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Toward a Unified Science of Hierarchy:

Dominance and Prestige are Two Fundamental Pathways to Human Social Rank

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Abstract

The pursuit of social status is a recurrent and pervasive challenge faced by individuals in all human societies. Yet, the precise means through which individuals compete for and effectively acquire social standing remains unclear. Despite a large literature examining the factors that lead to rank differentiation, this body of work currently lacks a unifying framework. The current chapter addresses this gap by proposing the adoption of the Dominance-Prestige Account, an evolutionary framework which suggests that there are two distinct pathways to rank attainment in human societies: dominance, or the use of force and intimidation to induce fear, and prestige, or the sharing of expertise or know-how to gain respect. Here, we show how this account provides a parsimonious explanation for the large body of previously disconnected findings that have emerged on rank attainment, and demonstrate that it has the additional benefit of explaining *why* various behaviors, traits, and attributes effectively promote rank, rather simply describing which of these factors promote rank. In light of its parsimony and explanatory power, we advocate the Dominance-Prestige Account as an empirically grounded framework for organizing, understanding, and generating research on human social rank dynamics.

Keywords: hierarchy, dominance, prestige, social status, respect, fear

Although affiliative and cooperative interactions form the primary fabric of human social relationships, group living necessarily entails conflict over divergent goals and competition over scarce resources. The formation of social hierarchies, an organizational structure observed across many species in the animal kingdom and ubiquitous to human groups, presents a solution to these conflicts. Although the bases on which humans form hierarchies and allocate rank are diverse, hierarchies are fundamentally social structures in which high-ranking individuals reliably receive greater influence, deference, attention, and valued resources than low-ranking others (Homans, 1950; 1961; Magee & Galinsky, 2008; Mazur, 1973; 1985; Strodtbeck, 1951; Zitek & Tiedens, 2012). By affording high-ranking individuals privileged influence and access to valued resources such as mates and food, mutually accepted hierarchical relationships minimize costly agonistic conflicts, establish order, and facilitate coordination and cooperation among individuals in groups (Báles, 1950; Berger et al., 1980). Indeed, a substantial body of evidence indicates that stable social hierarchies, in which subordinates defer to rather than dispute or contest their high-ranking counterparts, generally result in better group coordination and performance and more satisfying relationships (e.g., Halevy, Chou, & Galinsky, 2011; Kwaadsteniet & van Dijk, 2010; Ronay, Greenaway, Anicich, & Galinsky, 2012; Tiedens & Fragale, 2003; Tieden, Unzueta, & Young, 2007; see also Anderson and Willer, Chapter 4, this volume).

Despite the fundamental importance of social hierarchies to human relationships, however, questions remain about the processes that allow individuals to attain rank, and the factors that determine rank allocation. Although an extensive literature has documented a wide range of micro-level attributes and behaviors that influence rank attainment, these findings lack a coherent, unifying framework integrating the various data points into a comprehensive and

theoretically supported understanding of rank differentiation. To address this disparity, we have adopted a parsimonious and empirically supported evolutionary model, the Dominance-Prestige Account (Cheng, Tracy, & Henrich, 2010; Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013; Henrich & Gil-White, 2001), which we believe can unify the diverse extant findings. This account proposes that differences in hierarchical rank within human social groups are the result of both: (a) coerced deference to dominant others who induce fear by virtue of their ability to inflict physical or psychological harm (i.e., Dominance), and (b) freely conferred deference to prestigious others who possess valued skills and abilities (i.e., Prestige).

The current chapter provides a broad review of the extant research regarding rank allocation processes, by surveying findings from the major disciplines that have studied human rank dynamics empirically, including psychology, sociology, management science, and anthropology. We argue that the Dominance-Prestige Account can be fruitfully applied to organize these diverse empirical findings—including those that appear, at first glance, to be conflicting. The Dominance-Prestige Account not only allows for and predicts the diversity of results that have emerged in the prior literature, but also goes beyond many prior descriptive accounts to provide a deep theoretical *explanation* for the extant body of work.

It is important to note that, in contrast to many other chapters in this volume that focus more specifically on one particular dimension of social rank involving respect and admiration (often referred to as *status*; e.g., Anderson & Kilduff, 2009a), our focus is on the determinants of *social rank* broadly construed, a concept that reflects the degree of influence one possesses over resource allocation, conflict resolution, and group decisions (Berger et al., 1980; for further discussion of hierarchy-related conceptual terms, see Blader & Chen, Chapter 2, this volume; Cheng et al., 2013).

The present review is organized into three sections. First, we discuss the key tenets of the Dominance-Prestige account, outlining the selection pressures theorized to favor the evolution of these two distinct forms of social rank inequalities in humans, and the psychological processes that underpin them. Second, we discuss findings from our own recent work that directly support this account, by demonstrating (a) the co-existing effectiveness of Dominance and Prestige in promoting social rank, and (b) the distinction between Dominance and Prestige as separate rank-attainment processes, wherein each is underpinned by a distinct suite of personality profiles, emotional mechanisms, behavioral patterns, cognitions, neuroendocrine profiles, and fitness outcomes. Third, we summarize a number of predictions that the Dominance-Prestige Account entails regarding the relevance of a wide range of narrow, lower-order traits and attributes to rank attainment, and examine the fit of these predictions to the prior empirical literature. Taken together, this substantial body of research converges to suggest that intimidation and respect co-exist as two fundamental yet distinct bases of rank differentiation in human societies.

The Dominance-Prestige Account of Social Rank Differentiation

The Dominance-Prestige Account (Henrich & Gil-White, 2001) holds that social hierarchies are multidimensional, arising from two systems of rank allocation. In contrast to prior accounts of hierarchy differentiation (e.g., Anderson & Kilduff, 2009a; Berger, Cohen, & Zelditch, 1972; Lee & Ofshe, 1981; Magee & Galinsky, 2008; Mazur, 1973), the Dominance-Prestige Account argues explicitly, on the basis of evolutionary logic, that *both* avenues persist in contemporary human groups, and produce patterns of behaviors and tactics that effectively promote influence over others, even when wielded within the same social group.

