also remember that ancestral leadership was essentially situational and once the threat had gone this person lost their influence. However in modern environments leadership positions are often formalized and once the threat is gone, societies may be stuck with these leaders for a long time. Many figures from

Stalin to Musharraf in Pakistan offer examples of military leaders who refused to shed their power once attained.

Separating the Person from the Role of Leader

Another example of a potential mismatch is that modern humans may have difficulties in separating the role of the leader from the person occupying the role. Extrapolating from the hunter-gatherer evidence, there were no formally recognized leadership roles in ancestral times and there was little distinction between people's private and public life. In fact, people's personality and their personal norms, values, and ambitions were critical in determining whether they should get the chance to lead the group because this was the only information available. In modern society we may be consciously aware that, for instance, middle-level managers have only limited influence since they are simply following orders of their senior management. Because our psychological machinery is not very well adapted to these complex multi-layered group hierarchies, we nevertheless tend to make trait inferences whenever we see leaders or managers act in certain ways. This distortion is akin to the fundamental attribution error (Tetlock, 1985), which might be another product of our ancestral past in which group environments were arguably less complex. Clearly such attribution errors can undermine group objectives when leaders are held responsible for successes or failures that were beyond their control (cf. Hackman & Wageman, 2007).

Odd Correlates of Leadership

The mismatch hypothesis might also explain why leadership correlates consistently with seemingly irrelevant factors like age, height, weight, and health. Traditional leadership theories have some difficulty explaining these correlations and tend to see them as spurious (Bass, 1990). An evolutionary perspective might provide answers. In ancestral environments making a bad leader choice was potentially so

costly that any significant beneficial personal trait would be taken into consideration in following a particular individual. The possession of some piece of specialized knowledge would have been extremely useful, like knowing about a long-forgotten waterhole in case of a drought (Boehm, 1999). This knowledge was more likely to be held by older, more experienced individuals, and age should therefore correlate positively with prestige and leadership.² In modern society, the relation between age and leadership is still observed in professions that require a considerable amount of specialized knowledge like science, technology and arts (Bass, 1990). For leadership activities requiring physical strength and stamina, like a group hunt or warfare our ancestors would presumably pay attention to indices of physical fitness, and someone's height, weight, energy, and health might have been important markers.

However this might cause a potential mismatch in modern leadership environments. Although the physical aspects of modern-day leadership may seem relatively less important to the task at hand, it still matters a great deal in terms of the *perception* of leadership. For instance, physically fitter and taller men have an edge in leadership elections although there is little evidence that these traits are beneficial for the kind of jobs they are supposed to do (Ilies, Gerhardt, & Le, 2004; Judge & Cable, 2004). The health status of leadership candidates also plays an important role in their election – for example, for US presidential office – and that is perhaps why negative health information is very likely to be suppressed (cf. Simonton, 1994).

Gender and Leadership

Our ancestral leadership psychology might also explain why male leadership is still the norm in modern societies, for two reasons. In hunter-gatherer societies, leadership often includes a physical component, for example, leading group hunts,

² Group movement in nomadic species like baboon and elephant is indeed often decided by the older troop members.

organizing raids, and breaking up group fights. In light of the obvious physical differences between men and women, the chances for men to emerge as leaders in these situations would have been considerably higher. In addition, the different reproductive interests of men and women would favour male leadership emergence. In ancestral environments men's social status was probably a good predictor of their reproductive success. Evidence from band societies, like the Yanomamö, indicates a link between male social status and number of wives and offspring (Chagnon, 1997). One way to enhance social status is to earn prestige in a valued domain, for example, through taking on a leadership role.

The evolved differences in status sensitivity between men and women might contribute to an even greater male bias in leadership emergence in modern environments. In modern societies the pay-offs for leaders are often so much higher than for followers that men will go to extreme lengths to attain such positions (e.g., in modern American corporations average salaries for CEOs are almost 200 times the average pay for workers).

It remains to be seen how adaptive this male leadership bias is in the modern world which emphasizes interpersonal skills and network building as primary leadership functions (Eagly & Carli, 2003). There is some evidence that females have better empathy and communication skills (Van Vugt, 2006) and are more likely to adopt a democratic leadership style (Eagly & Johnson, 1990). However, the male leadership bias may be difficult to overcome if one assumes that it is part of an evolved leadership psychology. Research indicates that when women and men work together on group tasks men are quicker to assume leadership--even if the women are better qualified for the job (Mezulis, Abramson, Hyde, & Hankin, 2004). Regardless of talent, men are also more likely to assume leadership roles when being observed by

women perhaps because women prefer status in potential mates (Campbell, Simpson, Stewart, & Manning, 2002). Finally, women are sometimes penalized for excelling at stereotypically masculine tasks and leadership might be an example (Eagly & Karau, 2002; Heilmann, 2001).

