

The evolution of prestige Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission

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Abstract

This paper advances an “information goods” theory that explains *prestige* processes as an emergent product of psychological adaptations that evolved to improve the quality of information acquired via cultural transmission. Natural selection favored social learners who could evaluate potential models and copy the most successful among them. In order to improve the fidelity and comprehensiveness of such ranked-biased copying, social learners further evolved dispositions to sycophantically ingratiate themselves with their chosen models, so as to gain close proximity to, and prolonged interaction with, these models. Once common, these dispositions created, at the group level, distributions of deference that new entrants may adaptively exploit to decide who to begin copying. This generated a preference for models who seem generally “popular.” Building on social exchange theories, we argue that a wider range of phenomena associated with prestige processes can more plausibly be explained by this simple theory than by others, and we test its predictions with data from throughout the social sciences. In addition, we distinguish carefully between *dominance* (force or force threat) and *prestige* (freely conferred deference). © 2001 Elsevier Science Inc. All rights reserved.

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Acknowledged expertise attracts, though perhaps only temporarily, what we may term a following of dependent persons. These persons will be welcomed as a principal source of prestige — as a capital benefit of the hunter’s expertise. Nor is this expertise necessarily

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reduced or dissipated through having to share it with other persons attached to him (Paine, 1973, p. 308 of the Naskapi).

1. Introduction

This paper explores the evolution and psychology of noncoerced, interindividual, within-group, human status asymmetries — or *prestige*. We distinguish *prestige* from *dominance* and argue that each has its own distinct psychology, selected for by distinct evolutionary pressures. In the first part, we explain how the selective forces unleashed by the evolution of certain forms of cultural transmission generated a prestige psychology that further enhanced our cultural learning capabilities. In the second part, we test a series of predictions derived from our evolutionary analysis using data from across the social sciences.

1.1. What is status?

Social scientists have not converged on a common taxonomy of social asymmetries, classifying them inconsistently and variously as “status,” “prestige,” “power,” or “dominance” differences. One scheme divides status into “legal,” “traditional,” and “charismatic” (Weber, 1946, 1958). Another into “prestige,” “dominance,” and “wealth” (Goode, 1978). Archaeologists divide status into “ascribed” (e.g., chiefdoms and states) and “achieved” (e.g., “big man” societies; Renfrew & Bahn, 1996, pp. 187–188). Other scholars see no more than one status dimension, whether they call it “status,” “power,” or “prestige” (e.g., Leach, 1977, p. 10; Ryckman, Rodda, & Sherman, 1972; Shils, 1970, pp. 424–427), or they make finer distinctions but nevertheless claim conceptual unity for the assembled whole (e.g., Cartwright, 1959; French & Raven, 1959). Many evolutionary scholars tend to see all human status as homologous to nonhuman dominance (Barkow, 1975, 1989; Ellis, 1995; Hill, 1984a, 1984b), even though some human status processes are absent in nonhumans. This leads to calling status “dominance” even when no force or force threat is involved (e.g., Bernhardt, 1997, p. 45; Gibb, 1954, pp. 220–221).

Status can be viewed as either a hierarchy of rewards or as a hierarchy of displays — or both simultaneously. Status as *rewards* implies a hierarchy of privilege. High status entails greater access to desirable things, that access typically is not actively resisted by inferiors. There *will* be occasional fights, but not typically. If those who usually get their way have to fight for this every single time, we may speak of a tabulation of frequent winners and losers, but not of a *status* hierarchy. For status, properly speaking, we require a relatively stable acquiescence (begrudging or not) from the “have-nots” (Weisfeld & Beresford, 1982). This understanding is signaled in ethological behavior, such that higher status individuals — identified by the flow of benefits — are typically the receivers, rather than the givers, of *deference* displays.

Although nonhuman status is still poorly understood, a single process appears at least strongly predominant: agonism (aggression, intimidation, violence, etc. — that is, *force* or *force threat*) The resulting social asymmetries are referred to as “dominance hierarchies” in

the ethological and behavioral ecology literatures. The privileges that accrue to dominant individuals are (1) in males, preferential reproductive access to females, food, and spaces, as well as a disproportionate amount of grooming from others; (2) in females, preferential access to food and spaces, and disproportionate grooming. Despite some controversy, the evidence suggests that dominance correlates with fitness (Cowlshaw & Dunbar, 1991; Ellis, 1995). The stability of dominance is often reinforced through “reminders”: submissive behaviors (e.g., grooming, submissive displays, yielding space, etc.) from subordinate to superior, whether or not induced through intimidation by the latter.

In humans, in contrast, status and its perquisites often come from nonagonistic sources — in particular, from excellence in valued domains of activity, even without any credible claim to superior force. For example, paraplegic physicist Stephen Hawking — widely regarded as Einstein’s heir, and current occupant of Newton’s chair at Cambridge University — certainly enjoys very high status throughout the world. Those who, like Hawking, achieve status by excelling in valued domains are often said to have “prestige.”

In the Amazon, several researchers have observed two avenues to status and leadership in small-scale societies: “force” and “persuasion” (Krackle, 1978). “Forceful” leaders are domineering headmen who maintain their position through fear, threat, and compulsion (see also Maybury-Lewis, 1965, pp. 215–240, 1967, pp. 175–178). “Persuasive” leaders depend on their influence and the consent of their followers and lack the force to obligate (see also Arvelo de Jiménez, 1971, pp. 239–243; Clastres, 1998; Goldman, 1979; Huxley, 1966, pp. 66–73; Lévi-Strauss, 1944). These two styles of leadership, involving either persuasion or force, correspond to our two types of status: prestige and dominance.

1.2. Summary of our argument

The evolution of the human cultural capacity — that is, for intergenerationally stable, high fidelity, social transmission — created a new selective environment in which mutations improving the reproductive benefits of such transmission were favored. Our ancestral psychology evolved (within physical and phylogenetic constraints) into an increasingly well-organized and specialized battery of biases jointly designed to extract reproductive benefit from the flow of socially transmitted information. Prestige processes emerge from this evolved social learning psychology.

Cultural transmission is adaptive because it saves learners the costs of individual learning. Once some cultural transmission capacities exist, natural selection favors improved learning efficiencies, such as abilities to identify and preferentially copy models who are likely to possess better-than-average information. Moreover, selection will favor behaviors in the learner that lead to better learning environments, e.g., gaining greater frequency and intimacy of interaction with the model, plus his/her cooperation. Copiers thus evolve to provide all sorts of benefits (i.e., “deference”) to targeted models in order to induce preferred models to grant greater access and cooperation. Such preferred models may be said to have *prestige* with respect to their “clients” (the copiers).

The above implies that the most skilled/knowledgeable models will, on-average, end up with the biggest and most lavish clienteles, so the *size* and *lavishness* of a given model’s clientele (the *prestige*) provides a convenient and reliable proxy for that person’s information

quality. Thus, selection favors clients who initially pick their models on the basis of the current deference distribution, refining their assessments of relative model worth as information becomes available through both social and individual learning. This strategy confers a potentially dramatic adaptive savings in the start-up costs of rank-biased social learning. Finally, because high-quality information (“expertise,” “performative skills,” “wisdom,” “knowledge”) brings fitness-enhancing deferential clients, models have an extra incentive to outexcel each other.

2. What is prestige?

Since the common meaning of “prestige” corresponds closely with our posited domain of psychological and social causation, with its associated ethological displays and emergent population-level phenomena, we will stay close to the common meaning.

prestige

- 1:** standing or estimation in the eyes of people; weight or credit in general opinion.
2: commanding position in people’s minds. *syn* see INFLUENCE — Merriam Webster’s Collegiate Dictionary (1994, p. 923)

Notice that the synonym is “influence” — not “authority,” “power,” or “dominance.” Someone with prestige is *listened to*, their opinions are heavily weighed (not obeyed) because the person enjoys credit, estimation, or standing in general opinion.

prestigious

- 2:** having prestige — HONORED.

honor

- 1:** a good name or public esteem: REPUTATION: a showing of usually merited respect.
2: PRIVILEGE. **3:** a person of superior standing. **4:** one whose worth brings respect or fame: CREDIT. *syn* HOMAGE, REVERENCE, DEFERENCE: mean respect/esteem shown to another. HONOR means the recognition of one’s right to great respect or any expression of such recognition. HOMAGE adds the implication of accompanying praise. REVERENCE implies profound respect mingled with love, devotion, or awe. DEFERENCE implies a yielding or submitting to another’s judgment or preference out of respect or reverence (ibid.)

Nothing above suggests prestigious people are *feared*. Rather, others believe they have earned the right, if not to be obeyed, at least to have their opinions and desires considered more closely than those of ordinary people. They are also excused from certain obligations and obtain certain privileges. The words “respect,” “awe,” “devotion,” “reverence,” and “love” all connote that inferiors do not begrudge superiors and willingly confer such benefits.