First, *Dominance* entails the induction of fear, through intimidation and coercion, to attain or maintain rank and influence, and is thought to be homologous with dominance

hierarchical systems in non-human primates that result from agonistic contests (Chase, Tovey, Spangler-Martin, & Manfredonia, 2002; Rowell, 1974). In humans, Dominance can be observed in dyadic social relationships based on coercion, such as those between police and citizen, bully and victim, or boss and employee, as well as in larger social structures. Dominant individuals effectively instill fear in subordinates, typically through threats that are more psychological than physical. For example, those with formal institutional power, such as employers, can evoke fear in subordinates by threatening to provide or withhold resources. Subordinates respond by complying with the demands of Dominant individuals to safeguard their well-being and resources. Consequently, Dominance begets substantial social influence, rooted in coercive compliance. It is theorized that Dominance arose in evolutionary history in response to agonistic conflicts over material resources (e.g., food, mates), which were common among non-human species, but also persist in contemporary human societies in the form of psychological conflicts. By regulating patterns of domination-deference, Dominance hierarchies facilitate coordination and minimize the frequency of agonistic encounters and associated costs, and, as a result, enhance the fitness of all parties involved. It is noteworthy that numerous others have previously argued for the importance of Dominance-related processes in hierarchy formation, typically pointing to the prevalence of agonistic contests in human social life, as well as the tendency for competitive outcomes to govern patterns of domination and subordination in virtually all animals species (e.g., Chagnon, 1983; Mazur, 1973; 1985; Lee & Ofshe, 1981; Mazur & Booth, 1998). In contrast to prior models, however, the present account proposes that coercion and intimidation are *not* the only means to human social rank attainment; rather, a secondary pathway, termed Prestige, is thought to co-exist and operate concurrently.

Prestige refers to influence that is willingly granted to individuals who are recognized and respected for their skills, success, or knowledge. Subordinates seek out the opinions and company of Prestigious individuals in efforts to imitate and learn their superior skills or knowledge. As a result, the Prestigious are conferred with influence and rank, which in their cases rests on freely conferred deference and genuine persuasion, rather than forced compliance. Prestige-based rank is thought to be unique to humans, because it relies on cultural learning, which is considered to be less developed in other animals (Boyd & Richerson, 1985; Laland & Galef, 2009). Learning from the most skilled group members is a low-cost way of acquiring fitness-maximizing knowledge, so the emergence of cultural learning in early human evolutionary history likely generated selection pressures to preferentially identify, attend to, and copy knowledge from highly skilled or successful others. These selection pressures would favor a psychological machinery capable of differentiating and ranking individuals along the dimension of skill (and, thus, Prestige), such that the highest quality cultural models with the greatest expertise are elevated to the top of the hierarchy.

The assumption that earned respect represents a fundamental path to rank attainment in humans is consistent with the predominant view of rank attainment within social psychology, which assumes that hierarchical differences result from groups members' rational and freely chosen decisions to confer rank upon those individuals who possess and offer the greatest skills and ability to contribute to the group (e.g., Anderson & Kilduff, 2009a; Berger et al., 1972; Blau, 1964; Thibaut & Kelley, 1959; Ridgeway & Diekema, 1989). In contrast to the Dominance-Prestige Account, however, this perspective holds that social influence is acquired only via this merit-based route, and cannot be acquired via force or coercion (e.g., Anderson & Kilduff, 2009a; Barkow, 1975; Ridgeway, 1987; Ridgeway & Diekema, 1989).

The distinction between Dominance and Prestige parallels Krackle's (1978) delineation of two kinds of leadership in simpler societies: "forceful" leaders, or domineering headmen who maintain their position and power through the induction of fear, threat, and compulsion, versus "persuasive" leaders, who lack formal authority but nevertheless exercise substantial influence that is dependent on the consent of their followers. Similar contrasts have also been observed by scholars distinguishing between "agonic" vs. "hedonic" behavior (Chance & Jolly, 1970) and "resource-holding potential" vs. "social attention holding power" (e.g., Gilbert, Price, & Allan, 1995).

However, unlike these prior descriptive taxonomies, the Dominance-Prestige Account was theoretically derived, and provides an evolutionarily based explanation of *why* these widely observed patterns occur. The strong theoretical basis of this account allows for the formulation of precise yet broad predictions regarding the suites of traits, emotions, cognitions, and behaviors expected to propel and underpin these two avenues to rank. Furthermore, this account is unique in that it incorporates both our species' shared heritage with other primates who resolve conflicts through domination-subordination coordination, and our unique human nature as cultural beings who depend heavily on cultural learning (Henrich & Gil-White, 2001). The account's breadth also gives it the potential to unify prior theoretical efforts and to integrate the somewhat scattered extant literature on power, status, and leadership into a coherent account, by parsing these prior results into Dominance- or Prestige-based processes.

Evidence Supporting the Dominance-Prestige Account

The account outlined above generates two key predictions about social rank dynamics. First, Dominance and Prestige should concurrently promote social rank in groups. Second, because these two strategies are the products of distinct selection pressures, they should be

associated with distinct underlying psychological processes and patterns of behavior. Here, we review findings from recent studies that directly tested these two predictions.

Dominance and Prestige Both Promote Social Rank

We recently tested the central theoretical prediction of the Dominance-Prestige Account—that both these pathways effectively promote social rank—by examining the impact of these broad-level status-attainment strategies on rank attainment in small groups (Cheng et al., 2013). In the first of two studies, we assigned participants to small same-sex groups. These individuals independently completed a survival exercise (Bottger, 1984), which involved rank-ordering 15 items (e.g., oxygen tanks, heating unit) in order of their utility for surviving a disaster. They next worked collectively as a group for 20 minutes on the same task. Upon completing the group task, participants privately rated each other (in a round-robin design) on perceived social influence, Dominance, and Prestige; peer-rated Dominance and Prestige were assessed via previously validated scales, which capture the extent to which group members experience fear and admiration, respectively, toward each other group member (see Cheng et al., 2010). We also obtained a behavioral measure of influence by computing the degree of similarity between each participant's *private* response on the survival task and the *group's* final response, under the assumption that influential members would more effectively sway the group toward adopting their opinions. Finally, upon the completion of all sessions, outside observers watched video-recordings of the group interactions and rated all participants on the same dimensions as the in-lab peers. In a second study, naïve observers watched these same video recordings while their gaze was monitored with an eye-tracking device, and subsequently rated each group member on Dominance and Prestige. Together, this approach generated four separate indices of social rank: (a) group member-ratings of social influence; (b) outside observer-ratings of social

influence; (c) decision-making impact; and (d) visual attention received—which has been described as "the best framework for analyzing social rank as it takes into account all leadership styles" (Hold, 1976, p. 179).