Importance of Charisma

A final example of a potential mismatch is the role of charisma in modern leadership. Research on traditional societies suggests that Big Men are often extremely charismatic (Johnson & Earle, 2000; Nicholson, 2005). Being intimate, inspiring, persuasive, and visionary would have been important attributes of aspiring leaders in small face-to-face groups. In large modern organizations it is extremely hard to achieve the same levels of intimacy between leaders and followers. Yet even in large bureaucratic organizations we still demand from our leaders that they adopt a personalized style of leadership (Burns, 1978; Bass, 1985). The media obviously plays a large role in reducing the distance between leaders and followers in modern society. Yet this creates opportunities for charismatic leaders to exploit followers' susceptibility to their influence to sometimes devastating effects (e.g., Hitler).

Final Conclusions

Our main argument is that modern leadership is influenced by key aspects of our evolved leadership psychology, which has been shaped by several millions of years of human evolution. Because society today is much larger and socially more complex there is the potential for a mismatch between our innate leadership psychology that was shaped in small scale societies and modern day leadership requirements. However much we may employ our intellect, our cognition remains constrained by ancestral adaptations for conducting, perceiving, and responding to

leadership and followership. We reviewed several lines of leadership research that offer support for the ancestral leadership hypothesis.

A broader aim of this chapter is to start a constructive dialogue between social psychologists and other behavioural scientists studying leadership who have hardly influenced each other. Evolutionists theorize about the origins of leadership based on the principle of natural selection but they have not collected much data to support their claims. In contrast, social psychology has gathered a wealth of reliable empirical nuggets about leadership but this has not produced many overarching conceptual frameworks that can make sense of the richness of data (Van Vugt, 2006). In our view, evolutionary theory provides an excellent integrative framework that can explain the diversity of empirical findings and generate many novel testable hypotheses about leadership. Any proximate psychological theory of leadership must ultimately turn to evolutionary theory to explain its own assumptions (e.g., why people have selfish or tribal motives, where leader prototypes come from?)

A more specific contribution of our work is to show that our evolved leadership psychology is still influencing modern leadership today. We have identified several areas where there is some evidence for a *mismatch* between ancestral and modern leadership requirements such as in the influence of charisma, and the relation between leadership emergence with age, height, and gender. We are not in support of the idea that leadership and followership adaptations are somehow set in stone. Evolution has afforded humans a great deal of flexibility to adapt successfully to novel environments – such as through culture, social learning and general intelligence -- and this is why humans can function in environments that seem so radically different from our Pleistocene past. This should be reflected in the

diversity of leadership and followership styles that emerge in response to local environmental and cultural factors (Van Vugt, Hogan, & Kaiser, in press).

More research on the evolution of leadership is obviously needed. It would be interesting to see, for example, if leadership systematically varies with the ancestral group problems that we have identified (e.g., group movements, group cohesion, and intergroup relations). We suspect that leadership and followership should emerge more quickly in these evolutionarily-relevant situations. Also, we believe that perceptions of leadership should vary with the nature of these threats. For instance, a preliminary experimental study by one of us revealed that the presence of an inter-group conflict automatically activates a male leadership prototype but that an intra-group conflict activates a female leadership prototype (Van Vugt, 2007).

From an applied perspective we believe that organizations fare better if they take account of our evolved leadership psychology and find ways to either work *with* or *around* its limitations. For instance, the knowledge that men are more likely to compete for leadership positions when the status benefits are high suggests that a reduction in the rewards might favour more women to assume leadership roles. Finally, some modern organizations, like GoreTex, Virgin, and ABB, are already discovering the utility of an evolutionary approach by mimicking aspects of traditional band leadership. They delegate substantial responsibility to managers far down the chain of command so that the actual unit size that is being managed does not exceed that of a hunter-gatherer band of around 150 people maximum.