Contrasting *dominance* to *prestige* sharpens our understanding of both. Agonistic encounters, real or implied, stabilize rank hierarchies in many primate species. “Fear” estimates the costs of challenging superiors. Subordinates signal acquiescence by averting their gaze and avoiding superiors — for to stare is to challenge (Goodall, 1986; Schaller,

1963). Deference is often transitive¹ (if A defers to B and B defers to C, then A defers to C; see e.g., Strayer & Cummins, 1980). Finally, repeated losses by the high ranking lead to changes in the rank order.

The ethology of dominance in chimpanzees — our closest relatives — consists of five categories of behavior, each involving several action patterns (culled from Goodall, 1986):

Subordinates:

1. Proximity management: baseline avoidance of higher-ups.
2. Submissive behavior after agonistic interaction (e.g., gaze avoidance, hunched shoulders, turning body away, lowered head, etc.).
3. Occasional submissive behaviors without context or provocation.

Superiors:

4. Grandstanding (higher frequency of aggressive displays than subordinates in order to signal their position and have it confirmed).

Everybody but the alpha:

5. Occasional challenges to the rank ordering (i.e., agonistic encounters initiated or resisted by the subordinate).

We now compare the above description with an ethnographic description of a society with clear prestige, but apparently no dominance, hierarchies. The Semai are an indigenous, Malaysian people who are famous for their nonviolence, acephalous structure, and their prickly, independent individuals who will not be bossed around (Dentan, 1979). The absence of dominance hierarchies is maintained and guaranteed by the readiness with which diffuse punishment by third parties descends on those who would arrogate themselves authority.

At first it seems as if Semai communities are run by a council of elders The elders in fact have no authority to enforce their decisions, however, and the variety of ways in which the Semai calculate age often makes it hard to tell just who the elders are The fact that the Semai respect the elders does not mean that they have to obey them A Semai takes heed of what his elders say. In the Semai phrase, he “hears” them. He does not interrupt while they are speaking, nor does he address them familiarly On the other hand, after listening respectfully to them, he may reject their advice. If they press the point, he may say, “I don’t hear you.” Although a senior may have great influence over some of his juniors, he cannot order them to do anything they do not want to do (Dentan, 1979, pp. 65–66).

The Semai have three different ways of reckoning age, and the resulting ambiguity allows them considerable freedom in choosing their “elders,” giving a person “considerable leeway in deciding just whom he wants to respect” (Dentan, 1979, p. 67). “Elders” apply their

¹ Although in chimpanzees, at least, the transitivity seems to be between hierarchical *levels* and not between individuals (Goodall, 1991, p. 125). That is, coalitions of two or more individuals may obtain a certain rank, so some of the elements in the transitive set may be groups, rather than individuals.

influence gently (Dentan, 1979, p. 69) and must never arrogate authority, otherwise other individuals will cease “hearing” the elders. Self-deprecation, for example, is a common rhetorical technique used by elders to assure listeners that they are not trying to compel compliance. Despite this, or perhaps because of it, respected elders manage to exert considerable influence in Semai society.

Dentan’s (1979) ethological observations are limited, so we combine them with our own informal observations of prestige interactions — these, of course, await more ethological fieldwork for confirmation. Our tentative ethology of prestige is as follows:

Low-status “clients”:

1. Proximity management: they are responsible for the overwhelming majority of the total time that they spend in interactions with superiors.
2. Dyadic interaction: eyes and posture directed towards the superior. Relative to the superior, they make few utterances. If superior pauses, even for an unusually long period of time (as conversational pauses go), subordinate is unlikely to take the floor.
3. Public interaction: sing praises of superior and escalate these as others escalate. Offer denials of the self-deprecating offerings of superiors.

Superiors:

1. Proximity management: responsible for a minority of total time spent with subordinates.
2. Dyadic interaction: free posture but no grandstanding, undue raising of the voice, or making violent gestures with the arms and body. Speaks most of the time. If subordinate is speaking and there is a pause, superior is more likely to take the floor.
3. Public interaction: self-deprecating denials of whatever praises are extended, with expressions of gratitude. Posture is confident but does not become a swagger, and at key moments (e.g., beginning or end of the interaction, whenever the public roars approval, etc.) posture may become positively servile (bows, etc.).

Some elements above may be culturally specific, but they do not cease to be *prestige*. We expect functional similarities in prestige ethologies despite such local variations.

Prestige rests on merit in the eyes of others (rather than force deployed against them), and promotes the admiration of inferiors (not their fear), a desire for proximity (not distance), and periods of sustained observation (not furtive glances). Transitivity is weaker than in dominance because prestige hierarchies can be domain-specific. For example, if I defer to you because of your superior computer skills and you defer to Bob because he is an excellent grass hockey player, I may not give Bob any special deference if grass hockey is not my thing. Also, clients can shop around for the model offering the best copying “deal” (a function not only of information quality, but of the price of access, and may thus be different for individuals choosing at different times). Finally, changes in prestige rank result from “students” surpassing former “teachers,” which has nothing to do with losing violent contests (except when prestige comes from one’s prowess in combat — but even here, one’s rank falls by losing to one’s enemies or sanctioned competitors, not to members of one’s

clientele). High-prestige individuals can lose status by behaving as if *entitled* to the attentions of clients (thereby raising their price of access) rather than grateful for freely conferred client deference. This points to the power of market choice that clients exercise. As the summary on Table 1 shows, there are many important differences between prestige and dominance hierarchies, even at a broad, first approximation. If dominance and prestige ethologies are different, we suspect that their underlying psychologies are also different, as are the selection pressures that produced them.

Before presenting the theory, we have two clarifications. First, our focus is not on prestigious and dominant *individuals*, but on prestige and dominance *processes*. Although one may find prestige and dominance status in the same individual, the fact remains that qualitatively different stimuli elicit prototypical prestige and dominance responses. To lose sight of this distinction is to obscure our argument. Modern societies have complex, institutional hierarchies, so individuals often enjoy both dominance and prestige status. Presidents and school teachers, for example, have real control over rewards and punishments on the one hand, but may also be perceived as doing a good job, on the other. What justifies our distinction is not that individuals must always have only one or the other form of status, but that it is *possible* for humans to have only one or the other because the prototypical stimuli and underlying psychologies are fundamentally different (e.g., Stephen Hawking, for pure prestige, and a high-school bully, for pure dominance). Although acquiring prestige may confer a capacity for force threat, in turn evoking dominance psychology in subordinates, it is the *pathway* that is relevant here. Some can scare others only if they first excel at something, then gain a large following or an institutional rank. Stephen Hawking may strike fear in graduate students on whom he can inflict real costs with some measure of institutional power, but this is because he first achieved prominence through excellence (and Star Trek fans, over whom he has no institutional power, still respect and adore him). His avenue to status was a pure prestige process, even if in the end it gives him a measure of dominance in a small circle. Finally, prestige-deference evoked by one's great skill or knowledge in inflicting costs (e.g.,

Table 1
Summary of ethological differences between dominance and prestige

	Dominance	Prestige
<i>Low-status individual</i>		
Approaches often (proximity)	no	yes
Prolonged stares	no	yes
Occasional attack (to challenge)	yes	no
Fears high-status individual	yes	no
<i>High-status individual</i>		
Charges and attacks	yes	no
Is frequently imitated	no	yes
Swaggers	a lot	a little; sometimes displays subdominant ethology
Received gifts/services	yes	yes
Transitivity	more	less

violence) should not be confused with the dominance-deference created by the fear that one may become a victim of that violence.

Second, our explanation focuses on particular forms of *direct* social learning, which we collectively term *infocopying*. This category encompasses all forms of acquiring information directly from another, and includes, but is not limited to, “true imitation” (acquiring the details of motor patterns via direct observation; see Tomasello, 1994) and “goal emulation” (inferring behavioral goals via direct observation). Infocopying excludes indirect social learning processes, such as “social facilitation” or “local enhancement,” where learners have a higher probability of reinventing something due to close proximity to a competent performer and the materials involved. Infocopiers may also unconsciously acquire mannerisms, consciously acquire verbal knowledge and arguments, and consciously or unconsciously imitate action patterns. Finally, much infocopying does not approximate information “replication” (as implied by “copying”). For example, infocopying includes “influence” that occurs when a person expresses a position P at strength S that moves the strength of my own agreement with P closer to S. Such processes are fully included in this theory (justified below, also see Boyd & Richerson, 1985, pp. 70–71).

