Letters of Recommendation: An Evolutionary Perspective

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ABSTRACT

We develop a theoretical framework for understanding the appeal and tone of letters of recommendation using an evolutionary perspective. We also develop and test several hypotheses derived from this framework. Our theoretical argument makes two major points. First, over the course of human evolution, people developed a preference for narrative information about people, and the format of letters of recommendation is compatible with that preference. Second, because recommenders are acquaintances of applicants, the tone of letters should reflect the degree to which the relationship with the applicant favors the recommender’s interests. We hypothesized that, over and above an applicant's objective qualifications, letters of recommendation will reflect cooperative, status, and mating interests of recommenders. We used 532 letters of recommendation written for 169 applicants for faculty positions to test our hypotheses. The results indicated that the strength of the cooperative relationship between recommenders and applicants influenced the favorability and length of letters. In addition, male recommenders wrote more favorable letters for female than male applicants, suggesting that male mating interests may influence letter favorability. We conclude with implications for practice and future research.

KEY WORDS: evolutionary psychology, letters of recommendation, human resource management.
Letters of Recommendation: An Evolutionary Psychological Perspective

Of the commonly used personnel selection methods, letters of recommendation are among the most perplexing. They are widely used and have a significant impact on hiring decisions (Bureau of National Affairs, 1988; Friedman & Williams, 1982; Levy-Leboyer, 1994), yet traditional letters of recommendation are unreliable, poor predictors of job performance, and biased (Aamodt, Bryan, & Whitcomb, 1993; Muchinsky, 1979). In addition, the theoretical bases of research on letters of recommendation are divergent—including behavioral consistency, impression management, person perception, and person-job fit (Aamodt, et al., 1993; Baxter, Brock, Hill & Rozelle, 1981; Ceci & Peters, 1984; Knouse, 1983, 1987; Kryger & Shikiar, 1978). Nevertheless, three themes have remained constant over the years in letter of recommendation research: improving recommenders’ accuracy in describing applicants, pointing out how improved letters benefit organizations, and questioning why letters are so widely used.

Researchers have regarded recommenders as flawed but trainable vehicles for providing accurate and reliable information about applicants to decision-makers. As a result, much of the research has involved identifying sources of inaccuracy in letters of recommendation and suggesting structural or training interventions to improve accuracy. Ceci and Peters (1984) suggest that organizations give recommenders the option of confidentiality because it increases candidness. Knouse (1983) suggests that organizations ask recommenders to focus on specific attributes of applicants because this increases letters' validity. Still, after numerous suggestions for improvement, letters of recommendation continue to reflect more about the idiosyncrasies of the recommender than the characteristics of the applicant (Aamodt, Nagy & Thompson, 1998; Baxter, et al., 1981). A primary purpose of research on letters of recommendation has been to increase their value to decision-makers who request letters. This reflects an emphasis on
organizations’ needs for useful information about job applicants. Yet there is little reason to believe that recommenders are motivated to provide accurate information to organizations (Knouse, 1983, 1987; Miller & Van Rybroek, 1988). When little or no basis of exchange exists between a recommender and an organization, a recommender is unlikely to be concerned about or even aware of the organization’s goals. The recommender’s primary interest is not with the organization, but with the applicant. Finally, the continued and widespread use of letters of recommendation has remained a conundrum. For years, researchers have asked why are letters of recommendation so widely used when studies continue to show that they are typically biased, unreliable, and marginally valid predictors of performance. Recently, Terpstra and Rozell (1997) argued that people use ineffective staffing practices because they are unaware of scientific research on staffing practices. Yet, ignorance of research findings is not a compelling argument for the use of letters of recommendation. They are widely used by faculty in psychology departments and business schools – most of whom are aware of research on letters of recommendation – for hiring new faculty and admitting graduate students.

The purposes of this paper are twofold. First, we present a theoretical framework based on an evolutionary perspective for understanding the appeal and tone of letters of recommendation. We begin with an overview of the evolutionary perspective and then suggest areas for integration between the evolutionary perspective and the literature on letters of recommendation. The second purpose is to present the results of an empirical study that tests hypotheses about letters of recommendation derived from an evolutionary perspective. In particular, we examine how recommenders’ personal interests in applicants influence the tone of letters of recommendation.

AN EVOLUTIONARY PERSPECTIVE
Evolutionary theory views the development of biological and social systems as occurring through a process of variation, selection, and retention (Dennett, 1995). Such systems develop through a slow process of small incremental improvements rather than through *a priori* design. The evolutionary perspective tends to be concerned with "why" and "function" questions. To take an organizational example, an evolutionary perspective would be concerned with why organizational practices exist in the forms that they do, the functions of those practices, and the processes by which they originate and change. There are two broad sub-perspectives within this intellectual tradition, socio-cultural evolution and evolutionary psychology.

**Socio-Cultural Evolution**

Socio-cultural evolution suggests that organizations and organizational practices develop from variations in form and trial and error, rather than strictly through deliberate design (Campbell, 1975; Colarelli, 1998). Driven by variation, selection, and retention, socio-cultural evolution is a process whereby *acquired* characteristics – such as behaviors and values – are socially selected and retained (Boyd & Richerson, 1985; Campbell, 1975). Variations can arise through pure chance, but they can also occur through guided evolution, where imitation, learning, and analysis play important roles (Boyd & Richerson, 1985). Through cultural selection mechanisms, organizations select some variations and usually retain those that are functional (Colarelli, 1998).² A high utility or efficiency value does not ensure that organizations will select or use a social technology. Circumstances must favor its inclusion into a pool of variations available to organizations, selection mechanisms must capitalize on it, and conditions must favor its retention. Indeed, organizations may learn to use a practice (e.g., letters of recommendation) which is invalid for its intended purpose (predicting job performance) because it produces other, functional consequences (screening out people who
might cause harm) or is compatible with evolved human preferences. It is probable that evolved human psychological mechanisms play a crucial role in the development of and preferences for cultural, including human resource management, practices.