Results provided convergent support for the two proposed pathways to social rank: Individuals who adopted either a Dominance or Prestige strategy attained higher social rank. Specifically, not only were these individuals seen as more influential by both group members and outside observers, but they in fact exerted greater behavioral influence, as indexed by the measures of decision-making impact and attention. Furthermore, two other sets of findings provided evidence for the independence of these two rank-attainment pathways and their divergent psychological underpinnings. First, Dominance and Prestige were statistically independent, and the rank-promoting effect of each emerged even when controlling for shared variance with the other—suggesting that dominant individuals' ability to gain influence cannot be attributed to a tendency among group members to (incorrectly) perceive them as more competent or admirable (and by implication, Prestigious; cf., Anderson & Kilduff, 2009b).

Second, findings from a more recent study from our lab provide direct evidence that—in contrast to Prestigious individuals, whose influence is predicated upon perceived competence and value—Dominant individuals' elevated rank results from others' fear and *not* from a perception that they are contributing value to the group (Cheng, Tracy, & Henrich, 2013a). Although Dominants tended to forcefully dominate group discussions by speaking longer and occupying the floor to a greater extent than Prestigious individuals in small task groups (Cheng et al., 2013), in a recent study examining similar group interactions, we found that group members' perceptions of each other's contribution was much more strongly associated with Prestige ($r = .70$; $p < .001$) than with Dominance ($r = .29$; $p < .001$; $Z = -6.102$, $p < .001$).

Moreover, replicating our previous finding, both Dominance and Prestige predicted greater group-member-rated influence (*r*s = .48 and .52; *p*s < .001). However, when perceived contribution was statistically controlled (using partial correlations), only the relation between Dominance and influence remained strong and significant ($r_{=}$ .41), and did not show a significant reduction in its magnitude (Z = .97, p = .33); the association between Prestige and influence after controlling for contribution (r = .10, p = .13), on the other hand, was substantially reduced (Z = 5.27, p < .0001). Furthermore, consistent with our account, when fear experienced toward each individual ("I am afraid of him/her") was controlled for, the relation between Dominance and influence was not only significantly reduced in magnitude, but also no longer different from zero (r = .09, p = .16; Z = 3.73, p < .001). In contrast, accounting for fear did not significantly alter the relation between Prestige and influence (r = .56, p < .001; Z = -.66, p = .51). These results indicate that while the apparent value and contribution provided by Prestigious individuals are vital to, and account almost entirely for, their rank attainment, these attributes do not explain the social influence of Dominant individuals, who gain and maintain rank *not* by contributing value to the group, but by inducing fear.

More broadly, these findings offer first evidence supporting the claim that Dominance leads to increased social rank, a contentious notion that has been the topic of considerable theoretical debate (see Anderson & Kilduff, 2009a; Carli, LaFleur, & Loeber, 1995; Lee & Ofshe, 1981; Ridgeway & Diekema, 1989). Over two decades ago, in a series of methodologically similar studies (e.g., Carli et al., 1995; Copeland, Driskell, & Salas, 1995; Driskell, Olmstead, & Salas, 1993; Ridgeway, 1987; Ridgeway & Diekema, 1989), the opinions advocated by confederates who displayed domineering behaviors—such as dismissive and contemptuous speech, or a looming posture and angry tone—were consistently found to be no

more readily adopted than those of confederates who appeared more neutral or submissive. Although these results have been interpreted to demonstrate the futility of Dominance for ascending social hierarchies, two important aspects of the study design raise concerns about this inference.

First, these studies (inadvertently) examined the consequences of *failed* attempts at invoking fear. Despite their display of aggressive and threatening behaviors, confederates either posed no real threat to participants because they were present only via video-recording (e.g., Carli et al., 1995; Copeland et al., 1995; Driskell et al., 1993; Ridgeway, 1987), or were actively resisted and challenged with reciprocal aggressive acts (e.g., Copeland et al., 1995; Ridgeway & Diekema, 1989), indicating the absence of fear and thus an ineffective adoption of the Dominance strategy (Chase et al., 2002).

Second, all of these studies (e.g., Carli et al., 1995; Driskell et al., 1993; Ridgeway,1987; Ridgeway & Diekema, 1989) assessed persuasion—a unique component of influence that entails private, internalized shifts in behaviors, ideas, values, or opinions (Wood, 2000)—but not other forms of deference or influence. Importantly, our theory predicts *a priori* that, unlike Prestigious individuals whose influence is based on genuine persuasion and imitation, the influence of Dominant individuals is motivated by subordinate appeasement, and is thus a matter of compliance rather than actual persuasion (i.e., subordinates submit to the wishes of Dominants because they fear the consequences of non-submission, not because they come to genuinely adopt the Dominants' opinions; see Henrich & Gil-White, 2001, p. 186). In our studies, which were designed to circumvent these limitations, we examined generalized influence more broadly (incorporating both compliance and persuasion), and found that it is substantially determined by

the effective pursuit of Dominance (operationalized as group members' subjective reports of experienced fear, intimidation, and related perceptions).