3. Prior evolutionary theories

3.1. Theories conflating prestige and dominance

Barkow (1975, 1989) argues that prestige is homologous to nonhuman dominance. The social rankings imposed through force and force threat in nonhumans became the rankings of *merited* deference that we see in human societies. Missing from Barkow’s account, however, are the relevant selection pressures that would have achieved this exaptation. His attempt to supply them involves female mate choice. We sketch his model (Barkow, 1989, pp. 186–188):

Importance of male parental investment → female preference for males with greater subsistence skills, and male preference for the same in females → both males and females compete intrasexually to increase skills related to resource acquisition → selection for skill → exaptation of dominance into prestige

Every link makes sense, except for the last one: how does selection for skill *transform* dominance into prestige? Barkow says that males with greater skills are capable of higher levels of investment, and they are also those with better cultural capacities (i.e., greater innate ability in social transmission). Females, then, in choosing skilled males, select males with greater cultural capacities. But the last link remains unexplained. Why is prestige an exaptation from *dominance*? And what exactly *is* prestige? Female preference? Or greater cultural capacity?

Barkow (1989, p. 150) solves the problem by assumption: “Let us assume (assumption 1) that, among our protocultural ancestors, those males best able to learn and to transmit protocultural information tended to be the most able to provide parental investment and also to be the highest in status.” Since those best able to transmit were earlier assumed to be the

most highly skilled, the above stipulation amounts to assuming that the skilled have status. But this is what has to be explained (for a similar model, see Hill, 1984a, 1984b).

3.2. *Status arises from social exchange*

Some evolutionary psychologists explain nonagonistic status as exchange between individuals with differing assets, skills and/or resources (Patton, 2000; Pinker, 1997, p. 499, Tooby & Cosmides, 1996). Whether or not a behavior is *directed* to us, if the behavior benefits us, we should (if we can at a reasonable cost) do things that increase the likelihood that the actor will repeat it. This logic explains how trading relationships were bootstrapped from behaviors that originally were not directed towards trade but constituted instead “positive externalities” — that is, behaviors incidentally beneficial to others (Tooby & Cosmides, 1996). To the extent that some trading relationships involve one partner obtaining *tangible* goods (e.g., food, tools, coalitional support) at least partly in return for giving deference (e.g., by allowing the other to choose the best sleeping sites, sharing choice foods, excusing him from certain obligations, etc.), this view helps explain the origins of nonagonistic status. Hereafter, we call this the “tangible goods” hypothesis.

In our view, one must pay close attention to the goods being exchanged, for important selection pressures may be particular to certain goods. Explaining many ethological displays, attention and memory biases, emotional states, and patterns of influence and imitation evident in human status processes requires special attention to the trade in deference for high-quality information, for these processes would not arise by trade in deference for tangible goods alone.

If individuals have valuable assets, it makes sense to exchange deference for them. But why defer to them when they cease to produce tangibles (e.g., old men who are no longer able to produce)? Why remember what they say about a wide range of topics well outside of the exchange? Why copy their behaviors and opinions? And why is human status so different from that of other social species? Why does not social exchange among baboons and chimpanzees, who vary greatly in their individual skills and productive capacities, produce human-like status hierarchies? The hypothesis below addresses these questions.

4. **Evolving prestige: the information goods theory**

4.1. *The importance of social learning*

Prestige is a consequence of the evolution of direct social learning capacities in the human lineage — abilities that are quite distinct, from the social learning abilities of other species (Boyd & Richerson, 1985; Durham, 1991; Tomasello, 1994). For our argument, the most important difference between human and nonhuman social learning is that humans possess various forms of direct social learning, or “infocopying” that most other animals completely or almost completely lack (Tomasello, 1994, p. 304; Tomasello, Kruger, & Ratner, 1993). In *true imitation*, for example, a human imitator can copy the behavior or behavioral strategy of a model, including the motor patterns and objectives. So, for example, when a human child

learns to throw a ball, she tries to copy the model's arm motions and footwork as well as the objective (usually, getting the ball accurately to the receiver). In contrast, other forms of social learning common in nonhumans do not involve the transmission of both goals and motor patterns, e.g., *local enhancement*, *social facilitation*, *emulation learning*, etc. (Whiten & Ham, 1992). In local enhancement, for example, the learner's proximity to a skilled individual (and any necessary materials) increases the chance of reinventing — rather than directly acquiring — the behavior.

4.2. *Ranking and deference*

If chimpanzees lack infocopying abilities, these social learning capacities probably arose in our lineage some time after the hominid–chimpanzee split.² However, our story begins with two adaptations that probably preceded the rise of infocopying: (1) skill ranking of conspecifics and (2) discriminatory deference. Pigeons and macaques (Giraldeau & Lefebvre, 1986, 1987; Stambach, 1988), and possibly many group-living species, can rank conspecifics in terms of foraging success. “Scroungers” in these species can identify successful food producers and maintain proximity to them in order to feed from their food finds. Probably to increase their success, scroungers also give deference to the producers. For example, some macaques (Stambach, 1988) not only maintain close proximity to successful foragers, but also preferentially groom producers even when such producers have low dominance rank. Note that trading deference for scrounging opportunities has nothing to do with social learning, and may thus predate infocopying. In fact, macaques show no infocopying abilities.

With the evolution of infocopying, selection favors articulation of these capacities with preexisting ranking abilities and deference biases. Ranking abilities allow infocopiers to target their infocopying efforts preferentially toward models with high-quality skills. Deference biases allow imitators to buy proximity to their targets, improving their copying reliability and fidelity. If infocopying evolved first, then selection would have favored ranking abilities and deference biases, since discriminatory, sycophantic infocopiers would have outcompeted infocopiers without these capacities. However, these likely cognitive preadaptations add plausibility to our account.

If rank-biased social learning is such a useful adaptation, why is it not more common? The reason is that ranking abilities do not improve social learning unless the variation in skill or knowledge of models can be tapped. For example, suppose chimpanzees, by watching conspecifics, can infer a connection between reeds and getting termites (emulation learning), but, lacking true imitation, they cannot acquire the details of anyone's technique. Since the association between reeds and termites is constant across all models, and what vary are the details of technique (which cannot be acquired without direct social learning), social learners

² It is not clear whether chimpanzees are entirely lacking in true imitative capacities (see Boesch & Tomasello, 1998; Whiten, 1998). However, the key difference may be quantitative, rather than qualitative. As a species' reliance on true imitation increases, the relative benefit from improved copying abilities increases. But, if a species only rarely uses its imitative abilities, or only in some narrow behavior domain (like termite fishing), the benefits of improved imitation may not exceed the costs.

derive no benefit from ranking the termite-fishing success of others. Thus, we predict that rank-biased social learning should only be found in group-living animals with *direct* social learning capacities (infocopying).

These observations apply generally to prestige-biased transmission processes. In “influence,” where the behavior of a source moves me closer to her position, some information needs to be directly transmissible — otherwise all we have is the association of a person with a position. Unless information related to the variation in strength of commitment to a position or belief across different individuals can be directly transmitted, ranking their success in some domain cannot result in influence.

Next question: if infocopying capacities are so adaptive, why are they not more common? Boyd and Richerson (1996) have modeled this problem, and convincingly argued that if group members are all individual learners, mutant infocopiers cannot invade even though infocopying is evolutionarily stable once common. Thus, a fitness valley impedes the evolution of direct social-learning capacities, so they should be rare in nature.

4.3. *Picky infocopiers and rank-biased transmission*

Coevolutionary models of individual learning and infocopying show that individuals ought to retain some reliance on individual learning because (1) anything acquired socially can be refined through individual learning and (2) temporally and spatially varying environments will act to devalue culturally transmitted information (Boyd & Richerson, 1985; Henrich & Boyd, 1998). At the population-level, individual learning, infocopying, ranking abilities, and deference combine to produce what we call *prestige-biased guided variation*. To clarify this process, we construct it in steps, first considering the articulation of individual learning with rank-biased true imitation, and then adding discriminatory deference.

Although infocopying does not make individual learning obsolete, selection favors a strong reliance on infocopying in a wide range of environments (Boyd & Richerson, 1985, Chap. 4, 1988; Henrich & Boyd, 1998). Humans are thus *default infocopiers*, usually trying first to learn directly from others instead of “reinventing the wheel” (a great cost savings), and only then seeking improvements through individual learning.³ Default infocopying relies on social transmission when the costs of individual experimentation are greatest (thus outcompeting strategies with a heavier initial reliance on experimentation) but preserves the benefits of acquiring information about model quality.

Preadaptations to rank others (e.g., according to their food-finding abilities), combined with infocopying capacities, result in “picky” copiers. The details remain unknown, but both empirical and theoretical considerations suggest that people rank potential models using a number of cues. The first cue is the amount of freely conferred benefits and displays (i.e., deference) an individual receives — see below. Second, infocopiers assess the competence (skill/knowledge) of potential models in culturally valued domains (e.g., hunting, basketball,

³ Coevolutionary models of social and individual learning (Henrich & Boyd, 1998) show that mutants who rely *occasionally* on individual learning as their first guess — instead of social learning — outcompete those who *always* rely on socially transmitted information. This is because a small reliance on individual learning prevents individuals from getting stuck on the wrong behavior in spatially and temporally varying environments.

big yam growing, etc.) — often by observing simple indices such as hunting returns, rebounds, or yam size. Third, infocopiers assess cues of a potential model's state of health, such as clear skin (no growths, infections, discolorations, etc.), bright eyes, shiny hair, and a lack of disfiguring injuries. Finally, by incorporating the age and sex of potential models into their assessment, infocopiers increase their likelihood of acquiring information relevant to their role and stage in life.