**Evolutionary Psychology**

While socio-cultural evolution deals with social systems, evolutionary psychology focuses on the human mind and behavior. Evolutionary psychology is a synthesis of modern psychology and evolutionary biology. It uses the logic of natural selection to examine human mental processes and behavior. Two fundamental assumptions of evolutionary psychology are that the human mind is modular, consisting of numerous psychological mechanisms, and that these mechanisms evolved to solve particular adaptive problems that humans consistently faced over time. Just as the body contains different organs that function to solve particular adaptive problems (e.g., the eyes to see and the heart to pump blood), the mind contains different psychological mechanisms to solve adaptive problems of behavior, thought, and emotion. Psychological mechanisms are heritable, content-specific, and functional psychological processes that are activated in specific contexts for solving particular adaptive problems—such as identifying potential mates, competing for mates, responding to dominant or aggressive individuals, and preferring nutritious foods with high caloric value (Buss, 1995). People are not necessarily conscious of the psychological mechanisms influencing their behavior or of the functions they serve. However, the evolutionary psychological perspective does not deny learning, nor does it suggest that all behavior is “genetically programmed.”

A basic premise of evolutionary psychology is that the mind of present-day humans was shaped during 1.2 million years of the Pleistocene era, what evolutionary psychologists refer to as the environment of evolutionary adaptation (EEA). This has two important implications.
First, the human mind is not necessarily adapted to industrial and post-industrial society. Our current mental mechanisms evolved over hundreds thousands of years, and during most of this time humans lived in small hunter-gatherer bands on the African savanna. Second, changes in our mental mechanisms occur much slower than changes in culture. Behavioral patterns that are deeply rooted in evolutionary history cannot be quickly altered by cultural or technological change. For example, although the birth control pill was heralded as bringing about a sexual revolution where women would be as willing as men to engage in casual sex, this has not happened. Men are still more promiscuous, and women are still more choosy (Symons, 1979). Although, evolutionary psychology focuses on evolved psychological mechanisms, it is relevant to socio-cultural evolution. Evolved psychological mechanisms affect the type of behavior that humans engage in, and they constrain the degree to which new cultural and organizational variations can replicate (Nicholson, 1997).

**An Evolutionary Perspective and Human Resource Research**

All interventions make assumptions about systems and people. Nicholson (1997) has described the contrasting assumptions about human nature in the standard social science model and in evolutionary psychology with respect to organizational behavior. Colarelli (1998) has described the assumptions about systems, knowledge, and change in traditional and in evolutionary approaches to organizational interventions. Human resource research and practice flow in a hierarchical fashion from core assumptions about systems and people to interventions and predictions about those interventions. The traditional approach to human resource research differs from an evolutionary approach primarily in explanatory mediating variables—the presumed causal agents intervening between an intervention and its effects. Core assumptions in the traditional approach include the mind as a general learning mechanism, learning as the
principal determinant of culture, and the importance of individual differences in human action. The evolutionary perspective, on the other hand, assumes that mind is modular, that mental mechanisms influence cultural expressions and preferences for particular interventions, and that the effects of individual differences are often random.

The evolutionary perspective on human resource research is a recent phenomenon, so it may be helpful to describe how hypotheses using this approach are generated and tested. We need to distinguish among five levels of analysis (see Figure 1; Buss, 1995). At the most general level is the theory of evolution by natural selection. Although it is a theory, it is now widely regarded as fact. The theory of evolution by natural selection is the meta-theory for all of biology and the life sciences. There have been hundreds of studies from numerous disciplines, ranging from paleontology and anthropology to molecular biology, which support the theory. At the second level are middle-range theories. They are still fairly general but cover a particular domain. Trivers’ theories of reciprocal altruism (1971) and sexual selection and parental investment (1972) are examples of middle range evolutionary theories. Because these theories are still quite general, they have been tested in a variety of contexts, using samples from many different species, and employing a variety of methodological techniques. The next two levels include specific evolutionary psychological hypotheses and predictions. The focus here is on human subjects, using field and experimental methods found in the social sciences. At the fifth level are hypotheses about human resource practices. These hypotheses are tested in
organizational contexts with methods used in human resource research. Figure 1 illustrates the derivation of three hypotheses we present later in this paper.

INFORMATION ABOUT PEOPLE

In this section we argue that an evolutionary perspective can be useful in thinking about the appeal, and hence the widespread use, of letters of recommendation. A crucial feature of any hiring method is the type of information it provides. This information can be described along two dimensions: (1) diffuse-specific and (2) universal-particular. A diffuse method provides information about many characteristics of a person, while a specific method provides information about one or a few characteristics. A letter of recommendation is a diffuse method that typically provides information about multiple attributes (e.g., the applicant’s personality characteristics, work habits, and work experience), while a cognitive ability test is a specific method that provides information about one attribute (the applicant’s intelligence). Universal information is typically abstract and it applies to many situations, whereas particular information is concrete and applies to one or a few situations. A personality test for the trait of conscientiousness provides universal information that is relevant to a wide variety of jobs, whereas information from a work sample test provides particular information related to one or a few jobs. Any hiring method can be placed in a quadrant within these two orthogonal dimensions—the amount of information it provides about an applicant’s characteristics (diffuse-specific) and its relevance to jobs in general or to a given job (universal-particular). Letters of recommendation typically
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provide diffuse and particular information (Loher, Hazer, Tsai, Tilton, & James 1997). Their narrative format allows recommenders to describe applicants along a variety of dimensions, and organizations usually ask recommenders to tailor this information to applicants’ suitability for a particular job (Peres & Garcia, 1962). Because letters of recommendation are written by acquaintances who often share some history with the applicant in a social context, they can provide information about how applicants relate to other people in a particular setting (cf. Ambady & Rosenthal, 1992; Funder & Colvin, 1988; Kane & Lawler, 1978).

