

## 2. Detailed Description

**Objectives:** Our objectives are to: (a) investigate whether two distinct status-seeking social strategies—labeled Dominance and Prestige—are both effective avenues to successfully leading and influencing teams; (b) explore how Dominance and Prestige strategies are signaled and sustained through leaders’ verbal and nonverbal behaviors; and (c) examine the impact of Dominant vs. Prestigious leadership on group performance and on follower psychology, including well-being and satisfaction.

**Context:** Our theoretical framework emerges from an evolutionary approach to human status called the Dominance-Prestige Account (Henrich & Gil-White 2001), which is unfamiliar to many psychologists and leadership scholars. This account derives from an evolutionary logic that considers both our species’ heritage as primates who employ coercive social strategies, and as a cultural species that relies heavily on learning from other members of our group. By considering the selection pressures created by our cultural learning abilities, this account proposes that humans possess two distinct paths to attaining status: *Dominance* and *Prestige*. Homologous to status-seeking strategies in many non-human primates, *Dominance* refers to status acquired via intimidation and coercion, and victory in agonistic contests. This strategy includes physical threat, as well as control over other costs and benefits (e.g., salary bonuses). *Prestige*, by contrast, refers to the freely-conferred influence granted to individuals who are respected for their possession of valuable skills or knowledge, which can be acquired via cultural learning. This form of status is theorized to have arisen from selection pressures to preferentially attend to and learn from highly skilled or successful individuals. Prestigious individuals are influential both because they are seen as valuable sources of information, and thus can truly sway opinions, and because others seek to pay them deference (in part by assenting to their decisions) in order to gain greater access to them. A growing literature now supports a broad set of predictions from this theory (see below).

We aim to extend this theoretical foundation into the domain of leadership by addressing questions about how individuals can influence groups and facilitate collective goals (Bass 1990). We propose to test three hypotheses concerning the emergence, maintenance, and impact of Dominance- vs. Prestige-based leadership on attaining collective goals. First, we hypothesize that both Dominance and Prestige are viable paths to leadership, and thus that individuals perceived as high in either form of status will exert greater influence on group outcomes. Second, because we hypothesize that Dominance and Prestige each underpin distinct leadership styles, we predict that each will be associated with distinct verbal and nonverbal behavioral patterns. Specifically, given that Dominance rests on effective intimidation and Prestige on broadcasting one’s expertise, we predict that Dominant leaders will couple aggressive displays and spatially expansive movements with self-entitling verbalizations, whereas Prestigious leaders couple subtle, non-threatening movements that signal confidence with socially attractive verbalizations (e.g., humor). Third, we predict that these distinct leadership styles will have divergent effects on followers’ well-being, and on group functioning. Given evidence that psychological stress impairs subjective well-being and performance (van den Bos et al. 2009; Schiffrin & Nelson 2010), we expect followers in groups led by Prestigious leaders to experience greater well-being and group satisfaction, and to demonstrate better performance on group tasks, compared to followers in groups led by Dominants, who actively induce fear and stress.

Despite an immense enterprise broadly addressing leadership, a recent review of empirical findings drawn from across the social sciences—including social/organizational psychology, anthropology, political science, economics, and zoology—concluded that “this literature lacks a coherent conceptual framework to unify the wealth of data” (Van Vugt 2006), a view echoed by other leadership scholars (Chemers 2000; Hogan & Kaiser 2005; Hollander 1985; Yukl 1989). Over the past several decades, this literature has seen a proliferation of labels for leadership styles: e.g., “aversive”, “directive”, “transactional”, “transformational”, “empowering”, “charismatic”, “servant”, “selfish”, “democratic”, “autocratic”, and “authoritative” (and this is but a fraction of the total list). Thus, although progress has been made in our understanding of leadership, the diversity of terminology and conceptualizations has

led to a highly fragmented body of disconnected results. By constructing an evolutionary framework from the ground up, rooted in empirically well-established findings on human status, we strive to develop a theoretically integrated and conceptually clear approach to understanding leadership.