By combining an assessment of model competence in culturally valued domains with their overall state of health (direct proxies of fitness), infocopiers can both adapt to novel environments where required competencies differ (ice fishing, stone tool making, and bitter manioc processing), and ignore the maladaptive behaviors of individuals competent in cultural domains with net fitness costs. In our ancestral environment, this state of health assessment acted to cull out cultural domains that tended to reduce the fitness of those who adopted them as valued, and promote the spread of cultural domains whose practitioners see fitness benefits. We do not expect this to be true in many contemporary societies where modern institutions and divisions of labor have decoupled the effect of investing in a valued domain on one's state-of-health proxies. For example, an expert in theoretical physics may not look any less healthy than a farmer. Modern societies can therefore spawn endless valued domains where higher investments correlate negatively with reproductive success. However, in small-scale societies lacking division of labor and supporting institutions, arcane endeavors that compromise food production are likely to make practitioners appear unhealthy compared to their neighbors.

Individual, trial-and-error learning may also act to maintain the statistical connection between “culturally valued domains” and adaptive behavioral domains in ancestral environments. Individuals receiving poor marginal rates of return for investments in skill are likely to invest instead in other domains yielding “sellable products” (e.g., fish, medicinal herbs, canoes), deference benefits, or simply direct benefits (lots of fatty meat and sex). Given the ineffectiveness of contraception in the ancestral environments, excellent performers in valued domains would be transforming their trade-benefits into reproductive success.

Age and sex should also be important ranking criteria. Premodern societies have a strong, sex-based division of labor, so children should prefer somewhat older, same-sex models. This allows children to acquire gender-relevant skills and scaffold themselves to increasingly complex skills — for copying models that are too advanced will often result in failure.

Each generation, as people copy highly ranked models, the mean behavior of the population will move quickly — relative to genetic evolution and ordinary “guided variation” (Boyd & Richerson, 1985) — towards the most adaptive behavioral repertoire currently represented. As copying errors and individual experiments add new variation, the group's mean behavior will move toward the locally most adaptive configuration. However, because infocopying is *generalized* rather than targeted at specific traits (defended below), maladaptive traits possessed by the highly ranked models may hitchhike along with adaptive ones.

4.4. Picky infocopiers “kiss up”: the evolution of deference to skilled models

Infocopying benefits from the cooperation of the chosen model because perceptual access is a minimum requirement. Picky infocopiers who induce models to grant better perceptual

access (and perhaps provide direct instruction) have an advantage, especially when acquiring more complex behaviors and strategies. For example, only if the skilled hunter likes you can you accompany him on the hunt and observe his practices up close (perhaps receiving verbally transmitted tips), and thereby acquiring his superior knowledge/skills (e.g., tracking practices, approach methods, spoor interpretation, bow handling techniques, etc.). In order to gain this kind of preferential access, infocopiers become valuable interactants by “kissing up.” Infocopiers have evolved to do all sorts of things that models were already adapted to like or seek in potential interactants, such as being especially trustworthy, offering all sorts of help without expecting anything in return, deferring to the model’s judgment, being nice and helpful to the model’s children, exempting the model from certain obligations vis-à-vis the copier, etc.

One may object that many behaviors can be acquired without close proximity, so buying access with deference incurs unnecessary costs. This objection assumes that infocopiers know at what times they should be watching, i.e., that they have figured out exactly which of the model’s many behaviors contribute to his/her success. However, the success of the model, like most behavioral outcomes, is likely the result of very complex interactions among a large number of variables. Being a good hunter, say, probably depends not only on specific skills such as making a good bow, knowing how to aim, etc., but also on tracking knowledge/skills, animal behavioral knowledge, approach and pursuit techniques, prey preference, as well as on more indirect factors such as sleeping properly, keeping a certain diet (e.g., eating lots of vitamin A-rich foods to maintain good eyesight), and observing certain habits, etc. Thus, given the prohibitive acquisition, storage, and analysis costs involved in teasing out precisely which behavioral combinations actually lead to desired results, evolution would instead make copiers rely on a *general copying bias* (Boyd & Richerson, 1985, Chap. 8).

In any case, many behaviors and skills — even those obviously related to a model’s success — *cannot* be copied without close proximity to, and interaction with, the model. Hunting is one of them. Tracking abilities alone require the development of a counterintuitive “scientific” skepticism, involving hypothesis-testing, that cannot easily be learned without social assistance (Liebenberg, 1990). Furthermore, the evolution of language liberated a great deal of information for social transmission that is difficult to infer through mere audio-visual perception. The disbursement of this language-bound information can be tightly controlled by the model and thus creates even stronger selection pressures for copier deference.

4.5. *Broadcasting expertise: deference as an honest signal*

“Status” equals the amount of deference received. In our species, it appears that those with nonagonistic status are also those with skill/knowledge in valued domains of behavior. Thus, if a model’s skill stimulates observers’ deference (to buy proximity), then deference and skill will correlate — something Barkow (1989) assumed but which the present hypothesis can explain. This correlation provides yet another opportunity to save on information-gathering costs, because new entrants can exploit the distribution of deference as a low-cost cue to identify worthy models. This selects for infocopiers who leapfrog directly to the more fawned-over models and avoid the start-up costs of gathering and processing information about relative model quality. In addition, such infocopiers avoid the costs of not having

adaptive information (specific traits or information about model quality) during the initial stages of learning.

The distribution of deference is a reliable and honest signal of relative model worth because such signals are costly to fake. Sycophants cannot deceive their competitors by deferring to someone they would rather *not* copy without increasing their total deference costs and losing some access to their preferred models. Sycophants also cannot easily conceal deference directed to the desired model, for this entails a bias for private deference and therefore a reduction in total deference, and hence in less access. Moreover, models should prefer public displays of deference in order to broadcast their prestige and attract more clients.

Thus, *default infocopiers*, when unsure about model quality, evolved to prefer “models with the largest and most lavish clienteles.” As information about relative skill differences becomes available, infocopiers can switch their focus if a superior model is found. Concurrently, they improve their skills somewhat via individual learning.

If every naïve starts out with a model perceived to be (as per deference received) the most skilled individual, then everybody’s initial goal is the best, or close to the best, currently available transmissible idea, behavior, or strategy. If copying is reasonably reliable, effective cultural traits can spread rapidly. Thus, *prestige-biased guided variation* allows populations to approach adaptive optima much faster than they would under Boyd and Richerson’s (1985) *guided variation*, which lacks the information-channeling force of prestige distributions.

A hunting example will illustrate the above argument. Novice hunters may assess who is most successful among experienced hunters by comparing daily returns. However, picking a model on the basis of this 1-day sample is risky, for hunting success will exhibit much short-term variance. Only hunting returns averaged over a great many days will reliably predict hunting skill. Thus, novices are initially better off selecting models who are already favored by others. Later, after they have accumulated their own long-term samples, they can refine these borrowed judgments. Hunting returns are hard to fake — and if they bring prestige, they will be advertised — so information-gathering costs are substantially reduced for novices.⁴

4.6. *Coevolution of copiers and their models*

Some further implications of our theory arise from considering the coevolution between copiers and models. In prestige, clients choose whom they defer to, so a kind of “market” results. Like “firms,” models compete for “customers” (the copiers) who shop around for the best deal. Models should be sensitive to how “profit curves” change with added clients, for these “firms” can have too many customers. A hunter’s fitness initially increases as more clients raise total deference. So the hunter may prefer having 3 sycophants to 1, but would he want 20? Large hunting parties may scare off potential prey. Thus, good hunters should raise the cost of access by acting more arrogantly as clientele size approaches the optimum. On the other hand, if no practical limit on optimal clientele size exists (e.g., great storytellers), or if means other than arrogance will limit clientele-size (e.g., bodyguards),

⁴ Although we have been using hunting as our reference example, and hunting is typically a male activity, these arguments apply equally well to females and to the whole range of typically female activities such as food gathering and child care.

then increases in arrogance should *not* accompany growing prestige. Alternatively, if one's benefits do not come directly and primarily from client deference, the prestigious may learn that arrogance is not too costly (e.g., some sports stars). Finally, models should prefer above-average learners because they advertise the model's quality and provide a potential source of valuable information.