Preferences for Information about People

The literature from evolutionary psychology may help explain the appeal of letters of recommendation. One probable reason that people continue to use letters of recommendation is that they often contain vivid, narrative descriptions of applicants, and people prefer this type of information about other people (Dunbar, 1996; Rook, 1987). Face-to-face interaction and narratives were the only sources of information about other people for most of our evolutionary past, and our neurocognitive system evolved to utilize information about people in the rich form of everyday language and gesture (Baron-Cohen, 1997; Sugiyama, 2001). Natural selection shaped the human mind to prefer information about people from face-to-face interaction and narrative, rather than from statistical analyses—or what Moore (1996) refers to "identified" versus "statistical" lives. A large component of human moral systems is based on direct and indirect reciprocity, and to reciprocate a person must identify the individual who did or did not do him a good turn (Alexander, 1987). Specific identification requires face-to-face interaction or its narrative equivalent. The biological imperative for helping people who are genetically related to one’s self – altruism based on inclusive fitness (Hamilton, 1964) – requires a means of identifying kin. Human kin recognition systems are largely visual. Therefore, people must see,
interact with, or listen to descriptions of others to determine their degree of physical similarity and the probability of relatedness. In addition, information from narratives and face-to-face interaction was and is adaptive for competing in dominance hierarchies. Negotiating in dominance hierarchies involves following a set of complex social norms and obligations, engaging in deceptions, jockeying for power, attempting to outwit dominant individuals, and detecting instances of cheating (Cummins, 1996). However, the detection of rule violations and the communication of rule violations to others require face-to-face interaction or its narrative equivalent. Because human cognitive architecture evolved to solve these problems of social life, people tend to be unresponsive, and even antagonistic, towards abstract information about people—such as the information provided by IQ tests, numerical performance appraisals, and employee attitude surveys. As a result, people are more likely to believe, make decisions on, and act upon face-to-face and narrative information about people (Moore, 1996).

**Avoiding harm.** The appeal of letters of recommendation also probably relates to human risk preferences and mechanisms for harm avoidance. People are more comfortable taking a risk to avoid a loss than to pursue a gain (Kahneman & Tversky, 1981). Moore (1996) argues that the preference for risk when loss is possible evolved because losses in subsistence economies – the conditions under which humans evolved – had a high probability of severely impairing reproductive potential. People are also more emotionally responsive to negative than positive information (Taylor, 1991). Cacioppo and Berntson (1999) argue that people’s propensity to react more strongly to negative than positive information is an evolved adaptation. Over evolutionary history, it has been more difficult for people to reverse the consequences of severe assault than a missed opportunity.
People will prefer modes of information about others that allow them to assess the risk of loss and to describe negative attributes. Letters of recommendation are particularly suited to assessing risk of loss and potential harm because they contain rich, narrative accounts of an applicant’s behavior in group settings. It is likely that people use letters of recommendation, probably unconsciously, to evaluate the risk of harm and to reject applicants deemed likely to cause harm. Indeed, most employers take letters of recommendation seriously, and negative comments in recommendations are typically viewed as grounds for rejecting an applicant (Knouse, 1983; Muchinsky, 1979; Sheehan, McDevitt, & Ross, 1998).

Letters of recommendation are also suited to the assessment of risk of loss in another way: they are less subject to extreme errors than methods that use specific and universal information. The diffuse and particular format of letters of recommendation provides redundant, context-rich information that is processed by intuitive decision systems. As such, people are more likely to notice errors and anomalies. Hiring methods that use universal and specific information (e.g., standardized tests) are more likely to result in extreme decision errors because they use decontextualized information with limited cues, little redundancy, and strong inference decision rules (Hammond, Hamm, Grassia, & Pearson, 1997). Although they produce improvements in prediction, they are less likely to “recognize” anomalies. This is because all information, including erroneous information, is encoded and processed in the same manner.

The widespread use of letters of recommendation, particularly among professionals who ostensibly know about their shortcomings, makes a strong case that evolved psychological mechanisms influence the use of letters of recommendation. Most advertisements for faculty jobs in industrial/organizational psychology and human resource management request that
applicants submit letters of recommendation. This is also the case for applicants to their graduate programs.

**SELF-INTEREST AND THE TONE OF LETTERS OF RECOMMENDATION**

In the previous section we argued that the appeal of letters of recommendation is largely a function of the compatibility between the type of information in letters and people’s evolved preferences for narrative information. In this section we argue that an evolutionary perspective can help to understand the tone of information in letters of recommendation. We base our argument of the evolutionary logic of self-interest. Individuals are motivated to pursue their self-interest, and evolved psychological mechanisms influence what people perceive to be in their self-interest (Buss, 1999). Therefore, the recommender’s interests based on the relationship with the applicant will influence the content of letters of recommendation.

Humans evolved as social animals, and two of the most significant adaptive problems that humans faced throughout the course of evolution were living in groups and mating (Boyd & Silk, 1997). It is likely, therefore, that people evolved an array of psychological mechanisms related to these problems and these mechanisms continue to influence how we perceive, communicate about, and respond to other people (Buss, 1999). Although managers devise policies and procedures to subordinate personal interests to organizational goals, they cannot wholly override the imperatives of our evolved psychological architecture (Nicholson, 1997). Accordingly, psychological mechanisms related to group life and mating are likely to be activated in a variety of organizational contexts, including when an applicant asks an acquaintance for a letter of recommendation. An evolutionary perspective, therefore, suggests that a history of social exchange between an applicant and recommender influences the tone of letters of recommendation.
Possessing information about an individual is a different matter than presenting information about that individual to someone else. Information that people present about others or themselves is often influenced by their goals (Goffman, 1959). Therefore, an important function of communication is to manipulate information to favor one’s self-interest (Dawkins & Krebs, 1978). A goal of most job applicants is to obtain a job; thus, they provide information about themselves that is favorable. A goal of external HR consultants is to enhance their value to clients; thus, they present information that highlights their credibility and usefulness. What might be the goal of a recommender when presenting information about a job applicant? Because recommenders normally have has little or no motivational attachment to the organization requesting information, it is unlikely that their primary goal is to help the organization. The recommender’s self-interest is more closely entwined with the applicant. Therefore, a recommender’s primary goal involves providing information that will help or hinder the applicant. It is the nature of the relationship between the applicant and recommender – more so than the applicant’s objective qualifications or the organization’s need for accurate information – that should influence the tone of letters of recommendation.