As a final point on this matter, although research on organizational effectiveness has found that "pressure" tactics—which involve the use of demands, threat, and intimidation to influence others (and thus are akin to Dominance)—generally result in less successful and productive leadership, these findings address the effects of Dominance-based leadership on performance and other work outcomes, and should not be taken as direct evidence against or for the question of whether Dominance promotes social rank. The Dominance account holds that force and intimidation leads to submission and the conferral of influence and rank, but inherently makes no strong predictions about the quality of the behavior enacted out of coercion. It can be speculated, however, that because subordinates of Dominant leaders comply with their requests out of fear and harm avoidance, rather than genuine commitment, their influence will be met with resistance and the task behavior enacted by subordinates will generally be of poorer quality and performance. Consistent with this, a growing body of evidence appears to suggest that not only is Dominance-based leadership seen as an ineffective approach and frequently resisted by subordinates (e.g., Falbe & Yukl, 1992; Kipnis & Schmidt, 1988; Yukl & Tracey, 1992), but it can also bear counterproductive effects on workplace performance and subordinate commitment (e.g., Falbe & Yukl, 1992; Higgins, Judge, & Ferris, 2003; Yukl, Kim, & Falbe, 1996). Nevertheless, these findings address a distinct question, and do *not* directly indicate the basic efficacy of Dominance for acquiring rank and influence.

Dominance and Prestige are Distinct

If Dominance and Prestige indeed form the dual core foundations of human social hierarchies, they should not only concurrently promote social rank, but should also represent

distinct pathways to high rank. The theoretical distinction between the two pathways—Dominance predicated upon fear and intimidation, and Prestige upon obtaining respect and admiration—leads to the prediction that the two avenues should be underpinned by distinct psychological and behavioral patterns, which would allow their adopters to effectively intimidate (in the case of Dominance), or garner respect and admiration (in the case of Prestige). This prediction has received support from several recent lines of research, which have directly assessed and contrasted Dominance and Prestige by examining their associated behavioral patterns and fitness-related outcomes.

Distinct personality and emotional profiles. First, the pursuit of Dominance and Prestige are associated with different suites of interpersonal behaviors, personality traits, competencies, and emotional mechanisms. Consistent with evolutionary reasoning about the freely conferred versus coercive nature of their acquired rank, Prestigious individuals are perceived by group members as highly likeable, whereas Dominant individuals are not particularly well liked (Cheng et al., 2013). Furthermore, the two pathways diverge in their associated interpersonal behaviors, based on correlations with traits that comprise the interpersonal circumplex framework (i.e. agency and communion; Bakan, 1966; Wiggins, 1979). Whereas Prestigious individuals are perceived by peers as highly agentic *and* highly communal, Dominants are perceived as highly agentic but low in communion (Cheng et al., 2013b). These findings suggest that, as a result of their contrasting communal orientations, Dominance and Prestige represent two distinct ways of exerting agency. Further supporting this interpersonal distinction, individuals predisposed to pursue Dominance tend to rate themselves as aggressive, disagreeable, narcissistic, and manipulative, whereas those predisposed to pursue Prestige tend to rate themselves as conscientious, agreeable, and possessing high self-esteem (Buttermore, 2006;

Cheng et al., 2010). Prestigious individuals also demonstrate lower levels of basal Testosterone (Johnson, Burk, & Kirkpatrick, 2007), an androgenic hormone linked to aggression (Giammanco, Tabacchi, Giammanco, Di Majo, & La Guardia, 2005).

In addition, Prestigious individuals demonstrate locally valued competencies and skills, but this is not the case for Dominants. For example, in the context of collegiate varsity teams, peer-rated Prestige is positively related to each teammate's level of academic achievement and athletic, social, intellectual, and advice-giving abilities (Cheng et al., 2010). Likewise, in the context of a small-scale Amazonian society, perceived prestige is positively related to hunting ability, skill in food production, generosity, number of allies, and nutritional status (Reyes-Garcia et al., 2008; 2009; von Rueden, Gurven, & Kaplan, 2008). Furthermore, other prosocial traits that effectively broadcast one's expertise and social attractiveness (i.e., his/her viability as a cultural model), such as altruism, cooperativeness, helpfulness, ethicality, concern for the public good, are positively related to Prestige, but negatively to Dominance (Cheng et al., 2010; Maner & Mead, 2010; Mead & Maner, 2012).[1]

In contrast, Dominance is associated with a selfish disregard for the well-being of one's group. For example, when presented with a choice between personal benefits and collective success, Dominant leaders prioritize their own gains over those of others (Maner & Mead, 2010; Mead & Maner, 2012). Furthermore, individuals who pursue Dominance tend to be fueled by the arrogant, conceit-based "hubristic" pride (Tracy & Robins, 2007), whereas those who pursue Prestige are fueled by a more pro-social, competence-based "authentic" pride (Cheng et al., 2010).

[1] Although altruism and generosity increase perceived Prestige (Cheng et al., 2010; Willer, 2009), in times of conflict *un*conditional prosociality—altruism directed toward out-groups as well as one's own in-group—can reduce perceived Prestige, as such behaviors undermine perceptions of group commitment and loyalty (Halevy, Chou, Cohen, Livingston, 2012). However, invoking unnecessary harm upon an out-group (without benefiting in-group members) increases perceived Dominance.

Distinct behavioral patterns. Second, we have found that Dominance and Prestige are associated with distinct characteristic verbal, nonverbal, and vocal behavioral patterns. During social interactions, Dominant individuals tend to engage in an intimidating and self-entitling verbal style that evokes fear and coercion (e.g., teasing others in a dominant way, forcefully pushing one's own ideas or opinions). In contrast, Prestigious individuals demonstrate a socially attractive verbal style that entails displaying warmth and self-deprecation (e.g., teasing others in a flattering way, seeking the group's approval on matters; Cheng, Tracy, & Henrich, 2013c). Similarly, Dominant individuals tend to show spatially expansive postural displays (e.g., wide postures) in group situations, whereas Prestigious individuals display more subtle, non-threatening movements that communicate confidence and competence, such as the pride display (e.g., small smile, head tilt up, chest expansion; Tracy & Robins, 2004; Cheng, Tracy, & Henrich, 2013c). Finally, Dominant individuals tend to deepen their vocal pitch in the initial minutes of an unscripted social interaction (Cheng, Tracy, Ho, & Henrich, 2013), which likely serves to increase their perceived threat potential and formidability (Puts, Apicella, & Cárdenas, 2012). In contrast, Prestige is not associated with systematic changes in vocal pitch, consistent with the expectation that pitch deepening amplifies threat but does not influence perceived competence or respect.