For clients, the benefits of access diminish rapidly with increasing clientele size. Competing with more clients may mean less individual attention from the model, so copiers may prefer less popular, lower-quality models with cheaper prices of access.

Careful modeling will be required to understand the full implications of this process. However, we submit that the more competition there is for clients, the "nicer" models should be, because infocopiers evaluate their clientele size, and the price of joining — not just skill. The prestige market thus seems more like an ecology of resource patches (the models) where consumers (the clients) distribute themselves according to the patches' richness and the competition for access. Some readers may reason that if client choice dynamics are fast relative to those governing (1) the entrance of new naïve clients and (2) improvements in model skill and price of access, the system should quickly reach an "ideal free distribution," where every "deal" is the same for the next entrant into the system. At this point, the distribution of deference no longer provides information, so naïve clients should be indifferent as to their choice of model and no stable selection pressure results for an initial bias to prefer models with intense clienteles.

We think this intuition is wrong. If clients are going to pay for their models, they will do so only for above-average models because average skills can be obtained from one's parents without deference payments. So clients will be distributed only over above-average performers, and thus a bias for clientele intensity still narrows the naïve entrant's choices to models skilled enough to have clients. Second, if one person occasionally monopolizes all clients, a prestige-bias takes naïve entrants straight to the best copying "deal." Finally, client choice is probably not so fast that the death, injury, and skill improvements of models do not jolt the system out of equilibrium for significant periods. As in modern markets, equilibria are never achieved and consumers should compare quality and prices, or risk missing a rising star.

We believe this prestige market allows us to explain what appears as a counterintuitive fact: some high-status humans display *subdominant* ethology (deep bows, bringing one's hands to the center of the body, lowering the head, and generally appearing bashful). In contrast, these behaviors are not observed in dominant nonhumans. Self-deprecation is also common in prestige: those receiving applause and awards will publicly "doubt" their worthiness and attribute the gesture more to client generosity than personal prowess (in the US, Oscar-winning movie stars thank everyone, and stand-up comedians credit their success to their "great" audience).

Some elements of dominant pride displays (staring, squared shoulders, chest out, erect posture, stiff-legged gait, etc.) are sometimes evident in prestigious individuals, and may act as an advertisement of status (and, by implication, skill), thus alerting potential followers. However, they are diminished, less common, and apparently unappealing in their strong versions (cf. Goode, 1978, pp. 21–22). Perhaps, this is because: (1) to the extent that pride signals a dominant individual, it scares off clients and (2) because clients have choices,

models may *learn* to avoid behaviors — beyond any basic attenuations already achieved by selection — that make them less competitive in the prestige market.

4.7. Costly signaling, public goods, and prestige

Commonly, those who supply public goods at personal cost earn prestige. Our model does not, by itself, account for this. Deference will not buy altruism, should it depend on it, because those who “cheat” (do not defer) have higher fitness; giving deference in exchange for public goods has a second-order free-rider problem (Boyd & Richerson, 1992). Moreover, one should not want to copy obviously costly behaviors. However, perhaps excelling in domains generating public goods helps broadcast the altruist’s copy-worthy skills. Everytime a hunter shares a big kill with the group, his prowess is more likely to be noticed and remembered by others. All other things equal, models who excel in domains with better broadcast opportunities will gain more clients, more prestige, and more fitness-enhancing deference. Consequently, there should be a preference for behaviors that facilitate such broadcast opportunities — and providing public goods often furnishes such an opportunity (Smith & Bliege Bird, 2000).

5. Predictions and evidence

Here we present predictions derived from the information goods theory, and the available evidence. Not all predictions below are unique to this theory but, as a group, they cannot be better accounted for by any competing model.

5.1. General predictions about prestige, skill, and age

5.1.1. Skilled individuals have higher status

Individuals will seek out and pay deference to highly skilled individuals in exchange for copying access. The relation between skill and status is also predicted by the tangible goods hypothesis discussed earlier.

In geographically diverse societies, numerous ethnographers have observed the relationship between hunting skill and status. For example, among the Kuna, an island-living population that hunts and farms on Panama’s Caribbean coast, a lifetime record of tapir kills is kept (i.e., remembered) for each male. Males with the most tapir kills (a measure of hunting skill) receive higher status (Ventocilla et al., 1995, pp. 39–40). Among the Naskapi, hunting knowledge about animal migratory patterns, feeding cycles, tracking, etc., confers prestige (Moore, 1957). Among the Cubeo, Goldman (1979, p. 57) writes, “hunting, in summary, is a distinctive pursuit and marks one for prominence” (jaguar teeth are used to make girdles, which mark one’s high status). Among the Siriono (Bolivian foragers), Holmberg (1985, p. 58) notes, “If a man is a good hunter, his status is apt to be high.” Stearman (1984) further confirmed this for the recently settled Yuquí, who are probably closely related cultural relatives of the Siriono. Among the hunters in the Kalahari, “Although no one is in command, an informal leadership may develop and parties tend to form around good

hunters” Liebenberg (1990, p. 55). After reviewing the literature on foraging societies, Kelly (1995) argues that hunting large game is always a highly valued activity, and hunting skill is a primary means to acquire prestige.⁵

Excelling in certain other domains is also commonly associated with status throughout the ethnographic literature, particularly in simpler societies. These include combat (e.g., Yanomano: Chagnon, 1992; Achuar: Patton, 2000), oration (e.g., Semai, Dentan, 1979, p. 69; Benkulu: Fessler, 1999; Kuna: Howe, 1986; !Kung: Lee, 1979, pp. 343–344), and healing/supernatural knowledge (Lee, 1979, pp. 343–344; Simmons, 1945). Counting systems to keep track of an individual’s successes in combat (i.e., their “kills”) are common (e.g., Bateson, 1958, p. 48; Murphy, 1960). Farming and herding skill are an important criterion for status in small farming communities in rural New Zealand and, moreover, people feel that this is “natural” and in need of no justification (Hatch, 1992, pp. 89–90, 102, 108–109).

Coleman (1961) asked adolescent males what qualities were necessary to be respected by male peers, and by female peers. Students ranked athletic skill at the top, and scholastic skill at either the bottom or second-to-last, for both questions (the list of 6 options also included “being in the leading crowd,” “having a nice car,” etc). This shows (1) the importance of skill and (2) the effects of local culture in making some domains relevant.

5.1.2. Older individuals will tend to get more prestige than younger ones

Age is a proxy for skill/knowledge/success; the longer someone has lived, the more and better skills/knowledge he/she has likely accumulated. Simply living longer is a complex “skill” with acquirable components. Deference toward elders allows proximity and thereby promotes the acquisition of useful information. This reasoning predicts a general correlation between age and prestige, and also that elderly individuals will maintain their status well past their prime. In contrast, the status of elderly nonhuman primates usually falls in tandem with their coercive powers.

This prediction does not hopelessly confound prestige with dominance, or with conventional reciprocity, because, though older people receive deference, (1) some older individuals cannot deploy *force or force threat*, (2) many elderly are unable to reciprocate good turns in tangible currencies (or at least will not do so for much longer), and (3) one can determine whether deference towards elders has prestige vs. dominance ethology/psychology.

The best current evidence for the relationship between age and prestige comes from behavior towards the elderly. Despite being unable to contribute to the household or community economy, or reciprocate in tangible benefits, the very old will nevertheless often become high in status. This should not be the case if all nonagonistic status is reducible to exchange for tangible goods. Simmons (1945) provides evidence for this in an extensive cross-cultural survey of the role of the aged in 72 simple societies, 69 of which are known from ethnographic rather than historical sources. Of these 69, 46 include explicit ethnographic mention of (often quite extreme) respect, deference, reverence, homage, or

⁵ For additional examples see: Aché: Hawkes, 1991; !Kung: Lee, 1979; Naskapi: Moore, 1957; Shuaranahua: Siskind, 1973; Cashinahua: Kensinger, 1995; Efe: Bailey, 1991; Shavante: Maybury-Lewis, 1967; Meriam: Bliege Bird & Bird, 1997.

obedience to the aged. From 5 more, the high status of the elderly can be inferred (e.g., a requirement that chiefly roles be filled by elders). Simmons (p. 79) observes that “the most striking fact about respect for old age is its widespread occurrence . . . practically universal in all known societies.”