Given the shared history between the applicant and recommender, a recommender is likely to perceive it in her self-interest to either write favorably or less favorably about the applicant. A recommender will be inclined to write favorably if the applicant is perceived as a valuable resource or if there has been a history of mutually beneficial social exchange. An evolutionary perspective suggests that cooperation, status competition, and mating interests should affect the tone of letters of recommendation.
Cooperative Relationships

Cooperation occupies a central place in evolutionary theory (Buss, 1999). Although the literature on social exchange theory also provides a framework for understanding cooperation, its underpinnings are theoretically fragmented – including such diverse explanations as social cognition (Thibaut & Kelley, 1959), behaviorism (Homans, 1974), role theory (Graen & Cashman, 1975), and French structuralism (Ekeh, 1974). Evolutionary psychology, on the other hand, provides a more parsimonious approach to understanding cooperation (Nicholson, 1997). Kin-relatedness and reciprocal altruism are the primary bases and the most evolutionarily stable forms of cooperation (Hamilton, 1964; Trivers, 1971). Kin-related cooperation (altruism) involves helping a relative with no expectation of reciprocation because such assistance is likely to help some portion of one’s own genes survive into the future. Reciprocal altruism involves helping others (typically non-kin) with the expectation that favors will be returned at some time in the future. Reciprocal altruism evolved as a common form of cooperation among non-kin because the benefits of cooperation often outweighed the costs going it alone (Axelrod & Hamilton, 1981). Tit-for-tat is the most common and effective cooperative strategy (Axelrod & Hamilton, 1981).

The significance, duration, and reciprocity of social exchanges influence the strength of cooperative relationships. The strength of these relationships, in turn, influences person perception and social categorization (Kurzban, Cosmides, & Tooby, 1998). Thus, the tone of letters of recommendation is likely to be influenced by the nature of the relationship between the applicant and the recommender. How favorably a recommender describes the applicant in a letter of recommendation will be influenced by the degree to which a recommender perceives an applicant as someone with whom he has a cooperative relationship.


_Hypothesis 1:_ The strength of the cooperative relationship between a recommender and an applicant will be associated with more favorable and longer letters of recommendation.

**Status Competition**

Groups of human males differ from female groups in that male groups are organized into dominance hierarchies, whereas female groups are less hierarchical (Low, 1990; Nicholson, 1997, 2000). Similarly, male groups are characterized by intensive status competition, whereas female groups are characterized by greater cooperation. Males regularly engage in competition over status because high rank in a dominance hierarchy is associated with greater access to resources and females (Campbell, 1999). Therefore, in examining the effects of status competition on letters of recommendation, we will focus on males. Status competition involves behaviors whereby one individual attempts to best others with respect to material, symbolic, or social resources. Differences in rank are inversely related to status competition because people who are closer in rank are more likely to be in competition with one another for status (Weisfeld, 1980). A high-ranking individual is unlikely to view a lower ranking individual as a rival; similarly, most low ranking individuals realize that they cannot successfully compete with higher-ranking persons. Therefore, status rivalries are likely to influence how people perceive and communicate about others, including the information they include in letters of recommendation. Because males of disparate rank are less likely to be in competition for status with one another, higher ranking males would be less likely to view an activity that enhances a lower ranking male’s status (such as writing a favorable letter of recommendation) as a threat to his own status.
Hypothesis 2: Among males, a greater status difference between a recommender and an applicant will be associated with a more favorable and longer letter of recommendation.

Mating Interests

The reproductive imperative is a major influence on relationships between men and women, both consciously and unconsciously. However, because of greater parental investment by women and the role of female choice in human mating, men and women have evolved different mating strategies. These strategies, in turn, lead to somewhat different goals for same-sex and opposite-sex relationships. Parental investment is the effort and resources devoted to an offspring that improves its chances of survival and that also limit the parent’s ability to invest in other offspring (Trivers, 1972). Because of the physiological and psychological demands associated with gestation, birth, lactation, and attachment, human females invest more in offspring than males. It is in the reproductive interests of the more investing sex to be selective in mate choice, while it is in the less investing sex’s interests to be more promiscuous (Trivers, 1972). Female choice refers to females’ dominant role in mate selection and mating processes. Because of their greater parental investment, women attend to a larger number of attributes of potential mates than males, and they are more discriminating in their choice of mating partners. Women, therefore, and are usually the arbiters of choice in mating relationships (Hrdy, 1999). It is in a female’s reproductive interests to mate with “high quality” males (Cronin, 1991). As a result, females are less likely than males to evidence a generalized mating interest in the opposite sex, and we would not expect that females would be inclined, based on mating interests, to write more favorable letters for male than female applicants. Although we would expect that females would write more favorable letters for higher status males, this would be difficult to test
empirically because a high status person is unlikely to ask a person of lower status for a letter of recommendations (Muchinsky, 1979).  