Distinct fitness-related outcomes. Third, several other lines of work suggest that the pursuit of these two rank pathways may entail distinct fitness-related consequences. For example, Prestigious villagers in Tsimane', a small-scale forager-farmer society, tend to more healthy than the average group member (on the basis of current nutritional status), whereas no effect was observed for Dominance (Reyes-Garcia et al., 2009). This distinction may result from the theoretical expectation that Dominance depends on frequent assertions of intimidation and

threat which would entail greater biological costs (including increased stress) compared to Prestige—given that Prestigious individuals acquire access to resources and privileges through freely conferred deference. These biological costs might wash out the nutritional benefits that should accompany the greater flow of resources to those who effective invoke Dominance.

Interestingly, both forms of rank appear to facilitate success in mate attraction and reproduction, albeit via different mechanisms. Although women generally indicate a preference for male targets described as Prestigious over those described as Dominant, highly Dominant men (relative to less Dominant men) are deemed no less—and in some contexts (such as in a competition) even more—attractive and desirable as short-term mates (Sadalla, Kenrick, & Vershure, 1987; Snyder, Kirkpatrick, & Barrett, 2008). In addition, research among the Tsimane' found that Dominance and Prestige both predict greater reproductive success in men, though in different ways: Dominant and Prestigious men both have higher fertility (i.e., greater number of children), but Prestigious men additionally exhibit lower offspring mortality (von Rueden, Gurven, & Kaplan, 2011).

Overall, the theoretical distinction between Dominance and Prestige has been supported by a diverse range of findings, which, together, indicate that the two pathways to rank are underpinned by distinct suites of personality traits, emotional and neuroendocrine mechanisms, behavioral displays, and fitness-related outcomes.

The Dominance-Prestige Account Helps Integrate Prior Findings on Social Rank

The recognition that Dominance and Prestige form the core foundations of social rank in humans implies that these dynamics should jointly account for a vast range of previously observed rank-related phenomena. Specifically, we propose that the constellation of narrow lower-order traits and attributes that have been empirically linked to social rank can be best

understood within the Dominance/Prestige framework. In the remainder of this chapter, we review this fairly large literature, and, for each finding, briefly explain how it can be understood as a Dominance- or Prestige-related process. In doing so, we devote greater attention to evidence supporting Dominance-based rank attainment processes, given relatively greater controversy on this issue within the social psychological and management literatures (see Anderson & Kilduff, 2009a).

Dominance Promotes Social Rank

Numerous lines of research indicate that hierarchical relationships in humans are, to a large extent, shaped by interactions involving threat and intimidation. Indeed, six separate lines of work have demonstrated associations between an actual or perceived ability to inflict harm and elevated social influence. Specifically, studies have linked increased rank to each of the following Dominance-linked behaviors and attributes: (1) coercion and aggression, (2) personality dominance, (3) physical size and strength, (4) facial structure, (5) vocal pitch, and (6) spatially expansive nonverbal displays.

Coercion and aggression. According to the Dominance-Prestige Account, direct or indirect displays of physical, psychological, or verbal aggression are the primary route through which Dominant individuals attain influence. Consistent with this prediction, studies have found that acts of aggression, coercion, threats, derogation, debasement, and manipulation are frequently reported ways of "getting ahead" and influencing others (Buss, Gomes, Higgins, & Lauterbach, 1987; Howard, Blumstein, & Schwartz, 1986; Kyl-Heku & Buss, 1996). Conversely, the experimental induction of rank-attainment motives or assignment to a leadership role leads individuals to report increased aggressive intentions (Griskevicius et al., 2009). Interestingly, other studies have found that the highest level of abusive behavior is displayed by those who feel

incompetent (i.e., who lack Prestige), suggesting that aggression may provide a means of attaining influence when the Prestige pathway is inaccessible (Fast & Chen, 2009; Fast, Halevy, & Galinsky, 2012). Moreover, studies on hierarchical relationships suggest that the enactment of these aggressive behaviors are effective in promoting increased rank: Those who behave in a bullying, rude, demeaning, and anti-social manner in both experimental contexts (e.g., Van Kleef, Homan, Finkenauer, Gündemir, & Stamkou, 2011) and real-world relationships (e.g., romantic couples, fraternity members) tend to be the more highly ranked and influential members of the relationship (Keltner, Young, Heerey, Oemig, & Monarch, 1998; Kipnis, Castell, Gergen, & Mauch, 1976).

Developmental studies have also demonstrated that aggressive behaviors are effective in boosting influence in child and adolescent social groups. Preschoolers who display coercive and aggressive behaviors (e.g., taking away a toy, insulting, or physically aggressing against others) are more effective at acquiring control over a valued resource (e.g., a desired toy; Hawley, 1999; 2002; 2003). These children are also the recipients of greater eye gaze and visual attention from other children—a conceptual indicator of social rank (Abramovitch, 1976; Chance, 1967; Fiske, 1993; Hold, 1976; La Freniere & Charlesworth, 1983; Vaughn & Waters, 1981). Furthermore, consistent with our account of aggression as instrumental for acquiring rank and influence (Pellegrini & Long, 2002; Veenstra et al., 2007; Rodkin & Berger, 2008), not only are adolescents who are most desirous of high rank more aggressive (Faris & Ennett, 2012), but the display of aggression among adolescents tracks the availability of rank-improvement opportunities. Bullying and other aggressive acts increase in frequency during children's initial transition from primary to middle school, a period when the formation of new social groups provides ample opportunities to establish a new social hierarchy. Aggression subsequently

desists after rank differences are established (Pellegrini & Bartini, 2000), or when aggressors reach the pinnacle of the hierarchy and no opportunities for further rank gains are available (Faris & Felmlee, 2011).

Personality dominance. Given that Dominance is predicated upon threat and aggression, personality traits such as dispositional dominance—defined as a tendency to behave in assertive and forceful ways (though not necessarily aggressively, as our concept of Dominance implies; Wiggins, 1979)—are expected to promote threat-based relationships with others and consequently result in a high level of social influence for those who exhibit the trait.