Simmons (*ibid.*) also notes that “There have usually been extenuating circumstances, qualifying conditions, and . . . a ‘prime of life’ in old age — when prestige has been attained; and other circumstances under which it has been denied or has practically disappeared.” Tellingly for our hypothesis, the most important moderating variable seems to be the elderly’s obvious skills/knowledge or lack thereof. For virtually all of the sample, there is ethnographic mention of recognized bodies of knowledge that only the aged possess, or possess in obvious superabundance relative to younger people (magic, lore, hunting skills, calendrical, and traditional knowledge, medicine, etc.). Respect towards individual elderly persons varies considerably, and those with acknowledged expertise are most highly respected. Neglect of the aged appears invariably to follow senility and decrepitude, which make information transfer either moot or impossible. When variability in respect is extreme, with some elderly but not others suffering serious neglect, ethnographers typically report that the aged can only escape neglect if they possess valuable knowledge and skills. Simmons (1945, pp. 50–51) concludes:

Most primitive societies have insured some respect for the aged — often remarkable deference . . . at least until they have become so “overaged” that they are obviously powerless and incompetent . . . respect for old age has, as a rule, been accorded to persons on the basis of . . . their extensive knowledge, seasoned experience, expert skill, power to work magic, exercise of priestly functions, control of property rights, or manipulation of family prerogatives . . . their skill in games, dances, songs, and storytelling.

Despite their physical weakness the elderly certainly hold much political sway (sometimes *total*). A full 52 (out of 72) societies in the sample boasted aged chiefs, and many *require* advanced age for the role. There is also widespread participation of the aged in councils and they tend to be generally influential even when there is no institutional office to fill.

Silverman and Maxwell (1978), like us, see a link between expertise and deference to the aged. In a randomly selected sample of 34 small-scale societies they found only two with no ethnographic mention of deference towards the elderly.

5.1.3. Individuals with perceived skill/knowledge receive privileges, and are excused from certain social obligations

Those with real or perceived skill will see an asymmetrical flow of “perks” in their favor. The tangible goods hypothesis also makes this prediction.

A variety of ethnographic data confirms this prediction. Bateson (1958, p. 91), for example, found a case among the Iatmul in which a man “had sufficient standing in the community to marry his own wife’s mother, and this while his wife was still alive and married to him. He was a great sorcerer and at the same time a great debater and fighter. It was nobody’s business to say him nay . . .” Similarly, Hawkes (1990, 1991) reports that Aché males more frequently “overlook” sexual liaisons between their wives and highly skilled hunters.

In small-scale societies, the elderly tend to be prestigious, perhaps due to their accumulated experience, and this often translates into specific institutionalized perquisites and norm exceptions. The following age-perk illustrations are culled from Simmons (1945). Aged Omaha were no longer obliged to scarify themselves when someone died. Among Tasmanians, old people get the best food. Beer drinking was formerly an exclusive right of Akamba “grandfathers,” and the wood from a certain “spirit tree” could only be used by an old man or woman. Old Todas were accorded special privileges in the “catching of buffalo” at the funeral services. Aged Ainu had the exclusive privilege of conversing with foreigners. Aged Crow were excused from unpleasant tasks, and at the Sun dance ceremonies they were free to move at will.

Some experiments support the idea that there is a psychological bias to exempt prestigious individuals from some social sanctions and confer perquisites on them. For example, Bickman (1971) showed that subjects are more honest towards high-status individuals, i.e., those wearing business suits. Ungar (1981), with a similar manipulation, found that when high-status individuals offer excuses (claiming that somebody else is to blame) they are derogated less than low-status individuals, even though nobody is fooled about who is to blame.

5.1.4. Skillful individuals evoke prestige-deference and are well thought of in their social group

Those with real or perceived skill are popular. Their followers will seek to preferentially maintain proximity and interaction with them. The tangible goods model predicts this, but our theory also predicts that even if skilled individuals do not confer *tangible* benefits they will remain attractive, as information goods may remain available.

Psychological studies have repeatedly shown a correlation between skill and companion desirability. Gross and Johnson (1984) measured performance in 12 athletic skills (including running, swimming, basketball, and soccer abilities), and preferences for work and playmates. For 69 boys (ages 9–13), their performance scores in 9 of 12 skill areas was positively correlated with their preference scores; while among 39 girls, the same was true of 7 out of 12 skills (also see Moore & Fall, 1970; Thomas & Chissom, 1973).

Economic experiments using real monetary rewards show that more skilled individuals receive benefits from less skilled individuals. For example, (Ball, Eckel, Grossman, & Zane, unpublished observation) manipulated apparent skill by making the results of an apparent “trivia quiz” known to participants. In subsequent bargaining interactions, prices were higher when high-status sellers faced low-status buyers and lower when low-status sellers faced high-status buyers relative to controls. Performance on the trivia quiz is the only information participants have about each other, so players seem motivated to defer (at a real financial cost) to more skilled individuals.

5.2. Predictions about imitation, biased transmission, and influence

5.2.1. People preferentially copy skilled/successful individuals

Miller and Dollard (1941) claimed that the “prestigious” — defined as skilled or successful individuals in the immediate circumstances — are preferentially copied. Rosen-

baum and Tucker (1962) tested this by asking pairs of subjects to pick winners in horse races. Subjects showed a strong propensity to imitate the choices (i.e., horse “A” or “B”) of models with a “high competence” (those with a high frequency of correct answers), even though each subject faced a different race (see also Baron, 1970). Qualitatively similar results have been repeatedly obtained (Chalmers, Horne, & Rosenbaum, 1963; Greenfeld & Kuznicki, 1975; Kelman, 1958; Mausner, 1954; Mausner & Bloch, 1957).

Age and competence interact to influence copying bias. In a study using second-graders, Brody and Stoneman (1985) showed that age and competence interact to influence the copying bias. In order of decreasing preference, second-graders copy: same-age/high-competence, younger/high-competence, same-age/low-competence, younger/low-competence. When competence information on an *unrelated* task was available, it was a much stronger determinant of imitation than age. Brody and Stoneman (1981) also show that children will preferentially imitate older and same age models over younger models when the models are observed side-by-side in the “favorite food game.”

Several studies have found that investment decisions are based on copying good performers. In a multi-round investment experiment involving substantial stakes, Kroll and Levy (1992) unexpectedly found that when the performance of players (MBA students) was posted between rounds for all to see, participants “mimicked” the behavior of top-performers, even though players were rewarded competitively. In contrast to a previous experiment in which nothing was posted, copying high performers here allowed the whole group to move much closer to the optimal allocation behavior. Similarly, Offerman and Sonnemans (1998) show that players making investment decisions tended to copy the beliefs of successful investors (based on past performance) about the current state of the environment, even though imitators knew that good investors possessed the same information as they did (also see Pingle, 1995; Pingle & Day, 1996).

5.2.2. *Prestigious individuals are influential, even beyond their domain of expertise*

Like behavioral traits, the ideas, values, and opinions of prestigious individuals are also likely to be copied (Gibb, 1954, p. 252). Because figuring out which combinations of ideas, beliefs, and behaviors make someone successful is costly and difficult, selection favored a general copying bias, which also tends to make prestigious individuals generally influential (as people copy and internalize their opinions). Furthermore, much of the information that leads to success in one domain will often be transferable to others. This is probably why acquiring skill in one domain (e.g., a martial art) is often touted as promoting success in many other areas. For example, problem-solving methods, goal-achieving strategies, eye–hand coordination, control over one’s emotions, etc., are useful across several domains. Thus, prestigious individuals tend to be influential. No competing theory makes this prediction.

Ethnographic accounts of the influence of prestigious individuals are common. Goldman (1979, p. 155) writes that a Cubeo headman “is the chairman of discussions and arbiter of disputes. He has no authority to order punishment, although his opinion carries weight.” Among the Meriam of the Torres Strait, great turtle hunters are permitted to speak and are listened to more than others, despite the fact that their skill in hunting turtles gives no direct indication of their skill in public affairs or politics (Smith & Bliege Bird, 2000).

Skilled !Kung orators, arguers, ritual specialists, and hunters “may speak out more than others [in group discussion], may be deferred to by other discussants, and one gets the feeling that their opinions hold a bit more weight than the opinions of other discussants” (Lee, 1979, p. 343).

Ryckman et al. (1972) demonstrated prestige influence by examining how “locus of control” (“internal” vs. “external”) interacts with a prestigious source in attitude change. “Externals” are fatalistic, whereas “internals” feel “in control” due to their skill and/or determination. Using the topic of “student activism,” researchers elicited the opinions of subjects in three conditions: (1) after hearing the opinion of an expert in student activism (“relevant condition”), (2) after hearing the opinions of an expert on the Ming Dynasty (“irrelevant condition”), and (3) after hearing no opinions (the control). They found that “externals” (80% of the general population), in both the relevant and irrelevant expert conditions, and in contrast to the control, shifted their attitudes toward those of the prestigious individual. The effect size was identical in the relevant and irrelevant conditions. In contrast, neither expert had any effect on the opinions of internals. The researchers report that the lack of an effect for internals may result from their apparent awareness of the point of the experiment and their strong distaste for such manipulations. Ritchie and Phares (1969) obtained a similar result using the topic of national budget priorities. Rosenbaum and Tucker (1962) also found that competent models are copied even when their competence is unrelated to the copier’s circumstances.