The research areas most germane to the above program are the study of (1) leadership emergence and effectiveness, (2) signaling and ethology, and (3) Prestige- and Dominance-based status. Although prior research has identified a myriad of traits and attributes that predict leadership attainment and group performance (e.g., Judge et al. 2002; Stogdill 1974; Hogan et al. 1994), our goal is to test a model of the *broader processes* that shape and influence leadership, and can account for previously found connections between these identified *static* traits and attributes. According to our model, all of these previous findings can be understood as manifestations of one of two fundamental, evolved strategies. Specifically, prior evidence demonstrating associations between leadership and (a) physical strength (Schjelderup-Ebbe 1935), (b) aggression (Griskevicius et al. 2009), (c) toughness (Cashdan 1998), (d) threatening and coercive behavior (Kyl-Heku & Buss 1996), (e) assertiveness (Gibb 1968), (f) need for power (Flynn et al. 2006; Winter 1988), (g) anger (Tiedens 2001; Van Kleef et al. 2010), (h) narcissism (Brunell et al. 2008), (i) over-confidence (Anderson & Brion 2011), and (j) prioritizing self- over group-interest (Maner & Mead 2010), may be more parsimoniously viewed as reflecting Dominance-based strategies. Likewise, evidence for an association between leader emergence and the possession of (a) valuable skills (Berger et al. 1972; Lord et al. 1986), (b) task abilities (Driskell et al. 1993), (c) intelligence (Lord et al. 1986), (d) perceived competence (Anderson & Kilduff 2009), (e) specialized knowledge (Mesoudi 2008), (f) altruism (Hardy & Van Vugt 2006; Willer 2009), (g) helpfulness (Flynn et al. 2006), (h) generosity, honesty, responsibility, fairness (Lord & Maher 1991), and (i) charisma (Awamleh & Gardner 1999) may in fact reflect Prestige-based strategies. Thus, while prior research has made important progress in identifying what people look for in leaders and how leaders' traits influence group performance, this project will fill critical research gaps by explaining *why* these traits are important and *how* they shape group effectiveness, thus integrating a range of otherwise insular results from across the social and biological sciences.

Regarding leadership signaling and ethology, although a number of studies have examined status-based differences in behavioral patterns across a range of cultural groups, no research has yet explored how Dominance and Prestige are differentially signaled through verbal and nonverbal behaviors. In contrast to Dominants, whose power rests on the evocation of fear and anxiety, prestigious individuals must *attract* followers, and thus avoid any aggressive behaviors that could cue Dominance. Consistent with this assumption, our own previous work (Cheng et al. 2010) indicates that individuals who pursue Dominance are fueled by arrogant, hubristic pride and demonstrate aggrandizing, aggressive and disagreeable tendencies. In contrast, individuals pursuing Prestige are fueled by a more pro-social, self-confident “authentic” pride (Tracy & Robins 2007a), and are perceived by others as altruistic and generous, suggesting that Prestigious individuals demonstrate behaviors which draw respect and admiration without evoking fear. By identifying the behavioral patterns that distinguish between Dominance and Prestige, the proposed research aims to integrate prior findings from studies on nonverbal displays of pride and status (e.g., Aries et al. 1983; Bohns & Wiltermuth 2012; Carney et al. 2010; Huang et al. 2011; Shariff & Tracy 2009; Tracy & Matsumoto 2008; Tracy & Robins 2004; 2008) by parsing them into Dominance or Prestige ethologies and linking them to the above individual attributes or characteristics, and then to leadership.

Recent empirical work has generated considerable support for several predictions made by the Dominance-Prestige Account. In both the laboratory and field, we have found that Dominance and Prestige coexist as two distinct forms of status that rest on different emotional mechanisms and personality profiles (Cheng et al. 2010). Others have shown that Dominance and Prestige are associated with distinct impacts on neuroendocrine patterns (Johnson et al. 2007), reproductive success (von Rueden et al. 2011), economic decision-making (Bruno 2006; Eckel & Wilson 2000; Halevy et al.

2012), and female mate preferences (Snyder et al. 2008). Also consistent with these predictions are recent findings indicating that: (1) Prestige is associated with locally valued competencies, such as hunting ability in a small-scale Amazonian society (Reyes-Garcia et al. 2008; von Rueden et al. 2008), (2) admiration promotes emulation and copying behavior (Algoe & Haidt 2009), and (3) celebrity gossip is related to Prestige and cultural learning (De Backer et al. 2007). No work, however, has linked these forms of status to leadership.

*Preliminary Leadership Research:* As a first step toward exploring whether Dominance and Prestige are relevant to leadership, we examined whether athletic team members who tend to engage in each status strategy are considered good leaders by other team members (Cheng et al. 2010). Consistent with our predictions, results indicated that group members' leadership ratings were positively correlated with both their perceived Dominance ( $r = .40, p < .01$ ) and Prestige ( $r = .73, p < .01$ ). Dominance and Prestige perceptions were not significantly correlated ( $r = -0.03$ ), and had divergent relations with a range of attributes and traits, suggesting that these are likely independent avenues to leadership.

In this prior research we also developed and validated scale instruments for assessing Dominance and Prestige relationships using both self- and peer-reports; these instruments will be critical to the proposed research. These scales assess individuals' fear and respect towards group members (e.g., "I respect and admire her", "I seek her advice on a variety of matters", "I'm afraid of her"; see Cheng et al. 2010) to directly tap the interpersonal perceptions that define actual (vs. attempted) Dominance and Prestige processes, in contrast to the narrower, static attributes typically examined in previous studies of leadership (e.g., competence, intelligence, aggressiveness).