References

- Bass, B. M. (1990). *Bass and Stogdill's Handbook of leadership: Theory, research, and managerial applications* (3rd edition). New York: Free Press.
- Berger, J. (1977). *Status characteristics and social interaction: An expectation-states approach*. NY: Elsevier.
- Boehm, C. (1999). *Hierarchy in the Forest*. London: Harvard University Press.
- Burnham, T. C., & Johnson, D. D. P. (2005). The biological and evolutionary logic of cooperation. *Analyse & Kritik*, 27, 113-135.
- Burns, J. M. (1978). *Leadership*. New York: Harper & Row.
- Buss, D. M. (2005). *Handbook of evolutionary psychology*. Hoboken, NJ: Wiley.
- Campbell, L., Simpson, J., Stewart, M., & Manning, J. (2002). The formation of status hierarchies in leaderless groups. *Human Nature*, 13, 345-362.
- Chagnon, N. A. (1997). *Yanomamö*. London: Wadsworth.
- Cohen, F., Solomon, S., Maxfield, M., Pyszczynski, T., & Greenberg, J. (2004). Fatal attraction: The effects of mortality salience on evaluations of charismatic, task-oriented, and relationship-oriented leaders. *Psychological Science*, 15, 846-851
- De Cremer, D., & Van Vugt, M. (2002). Intra- and intergroup dynamics of leadership in social dilemmas: A relational model of cooperation. *Journal of Experimental Social Psychology*, 38, 126-136.
- De Waal, F. B. M. (1996). *Good natured: The origins of right and wrong in humans and other animals*. Cambridge: Cambridge University Press.
- Den Hartog, D. N., House, R. J., Hanges, P. J., Ruiz-Quintanilla, S.A., & Dorfman,

- P. W. (1999). Culture-specific and cross-culturally generalizable implicit leadership theories: A longitudinal investigation. *Leadership Quarterly*, *10*, 219-256.
- Diamond, J. (1997). *Guns, germs and steel*. London: Vintage.
- Dunbar, R. I. M. (2004). *Grooming, gossip, and the evolution of language*. London: Faber & Faber.
- Eagly, A. H., & Carli, L. L. (2003). The female leadership advantage: An evaluation of the evidence. *Leadership Quarterly*, *14*, 807-834.
- Eagly, A. e., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin*, *108*, 233-256.
- Eagly A. H. & Karau S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, *109*, 573–598.
- Epitropaki, O., & Martin, R. (2004). Implicit leadership theories in applied settings: Factor structure, generalizability and stability over time. *Journal of Applied Psychology*, *89*, 293-310.
- Foley, R. A. (1997). The adaptive legacy of human evolution: A search for the environment of evolutionary adaptedness. *Evolutionary Anthropology*, *4*, 194-203.
- Hackman, J. R., & Wageman, R. (2007). Asking the right questions about leadership. *American Psychologist*, *62*, 43-47.
- Hagen, E., & Hammerstein, P. (2006). Game theory and human evolution: A critique of some recent interpretations of experimental games. *Theoretical Population Biology*, *69*, 339-348.
- Heilman M. E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of Social Issues*, *57*, 657–

674.

- Henrich, J. & Gil-White, F. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, 22, 165-196.
- Hogan, R., Curphy, G. J., & Hogan J. (1994). What we know about leadership. *American Psychologist*, 49, 493-504.
- Hogan, R., & Kaiser, R. (2005). What we know about leadership. *Review of General Psychology*, 9, 169-180.
- Hogg, M.A. (2001). A social identity theory of leadership. *Personality and Social Psychology Review*, 5, 184-200.
- Ilies, R., Gerhardt, M., & Le, H. (2004). Individual differences in leadership emergence: Integrating meta-analytic findings and behavioral genetics estimates. *International Journal of Selection and Assessment*, 12, 207-219.
- Johnson, A. W., & Earle, T. (2000). *The evolution of human societies*. Stanford, Ca: Stanford University Press.
- Johnson, D. D. P., & Tierney, D. R. (2006). *Failing to win: Perceptions of victory and defeat in international politics*. Cambridge: Harvard University Press.
- Judge, T. A., & Cable, D. M. (2004) The effect of physical height on workplace success and income: Preliminary test of a theoretical model. *Journal of Applied Psychology*, 89, 428-441.
- Keeley, L. H. (1996). *Warfare before civilization: The myth of the peaceful savage*. Oxford University Press: Oxford.
- Lord, R. G. & Maher, K. J. (1993). *Leadership and information processing: Linking*