On the other hand, because of males’ minimal parental investment, it is in their reproductive interests to be less discriminating and more promiscuous (Geary, 1998). Males are more solicitous towards females than to males, are more likely to help females, and are more likely than females to interpret friendliness by a member of the opposite sex as evidence of sexual interest (Buss, 1994). Even during casual conversations, males’ testosterone levels rise significantly more when they are conversing with females than with other males (Dabbs, Ruback, & Besch, 1987). This generalized mating interest is just as likely to occur in organizational settings. Therefore, when approached by a female for a letter of recommendation, male recommenders would inclined to help by writing positive letters of recommendation. This effect is probably increased when females use sexuality to manipulate male recommenders. Females are more likely than males to use flirtation to get special favors from members of the opposite sex (Buss, 1994). Finally, males are likely to respond differentially to female applicants depending on their age. Males typically desire attractive, younger females as mating partners because youth and beauty are cues of health and fertility. As such, males are likely to be most solicitous towards younger females and regard them in a positive way. This positive regard, in turn, is likely to be reflected in letters of recommendation.

_Hypothesis 3a:_ Male recommenders will write more favorable and longer letters for female applicants than male applicants.

_Hypothesis 3b:_ Male recommenders will write more favorable and longer letters for younger female applicants than older female applicants.

**METHOD**
Sample

The sample consisted of 532 recommenders and 169 applicants for two junior faculty positions, one in cognitive (n = 82) and one in industrial/organizational (I/O) psychology (n = 87), at a Midwestern university in the United States from 1996 to 1997. Of those whose sex could be identified, 78% (n = 407) of the recommenders and 58% (n = 98) of the applicants were male. Male recommenders wrote more letters for male applicants (61.2%), and female recommenders wrote slightly more letters for female applicants (54.2%). Of the recommenders whose place of employment was identifiable from letters, 95% (n = 481) were from academic or research institutions, and 5% (n = 24) were from the private sector and government. Of the recommenders from universities, 12% were department chairs or administrators, 54% were full professors, 24% were associate professors, 9% were assistant professors, and less than 1% were graduate students or adjunct faculty. Forty percent of the applicants were graduate students, 22% were adjunct faculty or instructors, 16% were postdoctoral students, 19% were assistant professors, 2% were associate professors, and less than 1% were full professors. Fifty-four percent of the applicants either had not yet graduated or graduated during the same year that their application was received, 65% had graduated within two years of submitting their application, and 76% had graduated within three years of applying. Applicants ranged in age from 25 to 50 years, with a mean of 31 (sd = 5.53).

Procedure and Measures

This study used archival data obtained from the university. Data were coded from the vita and cover letters (n = 169) of job applicants for assistant professor positions and from letters of recommendation (n = 532) for the applicants. The mean number of letters per applicant was 3.1 (sd = .80). Two raters first coded objective data (sex, academic rank, and
length of letter). They then independently coded favorability ratings from the letters of recommendation. Since there were few applications that included more than four letters of recommendation \((n = 13)\), only the first four letters for each applicant were coded.

Demographic information. The sex of applicants and recommenders was coded as "0" for males and "1" for females. We coded applicants’ age from their vitae. When a date of birth was listed, we calculated age by subtracting the date of birth from the date of the letter. When age or date of birth was not listed (as was the case for 85% of the letters), we estimated applicants' age by subtracting the year when applicants received their (first) bachelor's degree from the date when their application was received and adding twenty-two years. We believe that this is a reasonable estimate of age, because most of the applicants were probably about twenty-two years old when they received their bachelor's degree. To test the accuracy of this estimation, we correlated the actual age (from subjects whose age was known) with their estimated age (calculated from the procedure described above). The correlation between actual age and estimated age was .93. We coded the academic rank of recommenders from information in their letters and the academic rank of applicants from their cover letters and vitae. We used the following rank categories for both applicants and recommenders: graduate student, adjunct faculty, post-doctoral student, assistant professor, associate professor, professor, or department chair or higher. These were coded from 1 to 7, respectively. Individuals who were not involved in academia were classified as "other." However, because the number of such individuals was small \((n = 24)\), they were not included in the analyses when the variables based on rank were used.

Cooperative relationship. We estimated the strength of the cooperative relationship between the recommender and applicant from the formal, structural relationship between them.
We assumed that applicants for assistant professor positions would have collaborated most closely with their dissertation advisors, and, accordingly, they would have had the strongest cooperative relationships with them. They would have probably had the next strongest cooperative relationships with their major professors, followed by dissertation committee members, and the least collaboration and weakest cooperative relationship with their department chairpersons. Information on structural relationships was obtained from the letters of recommendation. Dissertation advisor was coded “5,” major professor and/or research supervisor was coded “4,” a dissertation or thesis committee member was coded “3,” a professor with whom an applicant had only taken a class (or classes) was coded “2,” and department chair or company supervisor was coded “1.” Ninety-four percent of all recommenders on whom we had relationship data fit into one of these categories—100 recommenders were dissertation advisors, 203 were major professors, 66 were committee members, 30 were other professors, and 70 were department chairs.

**Status difference.** The status difference between an applicant and recommender was based on their academic ranks. We calculated the status difference between recommenders and applicants by subtracting the status of the applicant from the status of the recommender. A positive value would reflect the degree to which the recommender was of a higher status than the applicant. A value of zero would indicate that the recommender and applicant were of equal status, and a negative value would indicate that the recommender was of lower status than the applicant.

**Control variables.** We coded the number of journal publications and years since earning the Ph.D. as control variables. The former is an indicator of the scholarly quality of the applicants, and the latter reflects the opportunity to gain experience in research and teaching.
Applicants could receive up to five points for each publication, based on authorship. Applicants received five points for first authorship, four points for second authorship, and so on to fifth author or higher, for which they received one point. Publication points reflect the sum of points for all of an applicant's publications in referred journals. The number of publication points ranged from 0 to 109, with a mean of 15 ($sd = 15.24$). The number of years since graduation from a Ph.D. program was determined by subtracting the year of graduation from the date the application was received. Graduate students who had not yet graduated were assigned a value of 0 for this variable. The number of years since graduation ranged from 0 to 22, with a mean of 1.8 ($sd = 3.15$).