Supporting this expectation, a substantial body of evidence indicates that personality dominance is associated with higher rank and leadership attainment. Meta-analyses of over 30 studies and 7,000 individuals demonstrate that trait dominance is one of the most robust predictors of leader emergence, outperforming a myriad of other traits including conscientiousness and intelligence (Judge, Bono, Ilies, & Gerhardt, 2002; Lord, De Vader, & Alliger, 1986). Moreover, individuals with dominant personalities acquire influence in groups *because* they are seen as intimidating, as well as competent (although they are not, in fact, particularly skilled) by other group members, suggesting that trait dominance promotes influence at least partially via perceptions of Dominance (Anderson & Kilduff, 2009b; Cheng, Tracy, & Henrich, 2013d).

Physical formidability. Paleoanthropological evidence indicates that aggressive conflicts were sufficiently widespread and substantial in human ancestral environments to constitute a major selection pressure (Manson & Wrangham, 1991). The ubiquity of agonistic contests in this environment likely favored the emergence of a disposition to aggress and intimidate, alongside a decreased willingness to compete with physically more formidable individuals who engage in

aggression and intimidation. As a result, physical attributes that either confer or track their carriers' fighting prowess and ability or willingness to inflict costs in violent contests—such as physical size (e.g., height) and strength, testosterone-linked morphological features such as wider facial structure and lower vocal pitch, and spatially expansive nonverbal displays—should be associated with increased rank and influence. Considerable evidence for associations along these lines exists; here, we review findings demonstrating that social rank is systematically linked to each of four classes of formidability-conveying attributes: physical size and strength, spatially expansive nonverbal displays, facial structure, and vocal pitch (see also Blaker & van Vugt, Chapter 6, this volume).

Physical size and strength. Physical size and strength are the primary determinants of who prevails in aggressive competitions, across a diverse range of species including humans (Archer, 1988). Larger and stronger individuals generally prevail in agonistic encounters, and smaller and weaker individuals are likely to sustain injuries or risk death during conflicts, so selection should not only favor aggression among the large and strong, but also a readiness to submit and defer to these individuals among those who are physically smaller and weaker . As a result, size and strength are expected to predict rank. A large body of work examining diverse human societies has supported the first part of this prediction: that larger and stronger individuals tend to be more aggressive (e.g., Archer & Thanzami, 2007; Felson, 1996; Gallup, White, & Gallup, 2007; Pellegrini et al., 2007; von Rueden et al., 2008; Sell, Tooby, & Cosmides, 2009; Tremblay, 1998). Here, we focus on evidence supporting the second part of this prediction: that size and strength predict higher rank and influence.

First, both men and women who are taller in stature consistently occupy a disproportionate number of leadership positions in organizations, and have a higher income (see

Judge & Cable, 2004). Moreover, the human mind is biased toward intuitively associating larger size with greater formidability, power and influence, and leadership capacity (Fessler, Holbrook, & Snyder, 2012; Marsh, Henry, Schechter, & Blair, 2009; Schubert, Waldzus, & Giessner, 2009; Stulp, Buunk, Verhulst, & Pollet, 2013). Observers tend to overestimate the height of powerful others (Dannenmaier & Thumin, 1964; Wilson, 1968), and systematically overestimate the height of a target individual when feeling powerless, but underestimate this individual's height when feeling powerful (Yap, Mason, & Ames, 2013). This perceptual bias emerges early in life and is seen even among 10-month-old infants, who expect larger agents to prevail in conflicts with smaller agents (Thomsen, Frankenhuis, Ingold-Smith, & Carey, 2011).

Facial structure. Facial width-to-height ratio (WHR)—a sexually dimorphic trait influenced by testosterone (e.g., Andersson, 1994; Lefevre, Lewis, Perrett, & Penke, 2013; Verdonck, Gaethofs, Carels, & de Zegher, 1999)—has been shown to systematically predict men's fighting ability, physical prowess, and rates of violence and aggression in both the lab and the real-world (Carré & McCormick, 2008; Carré, McCormick, & Mondloch, 2009; Carré, Morrissey, Mondloch, & McCormick, 2010; Christiansen & Winkler, 1992). From the Dominance account, then, facial WHR should predict perceived formidability and resultant rank attainment. Supporting this prediction, men with greater facial WHR demonstrate an increased propensity to cheat and exploit others (Haselhuhn & Wong, 2012; Stirrat & Perrett, 2010), and are less likely to die from contact violence (Stirrat, Stulp, & Pollet, 2012). Most importantly, wider-faced men are viewed as more dominant, forceful, and assertive by others (Alrajih & Ward, in press; Valentine, Li, Penke, & Perrett, in press), report a heightened sense of power and influence (Haselhuhn & Wong, 2012), and achieve superior leadership performance, as evidenced by the financial earnings of CEO's firms (Wong, Orniston, & Haselhuhn, 2011).

Vocal pitch. Like facial WHR, lower vocal pitch is associated with higher levels of circulating testosterone (Dabbs & Mallinger, 1999; Evans, Neave, Wakelin, & Hamilton, 2008; Puts et al., 2012), and thus may serve as another cue to threat potential and aggression (Morton & Page, 1992). Vocal pitch is thus also expected to promote perceptions of formidability and, as a result, increased success in rank competitions. Consistent with this expectation, listeners consistently rate deeper voices as conveying greater physical size, strength, masculinity, and dominance (e.g., Feinberg, Jones, Little, Burt, & Perrett, 2005; Puts, Gaulin, Verdolini, 2006; Puts, Hodges, Cárdenas, & Gaulin, 2007). Moreover, individuals who perceive themselves as physically stronger than a rival strategically (but likely unconsciously) lower their voices in competitive contexts, whereas those who view themselves as weaker tend to raise their pitch (Puts et al., 2006). Finally, in studies directly linking vocal pitch to success in rank attainment, lower pitched political candidates were found to receive more votes than higher pitched candidates (Anderson & Klofstad, 2012; Klofstad, Anderson, & Peters, 2012; Tigue, Borak, O'Connor, Schandl, & Feinberg, 2012), and to manage larger companies and have higher income (Mayew, Parsons, & Venkatachalam, 2013). In addition, participants instructed to deepen their pitch report a greater subjective sense of power (Stel, van Dijk, Smith, van Dijk, & Djalal, 2012), and individuals in a social interaction who spontaneously lower their pitch over the course of the interaction are perceived as higher in Dominance, and attain greater social influence as a result (Cheng et al., in prep).