## Methodology

Study 1a tests the hypothesis that Dominance and Prestige predict leadership attainment in small, face-to-face groups of unacquainted individuals who interact in a group task (with no appointed leader) in a controlled laboratory setting. Dominance and Prestige will be assessed through ratings made by both fellow group members and outside observers (who will watch video-recordings of the interactions), and leadership will be measured in four ways: (1) group member-rated leadership, (2) outside observer-rated leadership, (3) behavioral demonstrations of decision-making power (quantified as influence over the group decision), and (4) amount of visual attention received (assessed using eye-tracking). Study 1b, which will involve meticulously coding these video-recorded interactions, will examine the nonverbal and verbal ethological patterns that distinguish leadership from follower-ship, and that distinguish Dominance-based leadership from Prestige-based leadership. Studies 2 and 3 will examine whether and how the two leadership styles differentially influence group functioning, specifically testing the prediction that groups led by Prestigious leaders will show enhanced performance and experience greater well-being and satisfaction compared to groups led by Dominant leaders. Study 2 will test this prediction by examining in-laboratory groups of unacquainted individuals, comprised of 1 assigned leader (pre-determined to be Dominant or Prestigious; see below) and 2-4 subordinates, who will interact during a series of group tasks with objective performance outcomes. To extend these studies beyond the laboratory into a more diverse population, Studies 3a and 3b will test whether Dominance and Prestige leadership styles, and their characteristic ethologies (e.g., postures), predict the performance and well-being of professional emergency medical teams, using patient outcomes as a measure of performance.

*Study 1a: Do Dominance and Prestige Strategies Promote Leadership?* Participants will be randomly assigned to same-sex groups of 4 to 6 unacquainted individuals. They will first, independently and privately, complete a "Lost on the Moon" exercise (Bottger 1984), which involves rank-ordering 15 items (e.g., oxygen tanks, heating unit) in order of their utility for surviving a lunar disaster. Participants will then work collectively as a group on the same task, with the incentive that the group will receive higher payment for more correct rankings. Upon completing the task, group members will privately rate

each other (in a round-robin design) on perceived Dominance, Prestige (using our validated scales), and leadership (i.e., “led the task”, “was paid attention to”, “was influential”). In addition, a behavioral measure of decision-making power will be obtained by computing the degree of similarity between each participant’s *private* response on the task and the *group*’s final response ranking. Next, trained outside observers will watch video-recordings of these interactions and rate all individuals on Dominance, Prestige, and leadership. Together, these multi-method assessments will provide group-member and outside-observer ratings of Dominance and Prestige, as well as three different indices of leadership—(1) group member-rated leadership, (2) outside observer-rated leadership, and (3) decision-making impact.

As a fourth measure of leadership, we will assess the amount of visual attention each participant receives. Received attention has been described as “the best framework for analyzing social rank as it takes into account all leadership styles” (Hold 1976: 179; Chance 1967). A new sample of participants will view the video-recorded group interactions while their gaze is monitored by an eye-tracking device, to yield the amount of visual attention (in milliseconds) each target is paid. After viewing each interaction, these participants will also rate each target on Dominance, Prestige, and leadership.

Analytically, we will fit four separate statistical models by regressing each of the four measures of leadership (group-member rated, outside-observer rated, decision-making power, and visual attention) on the measures of Dominance and Prestige. We expect both strategies to emerge as significant predictors of all four measures of leadership, thus linking these two status strategies to leadership.

*Study 1b: Are Dominance and Prestige associated with distinct verbal and nonverbal ethologies?* To assess verbal ethology, a team of six trained research assistants (RAs) will watch all video-recordings and conduct detailed behavioral coding of each target’s verbal behaviors. Specifically, coders will rate the extent to which each target demonstrates verbally dominant behaviors indicative of intimidation and self-entitlement (e.g., “appearing domineering and overbearing”, “teasing others in a dominant way”, “forcefully pushing one’s ideas or opinions”) and Prestigious behaviors indicative of social attractiveness (e.g., “seeking group input on matters”, “inviting others to challenge one’s ideas”, “appearing self-deprecating”, “telling jokes or using humor”). To assess nonverbal ethology, another team of six trained RAs will rate the intensity of each target’s display of a range of nonverbal behaviors, at each of six pre-determined moments from the video during which a key group decision was made. Specifically, coders will rate the intensity at which each target displayed nonverbal behaviors presumed to signal confidence (and, by extension, Prestige: e.g., chest expanded, head tilt up, smile) and elements involving spatial expansiveness (and, by extension, Dominance: e.g., arms out from body, wide or expansive posture). These verbal and nonverbal items were derived from Henrich and Gil-White’s (2001) ethological predictions and Tracy and Robins’ (2007b; 2008) work on the universally recognized human pride expression, a status-signaling display (Shariff & Tracy 2009).