**Dependent measures.** Two independent raters evaluated the favorability of the letters based on the valence of phrases and the overall tone. After initial training, the raters coded the letters on a seven point scale, ranging from strongly negative (coded "1") to effusively positive (coded "7"). Examples of the coding rules for the anchor points are: slightly negative letters (coded “3”) would include at least one negative phrase and convey some reservation about the applicant's ability to perform the job; slightly positive letters (coded “5”) would contain approximately 40% positive and 60% neutral comments; very positive letters (coded “6”) would consist of about 60% positive and 40% neutral comments, with a very positive overall tone. Ratings of letters ranged from 3 to 7, with a mean of 5.49 ($sd = 0.85$) and a median of 5.50. The interrater reliability of the two raters was .70. It probably would have been higher had there been less range restriction. The two raters gave identical ratings on 54% of the letters, and their ratings differed by just one point on 45% of the letters. The ratings were combined, and we used the average rating. We estimated the length of the letter in words by calculating the average number of words per line for the first five lines of a letter, multiplied by the number of lines in
the body of the letter. If a line was incomplete (generally the last line of a paragraph), we did not include it as one of the first five lines used to calculate the average number of words per line. However, incomplete lines were included as part of the total number of lines in the letter. The length of letters ranged from 102 to 2,567 words, with a mean of 689 words (sd = 378.23). Letter length correlated moderately with favorability ($r = .23, p < .01$).\(^{12}\)

**RESULTS**

The correlations among all variables in the study are presented in Table 1, as well as the variable Ns, means, and standard deviations. A number of analyses required additional correlational analyses, and they are presented in the text. We tested all of the hypotheses using both correlational and regression analyses; in the regression analyses, we held the control variables constant.

Recommenders who wrote letters for the same applicant had divergent perceptions. The mean correlation among recommenders was .19 for letter favorability and .07 for letter length.\(^{13}\) These results parallel those of Baxter, et al. (1981) and Aamodt, et al. (1998). Recommenders for a given applicant perceive, or at least write about, the applicant quite differently from one another. The number of recommenders correlated positively with the average favorability of letters ($r = .24, p < .01$) but not with length ($r = -.05, ns.$). Publication points and years since earning the Ph.D., as would be expected, were strongly correlated ($r = .59, p < .01$) (see Table 1). However, publication points were unrelated to either letter favorability or letter length. Years since earning the Ph.D. correlated negatively with letter favorability ($r = -.14, p < .01$) and was
unrelated to letter length. Applicant age correlated negatively with both letter length ($r = -.12, p < .01$) and favorability ($r = -.10, p < .05$).

**Hypotheses**

Hypothesis 1 predicted that there would be positive associations between cooperative relationship strength and letter favorability and length. There were positive correlations between cooperative relationship strength and letter favorability ($r = .18, p < .01$) and length of letter ($r = .36, p < .01$). The support for Hypothesis 1 was equally strong after we controlled for years since graduation and publication points with regression analyses, with *betas* of .16 for letter favorability and .36 for letter length (both at $p < .01$) (see Table 2).

The results did not support Hypotheses 2, that the status differences between a male recommender and a male applicant would be associated with letter favorability and letter length. Among male pairs, the correlations between status difference and favorability was -.03 (ns.) and between status difference and letter length was -.04 (ns.). The regression results were also not significant. We also examined these relationships among female-female, male-female and female-male recommender-applicant pairs. None of the correlations was significant.

The results partially supported Hypothesis 3a. Male recommenders wrote more favorable letters for female than male applicants ($r = .13, p < .01$). This relationship still held after controlling for publication points and years since earning the Ph.D. ($beta = .11, p < .05$). The results for letter length were not significant. We also examined the relationships between applicant sex and letter favorability and length for female recommenders and male applicants.
When females were recommenders, neither correlation was significant (.08 for favorability; .12 for letter length). The results did not support Hypothesis 3b, that males would write more favorable and longer letters for younger female applicants than older female applicants. Among male recommenders, the correlation between female applicant age and letter favorability was -.10 (ns.) and it was .21 (ns.) for letter length. The betas were also not significant (see Table 2). We also examined the effects of male applicant age on letter favorability and length for female recommenders, and there were no significant relationships.

DISCUSSION

Letters of recommendation are one of the most perplexing practices in human resource management. They are widely used and have a significant impact on hiring decisions; yet as typically used they have low reliability and are poor predictors of performance. We argued that part of the problem may be due to the way letters of recommendation are conceptualized. Traditionally, letters of recommendation have been viewed as flawed but salvageable social technologies to predict applicant job performance. We suggested that an evolutionary perspective provides an alternative framework for understanding the appeal and tone of letters of recommendation. Accordingly, the first purpose of this paper was to present a theoretical framework, based on an evolutionary perspective, regarding the appeal and tone of letters of recommendation. This perspective suggests that over the course of human evolution, people developed hardwired preferences for face-to-face and narrative methods for obtaining information about people. These methods provide diffuse and particular information, which is compatible with evolved psychological mechanisms related to reciprocity, kin recognition, cheater detection, risk assessment, and harm avoidance. Because letters of recommendation provide information in a manner that is compatible with evolved preferences, people continue to
Letters of Recommendation

use them. Our second purpose was to present the results of an empirical study examining how the interests of recommenders influenced the tone of letters of recommendation. We argued that the nature of the relationship between the applicant and recommender will influence the tone of letters of recommendation, more so than the applicant’s objective qualifications or the organization’s need for accurate information. A recommender typically has little or no motivational attachment to the organization requesting information, but she does have a relationship with the applicant. The recommender’s self-interest will be more closely entwined with the applicant than the organization. Thus, the recommender’s primary goal will be to provide information that will help (or hinder) the applicant. We examined three factors related to applicant-recommender relationships (cooperation, status competition, and mating interests) and their effects on letters of recommendation.