Spatially expansive nonverbal displays. Spatially expansive nonverbal postural displays increase one's apparent size, which should also convey formidability and thus promote high rank through the Dominance pathway (see also Hall et al.., Chapter 14, this volume). Consistent with prediction, numerous studies have demonstrated that spatially expansive, open postures—such

as pride displays and open arm and leg gestures—not only increase the perceived influence and rank of their displayers across cultures (Carney, Hall, & LeBeau, 2005; Marsh et al., 2009; Shariff & Tracy, 2009; Tracy, Shariff, Zhao, & Henrich, 2012), but also tend to be spontaneously adopted by powerful leaders or winners of physical fights (Tracy & Matsumoto, 2008; for a review, see Hall, Coats, LeBeau, 2005). In contrast, losers of such battles, and followers, tend to adopt complementary constricting postures, which signal their deference and subordination (Tiedens & Fragale, 2003; Weisfeld & Beresford, 1982). Furthermore, in addition to promoting rank by increasing perceived formidability, expansive postures also activate rank-related cognitions and hormones, which in turn motivate rank-seeking behaviors. For example, adopting expanded postures induces subjective feelings of power and control (Huang, Galinsky, Gruenfeld, & Guillory, 2011; Riskind & Gotay, 1982; Tiedens & Fragale, 2003) and associated increases in testosterone and decreases in cortisol (Carney, Cuddy, & Yap, 2010)—a unique neuroendocrine profile that underpins dominance and rank-seeking behaviors (Mehta & Josephs, 2010).

In summary, findings from these diverse programs of research converge to support a number of specific predictions that emerge from the Dominance account of social rank. Together, these findings underscore the formidability-enhancing aspect of certain attributes and traits that, by virtue of facilitating individuals' ability to wield dominance, are fundamentally linked to attaining and maintaining high rank. By recognizing the centrality of threat and coercion in human life, particularly in shaping patterns of influence and rank (alongside admiration and respect), the Dominance-Prestige Account thus allows us to explain and unite these previously disconnected lines of research.

Prestige Promotes Social Rank

Paralleling the findings reviewed above, a large body of evidence suggests that many of the narrower behaviors and psychological processes that underpin the attainment of respect and admiration (i.e., Prestige) also lead to increased rank and influence in humans. Here, we review these prior findings and focus on two major classes of traits and attributes that predict social influence via freely conferred deference: (1) the demonstration of locally valued skills and expertise, and (2) altruism and generosity.

Locally valued skills and expertise. Imitating or learning from highly skilled individuals provides significant advantages over learning from less skilled others (Henrich & Gil-White, 2001), making it adaptive for learners to effectively discriminate and mentally rank potential models according to their skills and expertise, and selectively determine whom to observe and imitate on that basis. Most importantly, learners should demonstrate a preference to imitate highly ranked models, and pay deference to these individuals in exchange for proximity and access to information. As a result, demonstrated expertise should be associated with higher social rank.

Supporting this prediction, a large body of research from across the social sciences has documented links between perceived competence in locally valued domains and rank attainment. Technical and task-relevant skills and expertise are among the most frequently nominated qualities important to leadership (Stogdill, 1974), and their possessors generally emerge as most influential members of task-focused groups (Anderson & Kilduff, 2009a; Bottger, 1984; Laughlin, Kerr, Davis, Halff, & Marciniak, 1975; Littlepage, Schmidt, Whisler, & Frost, 1995; Miner, 1984; Palmer, 1962). Moreover, meta-analyses reveal that intelligence—a trait that presumably gives rise to diverse skills and abilities emphasized in modern societies—consistently predicts leadership emergence (Lord et al., 1986). In addition, individuals who view

themselves as competent and capable prefer higher ranks and display greater rank-seeking behavior, whereas those who perceive themselves as less competent generally prefer lower ranks (Anderson, Willer, Kilduff, & Brown, 2012).

The ethnographic record also supplies numerous examples of the association between expertise and rank. Hunting skill, in particular, seems to be a primary means to both respect and societal influence in many foraging, horticultural, and pastoral societies (Gurven & von Rueden, 2006; Kelly, 1995; Wiessner, 1996). Among the Kuna, an indigenous island-living population that hunts and plants crops on Panama's Caribbean coast, each man keeps a lifetime record of tapir kills. Men with the most tapir kills receive respect and exert substantial influence over others (Ventocilla, Herrera, Nunez, & Hams, 1995). Among the Meriam, a Melanesian people of Torres Strait, Australia, success in turtle hunting—an extremely dangerous and financially costly activity that requires knowledge about turtle resting and feeding patterns—confers prestige, including from respected village elders who selectively support the opinions of younger skilled hunters in public meetings or private disputes (Smith & Bliege Bird, 2000). Among the Western Apache, all men actively participate in hunting but only good hunters are accorded the highest prestige (Buskirk, 1986). Beyond hunting, expertise in other valued domains—such as ethnomedicinal knowledge, storytelling, healing or supernatural knowledge, combat, farming and herding skills—are also associated with respect and influence in small-scale societies (see von Rueden, Chapter 9, this volume).

Importantly, Prestige is largely accorded on the basis of *perceived*, rather than *actual*, competence and expertise, which explains why Prestige and rank allocation tend to be strongly influenced by competence *cues*. The detection of true competence is often difficult, especially in circumstances that are noisy (i.e., models often fail before succeeding at difficult tasks), costly

(i.e., careful observation over multiple occasions is needed), and offer limited information (i.e., it is not always obvious how competence should be judged; Minson, Liberman, & Ross, 2011). Learners therefore come to rely on superficial cues and symbols of competence and success, despite an often imperfect link between these cues and actual skill. For example, assessments of competence are often based on observable cues of confidence, such as degree of certainty expressed and amount of talking (Anderson & Kilduff, 2009b; Littlepage et al., 1995), and nonverbal displays of pride (Steckler & Tracy, Chapter 8, this volume). Individuals incentivized to correctly answer trivia questions tend to imitate the answers of models displaying pride, regardless of these models' actual knowledge (Martens & Tracy, 2013), likely due to the expression's function as a cross-cultural signal of high rank (Tracy et al., 2013). Similarly, hunter-gatherers gauge Prestige from signs of success such as wealth, ornamentation, and larger yams (Kaberry, 1941; Malinowski, 1922). Another well-documented cue is age, which indicates a lifetime of experience and accumulated skills and knowledge; the Samai, an indigenous Malaysian population, for example, seek out elders for their opinions and grant them disproportional influence over the society, despite their lack of power or authority to enforce decisions (Dentan, 1979).