Ratings on both the verbal and nonverbal display items will subsequently be analyzed using factor analysis, to examine whether they reveal the expected two factor structure predicted by the Dominance-Prestige model. If this dual-factor structure is found, we will then test whether these factors are associated with targets’ Dominance and Prestige as rated by in-lab group members from Study 1a. This will address the question of whether individuals who are perceived as Dominant and Prestigious tend to engage in the verbal and nonverbal behavioral patterns expected by the model.

*Study 2: Do Dominant and Prestigious Leadership Styles Differentially Influence Group Performance and Subordinate Well-Being (Lab study)?* Three types of groups (quasi-experimental conditions) will be created by systematically varying the leadership style of each group leader. Specifically, we will create groups that are led by a (1) Dominant individual, (2) Prestigious individual, or (3) low-status individual. All other group members will be predetermined to be low status. To form groups, dispositional tendencies to use Dominance or Prestige strategies to attain leadership will be assessed several weeks prior to the study session, using self-reports on the scales we developed (which closely correspond to

peer ratings; Cheng et al. 2010). We will use these ratings to assign individuals to groups, to create the quasi-experimental manipulation of leadership style described above. These groups, comprised of 4 to 6 members, will complete a series of 4 challenging collaborative tasks (e.g., list uses for a brick, complete logic puzzles, analogical reasoning tasks) which can be scored for objective performance (adapted from Woolley et al. 2010). After the task, group members will be asked to report on their experience working on the team, and will complete measures of well-being and emotions (e.g., Watson et al. 1988) as well as work-group satisfaction (adapted from Judge et al. 2000). These measures will subsequently be aggregated across subordinates (i.e., excluding leaders) to derive a group-level measure of well-being and group satisfaction. In addition, two trained RAs blind to the experimental condition will score each group's response on each task. These scores will be aggregated across tasks to index group performance. Finally, we will replicate the ethological verbal and nonverbal behavioral coding performed in Study 1b to test whether initial leader assignments of Dominance, Prestige, and low-status can be predicted from ethological patterns.

*Study 3: Do Dominant and Prestigious Leadership Styles Differentially Influence Group Performance and Subordinate Well-Being (Field Study)?* To test whether findings from the lab (Studies 1 and 2) generalize to a more ecologically valid context, we will examine the impact of leadership styles on real-world performance outcomes among professional medical teams in a hospital emergency department, a highly stressful context in which leadership and group coordination are of paramount concern (Kunzle et al. 2010). Dr. Garth Hunte, a consultant on this project who is a physician and scientist affiliated with St. Paul's Hospital Emergency Department, Vancouver, will facilitate data collection and analysis for Study 3. Dr. Hunte's research examines communication among emergency-care practitioners.

We will examine the impact of Dominance and Prestige leadership on group performance in two ways. In Study 3a, we will assess team performance in patient simulation exercises. During these training exercises, medical professionals are randomly assigned to teams with a similar composition to the real medical teams described below. We will video-record these teams during the exercises, and two trained RAs will subsequently view the recordings to rate the Dominance and Prestige (as well as other relevant attributes) of the head physician (the team leader) and other team members. To assess performance outcomes, Dr. Hunte and a head physician will independently rate the performance of each team, and these scores will be aggregated into a single team performance score.

Study 3b will test our hypotheses in the context of the emergency room. We will analyze existing audio data, previously collected by Dr. Hunte over a four-year intensive investigation. These data were collected by having emergency room medical team members carry digital voice recorders in their pockets while engaging in their regular duties, yielding a total of 25-hours of conversations between 85 members over the course of many shifts. We have access to (a) the audio data and verbatim transcripts of conversations between medical team members, which typically consist of 1 head physician (the team leader), 2-3 nurses, 1 nurse leader, and 1 unit coordinator, (b) Dr. Hunte's field notes documenting the medical role of each speaker, and (c) medical charts documenting patient outcomes. We will measure leadership styles using (1) the peer evaluation approach described in Study 1, by having all team members rate a subsample of all other team members on Dominance, Prestige, and other relevant dimensions; and (2) a team of three coders who will listen to all recorded interactions and use these to rate the head physician on Dominance and Prestige, using our scales. Patient outcomes will be scored independently by Dr. Hunte and a head physician (not in the sample), and aggregated to form an index of group performance.

Analysis of data from both Studies 3a and 3b will allow us to examine how the interplay of different leadership types influences important real-world outcomes. We expect Dominance to be negatively, and Prestige positively, predictive of team performance and team members' subjective well-being.