Our results were mixed. Consistent with our theoretical expectations, recommenders who had strong cooperative relationships with applicants wrote more favorable and longer letters than those whose relationships were less cooperative. This is significant because it indicates that people perceive and communicate features of other persons in line with their interests. Also consistent with our expectations, male recommenders wrote more favorable letters for female than male applicants. Both of these relationships remained significant even after controlling for publication points and years since the Ph.D. Although neither relationship accounts for a large amount of the variance, there was considerable restriction of range in the tone of the letters, which is typical. When we correct for range restriction in the dependent variable using a common correction factor of .60, the correlation between cooperative relationship strength and tone becomes .29; among male recommenders, the corrected correlation between applicant sex and letter tone is .21. Moreover, even the uncorrected correlations are within the range of
correlations commonly found in much human resource research conducted in field settings (e.g., Guzzo, Jette, & Katzell, 1985; Phillips, 1998).

Although we believe that male mating interests are a reasonable explanation for the relationship between recommender sex and letter tone, there is an alternative. In the current political climate, males may be fearful of being accused of discrimination against females. To protect themselves against this possibility, they may inflate recommendations for females (Kryger & Shikiar, 1978). However, studies done between 15 and 20 years ago, when awareness of sex discrimination was perhaps somewhat lower than it is now, still found that males rated females higher (Bronstein, Black, Pfenning, & White, 1986). That males gave more favorable recommendations to females is an important finding because social role theory would predict the opposite (Eagly, 1987). Social role theory suggests that social behaviors, including behaviors that are characteristic of one sex or the other, are largely a result of role expectations learned through socialization. According to social role theorists, males in most cultures have been socialized to favor other men in work-related situations. Given the continued existence of traditional stereotypes of men and women, and the credence that many still give to the "old boy" network and other forms of male solidarity, one would expect that male recommenders would give higher ratings to male applicants (Kanter, 1977; Schein, 1975). The evolutionary perspective, on the other hand, suggests that male solidarity is a thin veneer concealing precarious relationships characterized by dominance hierarchies, power struggles, conflict, and shifting alliances.

Two of our hypotheses were not supported. Males did not write more favorable letters for younger female applicants. This may have been due to the restriction in range of the age of female applicants. Most of the female applicants were young; 53% of the female applicants who
received letters from male recommenders were between the ages of 25 and 29; 92% were between the ages of 25 and 38. On the other hand, given the work-related context, mating interest may not have been salient. Rather, the degree of cooperation and cordiality may have been more relevant. Our hypothesis that the status difference between male recommenders and male applicants would relate to letter favorability and length was not supported. One explanation is that it is to the advantage of the recommender that a similar-status colleague leave the group. This would lessen competition for resources. Therefore, to increase the probability that a colleague take another job, similar-status recommenders may have written deceptively favorable letters. Also, it is possible that status difference was not salient.

Implications for Practice and Future Research

Practice. Most traditional suggestions for improving letters of recommendations stem from the view that they are flawed, but salvageable, social technologies for predicting performance. This view suggests that they can be improved by adjustments to enhance their reliability and validity (e.g., recommender confidentiality, providing more structured formats, training recommenders, and using statistical techniques to remove bias from letters). For example, Judge and Higgins (1998) found that the affective disposition of recommenders biased the favorability of letters. Accordingly, they suggested that organizations apply a scaling factor when interpreting letters. “If the positivity vs. negativity of the letter writer is known, the employer may . . . discount letters by positive people” (p. 218). This is an interesting suggestion, but hardly realistic. An evolutionary perspective, on the other hand, suggests that improvements to letters of recommendation be based on their relationship to psychological mechanisms, their functions, and the social context in which they are used. Although our results were mixed, some results were sufficiently robust to suggest practical implications.
One implication is for organizations, rather than applicants, to choose recommenders. Psychological mechanisms related to self-interest and social exchange are probably activated when an applicant asks an individual to write a letter of recommendation for him. Indeed, one reason why the tone of most letters of recommendation is so positive is that most applicants choose their own recommenders, and these are typically acquaintances with whom applicants have positive, cooperative relationships. Recognizing this, organizations could solicit recommendations from a sample of an applicant’s colleagues. Although such a procedure would be more expensive and time-consuming, it would provide more diverse information about an applicant. This would not eliminate bias from letters, but it would provide a broader array of information about an applicant, which, in the aggregate, would provide a more realistic picture of an applicant.

By highlighting the nature of the exchange relationships in letters of recommendation, the evolutionary perspective also makes it clear that most recommenders have little, if any, relationship with the organizations requesting letters and, hence, little motivation to write an accurate letter. Therefore, another practical implication would be for organizations to compensate recommenders for writing letters of recommendation. Organizations routinely pay consultants, testing specialists, and test producers. Therefore, why not pay recommenders? This would create an exchange relationship and provide greater motivation for recommenders to write accurate letters. To minimize the expense of paying large numbers of recommenders, organizations could solicit recommendations from only the most promising applicants. Depending on the legal climates in different countries, it may be necessary to try various approaches to soliciting letters of recommendation and to paying recommenders. For example, if
people are concerned about the potential legal liability of including negative information in a letter, organizations could require applicants to sign waivers.

A third implication stems from the possible function of letters of recommendation to identify people who may cause harm. The information in letters of recommendation is probably more useful for rejecting unsuitable applicants than for predicting performance. Research by Anstey (1966) supports this view. In a study of British Foreign Service officers, he found that of eight officers who received negative letters of recommendation but were subsequently hired, six received poor performance ratings, and four received the lowest possible ratings. Letters of recommendation might be best treated as a rough screening device to identify potentially harmful applicants. However, more research is needed on the nature of negative information in letters of recommendation and on the relationship between negative information and unsatisfactory performance.