A study by Tannenbaum (1956) investigated the effect of a prestigious source on attitude (opinion) change and found important effects. The sources used were: (1) a prominent individual, (2) a prominent newspaper, and (3) a prominent social group. His 3×3 design tested for how the same source would bias subjects who (1) had prior respect for the source, (2) were previously neutral towards it, or (3) had prior disrespect for it, on an attitude item they (1) previously agreed with, (2) were previously neutral towards, or (3) previously disagreed with. He tested the effects of the source’s positive and negative attitudes and found that subjects’ attitudes were pulled closer to those of the source, even when subjects’ prior opinions were contrary. Methodological problems of earlier research were avoided here (Asch, 1948).

Social learning should dominate when individual learning is difficult or costly, and this extends to prestige effects on influence. Studies show source expertise has greater impact when distraction is high (Kiesler & Mathog, 1968) and when topic-relevant knowledge is low (Wood & Kallgren, 1988). When the amount of scrutiny devoted to an argument is manipulated by presenting message recipients with written vs. taped arguments, source expertise has a greater impact on attitudes (Andreoli & Worchel, 1978). When arguments are ambiguous (difficult to evaluate), expert sources are more persuasive (Chaiken & Maheswaran, 1994). And, when messages are run faster to impair ease of processing, listeners rely more on source expertise than argument quality (Moore, Hausknecht, & Thamodaran, 1986).

The attractiveness construct shows very little consistency across researchers, and it does not always involve varying *physical* attractiveness while controlling for other sources of likeability (Petty & Wegener, 1998, p. 345). In one study that avoids these problems, Haiman (1949) showed that a model’s prestige and perceived competence significantly

affected opinions, while perceived physical attractiveness, “likeability,” and “fair-mindedness” *did not*.

5.2.3. *Prestigious individuals are memorable*

People should more accurately remember what prestigious individuals do and say compared to nonprestigious individuals.

Holtgraves, Srull, and Socall (1989) found that subjects recalled better the conversational contributions of an individual when they were told he was “the boss.” In the *high-status* condition, subjects were told that one of the individuals was “the boss.” In the *equal-status* condition, both interactants were identified as “co-executives.” Subjects recalled what the “boss” said significantly better than what the others said in both treatments. Since “the boss” here is not the experimental subject’s boss, the effect probably results from inferring that his superior skills made him *someone’s* boss — thus, it’s prestige rather than dominance vis-à-vis the subject.⁶

5.2.4. *Prestigious individuals, but not dominant ones, are preferentially copied in many behavioral domains*

Those who are freely deferred to — even when their skills have not been directly evaluated by the copier — should be copied because of the superior information they typically possess. However, the same should not be true for dominant individuals, unless individuals are copying the combat/dominance skills in an effort to become dominant. If nonconformity with the dominant individual’s behavior is taken as a challenge, individuals should copy, *but only in the presence of the dominant individual, and only to appease him* (a matter of compliance rather than internalization; see Kelman, 1958). Prestige-biased information transfers should have greater postinteraction stability than dominance-induced or pure-tangible-goods-induced transfers. No competing theory makes this prediction. Some work suggests that dominant sources have influence, but it does not examine the degree to which it is compliance rather than internalization (Petty & Wegener, 1998, p. 346).

In his review of the literature on the *Diffusion of Innovations*, Rogers (1995) argues that “local opinion leaders” strongly influence diffusion processes. These leaders are: (1) locally high in social status (e.g., high status within the village or village cluster), (2) well respected (indicating prestige rather than dominance), (3) widely connected, and (4) effective social models. After local opinion leaders adopt a novel practice or technology, it tends to spread much more rapidly, whereas prior to this it may not have spread at all. Rogers argues that “social imitation” is the heart of the diffusion process.

Labov (1972, 1980) shows that dialect change is led by individuals with high status in their local community. In Philadelphia, upper-class working women pioneer novel sound changes

⁶ Holtgraves et al. (1989) also manipulated when subjects received the status information: *before* or *after* the reading or observing task (they tested both recall and recognition using both observation of live action and reading tasks). Contrary to the researchers’ initial hypotheses, but in accordance with the predictions of the information goods theory, high status showed a significant retention effect in the “before,” but not in the “after,” condition. Only in the *before* condition can status information have an effect on attention and encoding processes with consequent results in memory stability.

that spread through the social strata. Similarly, in Martha's Vineyard, most do not notice dialect differences between themselves and mainlanders. Yet, they have granted considerable social status to local fishermen — who exemplify the local spirit of resistance and tradition — which has led to inadvertent copying of distinctive linguistic markers.

Using a task that involved guiding a marble through a maze, Bauer, Schlottmann, Bates, and Masters (1983) showed that female undergraduates preferentially copy the “style” of a prestigious model over a lower-status model, where the time taken to navigate the maze is the dependent measure. The “high” prestige condition subjects observed a “professionally attired PhD,” while in the “low” prestige condition subjects observed an “immature-looking college student” (both female). Both models took about 70 s to perform the task, but the prestigious models displayed a “slow and deliberate” style. Subjects copied this style, and as a consequence, performed much more slowly (in time to completion) than subjects with the low-prestige model (or in the no-model control). The work confirms previous research on the effect of prestigious models (Bandura & Kupers, 1964; Harvey & Rutherford, 1960; Lefkowitz, Blake & Mouton, 1955).

5.3. *Predictions about ethological patterns*

5.3.1. *Prestigious individuals will be gazed at more*

For effective copying, clients must gaze at prestigious models longer and more frequently. No competing theory predicts this.

In the Bauer et al.'s (1983) maze navigation task described above, the researchers also recorded the amount of time that subjects spent watching each of the models (a measure they termed “visual fixation”). Bauer et al. do not provide the data, but they specify that the high-prestige model was watched significantly more than the low-prestige model. They also note a significant correlation between “time to completion” of the maze (the modeled behavior) and time spent staring at the model. Thus, those who watch the model longer are also more likely to acquire her behavior (*all* participants were female).

5.3.2. *Absent other information, individuals should infer prestige status from ethology*

In the absence of personal knowledge and experience, people should pick out prestigious members of a social group simply by observing the ethological displays of group members.

5.3.3. *The ethologies and other behaviors elicited by dominant and prestigious individuals will contrast in predictable ways*

These are enumerated as follows: (1) prestigious individuals get direct and plentiful attention, dominant individuals get furtive glances, (2) in prestige, but not in dominance-hierarchies, lower-ranked individuals will seek close contact with the higher-ranked, who will be preferentially copied, and (3) prestigious individuals receive more *freely* conferred gifts (and other tokens) than dominant individuals.

Ethological studies of children have explored questions that bear directly on our predictions. Hold (1976) explored the relationship between status and attention, imitation, and other pertinent variables. Similarly, Abramovitch (1976) tested the relationship between dominance and proximity, on the one hand, and dominance and attention, on the other.

In Hold's (1976) ethological study of preschoolers, "attention" is a proxy for social rank. Hold (p. 179) argues that attention structure is "the best framework for analyzing social rank as it takes into account all leadership styles." However, we wish to distinguish between "leadership styles," and attention can arise in different ways. In dominance, agonistic encounters will attract much attention because they convey information about changes in the dominance hierarchy (Joan Silk, personal communication). But most of the time, a dominant individual gets mostly furtive glances from a safe distance — they certainly do not absorb much attention in long stares from *up close*. On the contrary, subordinates tend to turn their whole bodies submissively *away* from such higher-ups to avoid any appearance of confrontation. In prestige, we predict exactly the opposite: high-status individuals should get sustained and *generalized* attention, and clients should keep close proximity whenever possible.

In contrast to the attention measure(s) used by other researchers, Hold's (1976) measure captures prestige not dominance. Every 5 min, Hold sampled every child and recorded whether he was "the center of attention" (COA) — that is, "being looked at by three or more children simultaneously," who are, "standing within one meter of the child under observation, and their bodies and heads had to be oriented in the direction of the subject child" (Hold, 1976, p. 180). The probability that three individuals will simultaneously find themselves watching a dominant individual, with their bodies oriented toward him, *within a meter* of the dominant individual seems rather low.⁷ Therefore, COA, as an indirect measure of prestige, should strongly and positively covary with several of Hold's other measures, namely, "being imitated," "being obeyed," "receiving presents," and "Is told, shown, asked" (interactional preference). Table 2a shows the substantial correlations we found for each of these.

Importantly, COA does not correlate with "aggressor," but does correlate with "protector." Prestigious individuals need not be "aggressors" (that is a dominance strategy), but they possess the social influence required to "protect" the lower-ranked. Second, COA is uncorrelated with "imitator." The more prestige (i.e., skill-derived status) you have, the fewer skilled models will be available for imitation. Third, COA is either uncorrelated or negatively correlated, with "retreater" and "onlooker." More prestige means you do not need to retreat; your status leads others to defer to you and this includes restraining their aggression. And, with higher prestige comes greater number of interactions because you are sought more often by others.