- perceptions and performance*. Boston: Unwin Hyman.
- McCann, S. J. H. (1992). Alternative formulas to predict the greatness of U. S. presidents: Personological, situational, and Zeitgeist factors. *Journal of Personality and Social Psychology*, 62, 469-479.
- Nicholson, N. (2005). Meeting the Maasai: Messages for management. *Journal of Management Inquiry*, 14, 255-267.
- Ohman, A., & Mineka, S. (2001). Fear, phobias, and preparedness: Towards an evolved module of fear and fear learning. *Psychological Review*, 108, 483-522.
- Park, J., Schaller, M. & Van Vugt, M. (in press). A heuristic kinship model. *Review of General Psychology*.
- Pinker, S. (2002). *The blank slate*. London: Penguin Classics.
- Rabbie, J. M. & Bekkers, F. (1978). Threatened leadership induces intergroup competition. *European Journal of Social Psychology*, 8, 9-20.
- Richerson, P. J., & Boyd, R. (2006). *Not by genes alone: How culture transformed human evolution*. Chicago: Chicago University Press.
- Sahlins, M. (1963). Poor man, rich man, big man, chief: Political types in Melanesia and Polynesia. *Comparative studies in Society and History*, 5, 285-303.
- Sessa, V.I., Kaiser, R.B., Taylor, J.K., & Campbell, R.J. (1998). *Executive selection*. Greensboro, NC: Center for Creative Leadership.
- Schaller, M., Simpson, J., & Kenrick, D (2006). *Evolution and social psychology*. London: Psychology Press.
- Simonton, D. K. (1994). *Who makes history and why?* New York: Guilford Press
- Tetlock, P. E (1985). Accountability: A social check on the fundamental attribution error. *Social Psychology Quarterly*, 48, 227-236..

- Van Vugt, M. (2006). Evolutionary origins of leadership and followership. *Personality and Social Psychology Review, 10*, 354-371.
- Van Vugt, M. (2007). *Gender biases in leadership: Testing an evolutionary hypothesis*. Unpublished manuscript: University of Kent.
- Van Vugt, M., De Cremer, D., & Janssen, D. (2007). Gender differences in cooperation and competition: The male warrior hypothesis. *Psychological Science, 18*, 19-23.
- Van Vugt, M., Hogan, R. & Kaiser, R. (in press). Evolution, leadership and followership: Some lessons from the past. *American Psychologist*.
- Van Vugt, M. & Schaller, M. (in press). Evolutionary approaches to group dynamics. *Group Dynamics*.

Biographical Information

Mark Van Vugt is professor of social psychology at the University of Kent, UK. He studies leadership from an evolutionary perspective. He is the chief editor of the book "Cooperation in society: Promoting the welfare of communities, states, and organisations" with M. Snyder, T. Tyler, & A. Biel (Routledge, 2000), and author of the textbook "Applying social psychology: From problems to solutions" with B. Buunk (SAGE, 2007). His work on leadership has appeared in the major journals in psychology, including the American Psychologist and Journal of Personality and Social Psychology as well as in the news. He sits on the editorial boards of various journals in social psychology and is chair of the evolution and social sciences group at Kent.

Dominic Johnson is a lecturer in international relations at the University of Edinburgh, UK. He has a D.Phil. in biology from Oxford University, and a Ph.D. in political science from Geneva University. Drawing on both disciplines, his research centres on the role of evolutionary psychology on decision-making, cooperation and conflict behavior. He has two books with Harvard University Press: "Overconfidence and War: The Havoc and Glory of Positive Illusions" (2004) and, with D. Tierney, "Failing to Win: Perceptions of Victory and Defeat in International Politics" (2006).

Rob Kaiser is a partner with Kaplan DeVries Inc. and was previously at the Center for Creative Leadership. He has over 90 publications and presentations on leadership. His work with Bob Kaplan on leadership versatility won runner-up for article of the year

in MIT's Sloan Management Review in 2004; they also received a U.S. patent for their innovative approach to assessing leadership. Rob also has a leadership consulting practice. He provides unique research-based services, which includes developing custom leadership models and assessment tools for organizations like Motorola, ConAgra, Unilever, and ConAgra Foods.

Rick O’Gorman is a lecturer in psychology at Sheffield Hallam University, UK. His research topics include leadership, cooperation, prosociality, morality and evolutionary models of altruism. He has published in both social and evolutionary journals including *Personality and Social Psychology Bulletin*, *Evolution and Human Behavior* and *Human Nature*, as well as providing commentary to the BBC. He has served as a reviewer for a variety of journals (*British Journal of Social Psychology*, *Group Dynamics*, *Human Nature* and *Adaptive Behavior*) and for the National Science Foundation.