Research on children's learning preferences indicate a similar reliance on Prestige-related cues, suggesting that these biases are rapidly acquired in development, or may be innate, in the sense of reliably emerging across diverse environmental variations. Children as young as two years old prefer to learn from models who display confidence, compared to those who appear uncertain (Birch, Akmal, & Frampton, 2010; Jaswal & Malone, 2007; Rakoczy, Warneken, & Tomasello, 2009; Sabbagh & Baldwin, 2001). Similarly, 3- and 4-year-old children make inferences of Prestige on the basis of bystanders' visual attention to potential models (a Prestige

cue), and subsequently choose to learn from the most apparently Prestigious models (Chudek, Heller, Birch, & Henrich, 2012).

The appeal of confidence as a marker of skill and knowledge is so potent that adults demonstrate a propensity to confer Prestige and deference to *over*confident individuals, whose metacognitive assessment of their ability exceeds their actual performance; such individuals consistently attain higher rank than their skills merit (Anderson, Brion, Moore, & Kennedy, 2012). This bias, toward granting influence to group members who may not in fact deserve it, is similar to that described by status characteristics theory (Berger & Conner, 1969; Driskell, 1982; Driskell & Mullen, 1990; Webster & Driskell, 1978), which argues that rank differentiation in newly formed groups is partly influenced by members' personal characteristics—such as race, age, sex, and occupation. In this view, these characteristics have become stereotypically (if often incorrectly) associated with perceived task competence (see also North & Fiske, Chapter 12, this volume). These stereotypical expectations are imported into new and pre-existing group contexts, and shape expectations of relative skill and rank allocation (for a review, see Berger et al., 1980).

Altruism and generosity. The Prestige Account predicts that altruism and generosity, when coupled with competence in valued domains, should promote Prestige and social rank. Apart from marking excellence in the valued domain of morality, these pro-social behaviors—which typically benefit the group at a cost to the self—provide another means of conveying and widely broadcasting the generous individual's skills and ability to accrue valuable resources (i.e., Prestige). Large charitable donations, for example, serve as signals of the donor's wealth (Cheng & Tracy, 2013). Such costly advertisements attract more learners and further elevate the Prestige of the displayer. In addition, social learners' tendency to imitate skilled individuals creates an

extra incentive for the Prestigious to act pro-socially. If a prestigious individual behaves pro-socially (e.g., contributes to the group) others are likely to follow suit, thereby increasing the Prestigious individual's payoff. In contrast, if a prestigious individual defects, others are likely to defect, reducing any potential free-riding benefits for the Prestigious. In contrast, Dominants' behaviors are not copied, so any pro-social behaviors they display will not only mitigate their ability to evoke fear, but also fail to result in increased group-wide pro-sociality (Henrich, 2005).

A large body of evidence from psychology, sociology, anthropology, and behavioral economics supports an association between altruism, generosity, and social rank. For example, groups tend to elect the most altruistic members as leaders (Hardy & van Vugt, 2006; Milinski, Semmann, & Krambeck, 2002), and confer them with greater respect, admiration, as well as influence (Willer, 2009). When rank-seeking motives are made salient, individuals express an increased desire for environmentally friendly yet costly products—but only when their purchase of these products is made publicly known to others, suggesting that certain altruistic acts are motivated by reputational concerns (Griskevicius et al., 2010; see Kafashan et al., Chapter 7, this volume). Indeed, the anthropological literature documents cross-cultural links between costly displays of altruism and reputational gains. For example, in a Melanesian tribe the ability to share turtle meat—a highly prized commodity—signals the high quality (of the sharer), because turtle hunting is a time-consuming activity which requires substantial knowledge and skill (Smith & Bliege Bird, 2000). Among the Semai, the most generous men are also the most popular and sought out for advice (Dentan, 1979). In Lamalera, a sea-hunting village in Indonesia, those who hold official leadership positions tend to be the most excessive sharers (Nolin, 2012; for more ethnographic accounts, see Hardy & van Vugt, 2006).

In summary, the Prestige account—which was developed from theoretical models of cultural evolution and social learning, and in isolation from these empirical research efforts—provides an explanatory account for these prior findings demonstrating the importance of skill, talent, altruism, and generosity to rank attainment. The key insight that emerges from our empirically grounded theoretical approach is that humans allocate social rank on the basis of respect and admiration, in addition to force and coercion.

Concluding Remarks

Theoretical and empirical research programs from across the social sciences are converging to suggest that Dominance and Prestige form the dual foundations of human hierarchical relationships. Unlike prior psychological theories that specify proximate explanations for specific findings (e.g., competent individuals emerge as leaders because group members view them as best able to contribute to group functioning), the Dominance-Prestige Account provides a broader ultimate explanation for *all* of these findings, by proposing that human hierarchies are the product of our species' evolved tendency to submit to those who wield force and intimidation, and to follow and learn from those who garner respect and admiration. In this view, these two systems of rank allocation are underpinned by distinct psychological processes, behaviors, and neurochemistry which were selected for by distinct evolutionary pressures.

More generally, we argue that this approach is not only a useful framework for organizing and understanding the extensive and rapidly emerging body of research on social rank dynamics, but also unifies these efforts into a single cumulative research program. As we have demonstrated, the Dominance-Prestige framework offers a unified explanation for why people who are coercive and aggressive, high in personality dominance, tall or strong, have wide faces

and deep voices, and assume spatially expansive postures, tend to rise to the top of hierarchies; and why other highly-ranked individuals gain influence by instead demonstrating skills, expertise, and generosity. These diverse rank-related phenomena are best understood as phenotypic manifestations of one of two fundamental rank processes. Importantly, although not all predictions sketched above are unique to this account—in fact, other proximate explanations have been generated for each isolated finding—collectively they cannot be better explained by any competing model.

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