COA should correlate strongly with an underlying prestige variable, but so should other prestige-relevant variables. To explore this, we performed a principal components analysis on Hold's (1976) data (see Table 2b for results) and found that Factor 1 (F1) accounts for 51% of the variation, and is by far the most important factor. Factor 2 accounts for only 24% of the variation. F1 seems to capture the hypothesized prestige variable. As expected, the "center-of-attention" variable is most strongly positively correlated with F1, along with "is imitated," and "present receiver" (all $> .90$). "Is obeyed," "protector," and "is asked, told, shown"

⁷ Some nonhuman primate subordinates groom dominant individuals, perhaps to avoid future aggressions. This may be confused with prestige-caused proximity maintenance. However, subordinate groomers do not maintain proximity to the dominant individual after the interaction, they do not fix their eyes on the dominant except when grooming, they do not stare, and they do not orient themselves toward the dominant, except in whatever positions are necessary for grooming.

Table 2

(a) Correlations of the center of attention variable with 13 measures

Observed behavior category	Correlation with center of attention measure	Significance P value
2. Aggressor	– .016	.9744
3. Protector	.795	.03
4. Is imitated	.841	.0142
5. Is obeyed	.930	.0009
6. Present receiver	.794	.0305
7. Is told, shown, asked	.912	.0021
8. Is avoided	.615	.152
9. Imitator	– .128	.7975
10. Friendly child	.058	.9071
11. Seeking reassurance	– .135	.7853
12. Retreater	– .745	.055
13. Onlooker	– .625	.1425

Correlations clearly predicted by the information goods theory are in bold.

(b) Theoretical predictions and F1 from principal components analysis

Observed behavior category	Predicted relationship with prestige	Actual correlations with F1
1. Center of attention	++	.94
2. Aggressor	.0	.18
3. Protector	+	.84
4. Is imitated	++	.93
5. Is obeyed	++	.88
6. Present receiver	++	.92
7. Is told, shown, asked	++	.83
8. Is avoided	–	.76
9. Imitator	–	– .31
10. Friendly child	.0	– .01
11. Seeking reassurance	.0	– .02
12. Retreater	–	– .85
13. Onlooker	–	– .70

The “++” symbols predict a strong correlation. The “+” symbol indicates a weaker positive correlation. The “.0” predicts no relationship. The “–” indicates a negative correlation.

were correlated at $>.80$. We also predict the negative relationship between F1 and both “retreater” and “onlooker.” Prestigious individuals are rarely forced to retreat, owing to their influence and the desire of others to please them. Their salience prevents them from being merely an “onlooker.” We remain surprised that “is Avoided” contradicts our predictions.

Abramovitch’s (1976, p. 158) study of dominance interactions in children ages 3 to 6, in contrast to Hold (1976), operationalized rank as follows:

the number of individuals with whom fights were won and lost . . . Rank determinants were made on the basis of “property fights,” struggles to gain or to retain an object (. . .) A property fight was defined as an agonistic or quasi-agonistic encounter in which two individuals actively “tussled” or fought over the same object (cf. McGrew, 1972). The child who obtained or retained the object was scored as the winner . . .

This is more likely to pick out dominance rather than prestige. As for attention, Abramovitch (p. 154) throughout claims to have recorded “glances,” and in her introduction notes that subordinates attend to alphas but avoid face-to-face contact and practice gaze aversion in order to avoid staring. These twin facts suggest she recorded glances, not stares, but she does not say explicitly how “glances” were operationalized. With regard to proximity, it “was investigated by analyzing the spacing between individuals of various ranks rather than by looking at actual amounts of space held by particular individuals.” This measure allows her to see whether subordinates are *avoiding* those of higher rank. In contrast to Hold, Abramovitch found that the high-ranked got more *glances*, and were avoided more, by subordinates.⁸

To this evidence we add that recent ethnographic work on the ethology of status in Benkulu, Sumatra reveals that people with institutional offices (i.e., with real power over punishments and rewards, and thus analogous to dominant individuals in nonhuman primate hierarchies) receive displays from subordinates like those offered to dominant individuals by nonhuman primates (Fessler, 1999). However, these same displays are not offered to those whose prominence derives solely from their individual above-average achievements, such as good poets (Fessler, personal communication).

5.3.4. *Prestige rankings are socially transmitted*

When information about the relative merits of individuals is hard to collect, people rely on the “judgments of others,” often coded in markers such as medals, a university degree, etc. No competing theory predicts this.

Evidence for the importance of socially transmitted prestige ranking comes from three sources. First, the “expectation states” literature has found that status differences are “instantaneously” created in task groups, rather than evolving out of face-to-face interaction among participants. People may rely on markers that stand for social judgments, not personal evaluations (Berger, Rosenholtz, & Zelditch, 1980). Experimental manipulations provide similar evidence, for subjects often have only the researchers’ word on the relative statuses of available models (e.g., “leading economist” vs. “college sophomore”; Ritchie & Phares, 1969), and yet the predicted effects obtain. Finally, Hatch (1992) found that New Zealand farmers in small communities rely on the assessments of other farmers, as well as on individual judgment, to rank farmers according to their skill (which confers local prestige). *Nonfarmers*, who lack much direct evidence of farming skill, rely almost entirely on the socially acquired judgments of farmers to develop their prestige hierarchies, which correspond closely to those formed by the farmers.

5.4. *Distinguishing the information goods from other social exchange theories*

Social exchange between individuals with asymmetrical endowments of abilities, skills, resources, or knowledge can produce status differences. Such asymmetrical endowments may result from genetic inheritance, cultural inheritance, or noncultural environmental differences.

⁸ Russon and Waite (1991) studied the relationship between dominance rank and imitation in babies (11–16 months). Although their findings support our theory, we feel the subjects are too young to draw any conclusions.

In general, this logic should apply to many social species, not only humans. However, because of our unique social learning capacities, humans can trade an asset that most other species cannot: directly acquirable information. The exchange of information goods results in status processes characterized by particular psychological, ethological, and sociological features that would not arise through the exchange for tangible goods alone. Table 3 compares the tangible and information goods models. Both models make many of the same predictions, but there are interesting differences as well — and the preceding section provides evidence that addresses these differences. Focusing on the exchange for deference benefits for information goods helps us understand many important human status processes that an exclusive attention to “tangible” tradables would leave unexplained.

This is not the last word on human status. The evolutionary logic of social exchange, deployed in the analysis of specific kinds of assets, resources, and endowments, will continue

Table 3

Comparison of predictions derived from the information goods theory of nonagonistic status with those arising from the tangible goods approaches to social exchange

Predictions	Tangible goods	Information goods
Positive relationship between status and skill/knowledge	yes	yes
Asymmetrical flow of deference benefits	yes	yes
Influential opinion of skilled/knowledge individual	yes	yes
Characteristic ethological displays	^a	yes
Proximity maintenance when there are no tangible goods to be had	^a	yes
Individuals of perceived skill statements are more memorable	^a	yes
Prestigious individual's are gazed at more, even outside dyadic interactions	^a	yes
<i>Differences between the two models</i>		
Opinions adopted from prestigious individuals are both internalized and fairly stable.	no	yes
Status accorded by age, and to very old (even when economically marginal)	no	yes
Biased imitation (including imitation outside the model's expert domain)	no	yes
Children should bestow prestige-deference on and preferentially copy models that are somewhat older and of the same sex	no	yes
Noncultural and cultural species (those with direct social learning) will have qualitatively different status hierarchies	no	yes

^a We can imagine possible ways that the tangible goods approach could generate these predictions. But, to our knowledge, no one has explored them in detail or made them explicit, and the predictions are not as straightforward as they are for the information goods model.

to generate additional insights into the psychology, ethology, and sociology of both human and nonhuman status processes. For example, the nature of assets like coalitional support, storable food, fungible currencies, and rare linguistic competencies may have generated their own cascades of psychological adaptations, characteristic ethologies, and sociological phenomena. And, while they may not have yet spurred genetic adaptations, more recent cultural developments like long-term debt, large-scale private property, political institutions, and inheritance laws probably evoke novel recombinations of our old status processes, thereby giving rise to new sociological phenomena.

6. Conclusion

We have presented a theory for the evolution of prestige and prestige-biased cultural transmission. We have argued that prestige, in contrast to dominance, is a second avenue to human status and status-competition, which results from group living plus direct social learning capacities. From this theory, we have generated a number of testable predictions and have begun to review evidence from throughout the social sciences to substantiate them. In future work, we will test our theory by exploring the importance of hunting and related behaviors to prestige in foraging societies, the emotions involved in prestige and dominance hierarchies, and the evolution of social hierarchy (from the prestige economies of “big men” to the prestige goods of chiefdoms).

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