The results of this research also suggest implications for applicants. They are likely to receive the most favorable letters from individuals with whom they have developed cooperative relationships. The relationship with the recommender appears to be critical, while objective qualifications seem to have minimal impact on the letter favorability. In addition, since the favorability of recommendations decreased with the greater number of years that had passed since applicant earned her Ph.D., current or recent relationships are likely to result in more favorable letters. Finally, although female applicants were somewhat more likely to ask female acquaintances for letters of recommendation, they will probably receive somewhat more favorable letters from male recommenders.

**Future research.** Evolutionary psychology provides an alternative theoretical basis for research in human resource management and organizational behavior (Nicholson, 1997). It
offers a framework for examining why people prefer particular types of interventions and why they avoid others, as well as for examining what aspects of human resource management technologies are and are not compatible with people's preferences for information about people. An important research agenda is to frame and examine human resource decisions in terms of self-interest calculations. While it has been customary to look at how interventions should benefit organizations, an evolutionary perspective helps us analyze interventions from the perspective and goals of the people who use them as well as from the perspective of their actual functions within organizations.

In addition, evolutionary psychology can provide guidance for designing interventions by providing a framework that is more compatible with our evolved psychology (Nicholson, 1997). It focuses our attention on the many exquisite features of people and social systems that have been "designed" by evolution. For example, informal methods of information transmission are essential for learning skills (Lave & Wenger, 1991). Just as many technologies (e.g., antibiotics, Velcro, the smallpox vaccine, insulation) are based on phenomena that first evolved in the natural world, our own evolved natures may provide useful insights for the design of better social interventions.
REFERENCES


MILLER, R. K., & VAN RYBROEK, G. J. Internship letters of recommendation: Where are the other 90%? *Professional Psychology: Research and Practice*, 1988, **19**, 115-117.


ENDNOTES

1 For an excellent analysis of evolutionary psychology’s implications for society and organizations, see Nicholson (1997).

2 A practice is functional to the extent that its "consequences . . . make for the adaptation or adjustment of a given system" (Merton, 1957, p. 51). Adaptation is the aligning of structures, processes, and outputs of a system with exigencies of its environment, thereby increasing the probability of its survival in that environment. However, current practices that have survived the test of time are adapted to past worlds. If a system's environment has significantly changed, past adaptations may be dysfunctional.

3 To the contrary, the evolutionary perspective emphasizes the interaction between human nature and the environment. Consider, for example, language. All normal humans acquire language. The developmental regularities of language acquisition and grammatical regularities across languages suggest that language is an instinct in humans. However, the content of language – whether a person speaks French or English – is a product of culture. Evolution has shaped the degree to which behaviors are innate or learned with respect to the types of problems they encountered over the course of evolution. In species that faced highly variable environments or classes of problems that were highly variable, natural selection favored the ability to learn as the means of acquiring adaptive behaviors. When environments were stable or particular classes of problems were stable and could be solved in a set way, evolution shaped behavior to be primarily guided by instinct (Alcock, 1975).

4 As one reviewer pointed out, organizations may first screen applicants for basic qualifications using methods that provide specific information (e.g., ability tests) and then use letters of recommendation to evaluate remaining applicants. The diffuse information in letters of
recommendation may be more amenable to making fine distinctions among candidates who meet basic qualifications.

5 It would be interesting to survey parents of young children and ask whether they would rely on a valid paper and pencil test to select a baby sitter for their young children. Being primarily concerned about assessing potential harm, it is likely that parents would insist on face-to-face information or at least narrative information from a trusted friend.

A slang term used among many interviewers in the United States is “the green tongue.” A green tongue refers to odd, inappropriate, or highly unusual characteristics. Some interviewers mention that one objective of interviews is to identify and reject people with a green tongue, and that interviews are necessary because paper-and-pencil tests cannot identify green tongues.

6 For example, 8,600 students in New York City were wrongly assigned to summer school for remedial education because of a miscalculation by a standardized test publisher (Hartocollis, 1999).

7 A reviewer pointed out that recommenders could also have goals related to an organization if they frequently send letters of recommendations to that organization. In such cases, they may want to establish a reputation for credible recommendations.

8 When organizations request applicants to submit letters of recommendation, they typically stipulate that recommendations must come from individuals who are not kin. This suggests that people implicitly understand the power of kin-related altruism. People will be inclined to assist kin by writing a very positive letter of recommendation regardless of the individual’s talents or history of reciprocation, simply because of kin-relatedness.
Females prefer high status males who are somewhat older. Status is desirable due to its association with wealth, which in turn helps to ensure greater protection and provisioning. Presumably, older males are desirable because age is associated with greater psychological maturity and wealth. While this may seem unrealistic or outdated in modern society, it is important to remember that present-day humans are the product of over 1 million years of evolution, and for over 99% of human history people lived in hunter-gatherer societies. Indeed, studies find that women who possess considerable wealth and status still prefer mates who possess greater wealth and status than themselves (Buss, 1994).

Our sample did not contain cases of high status males asking females of lower status for letters of recommendation.

We would like to thank Hajime Otani for suggesting this.

Although letter length and favorability are related, the modest correlation suggests that length is not a proxy for favorability. One possibility is that letter length may reflect the writing style of recommenders, in that some recommenders tend to write longer (or shorter) letters, regardless of how they perceive an applicant (Aamodt et al., 1998).

It is important to keep in mind the distinction between the interrater reliability of the recommenders who wrote the letters (which was poor) and the interrater reliability of the individuals who coded the letters for favorability (which was a respectable .70).

When reading letters of recommendation and evaluating applicants, male decision-makers are more influenced by applicant sex than female decision-makers are (Kryger & Shikiar, 1978;
Tommasi, Williams, & Nordstrom, 1998). For example, Kryger and Shikiar (1978) found that male decision-makers rated (identical) letters for females higher than those for males.
### Table 1

**Correlations Among All Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>X</th>
<th>sd</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>1. Applicant sex</td>
<td>532</td>
<td>0.42</td>
<td>0.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Recommender sex</td>
<td>525</td>
<td>0.23</td>
<td>0.42</td>
<td>13**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>3. Applicant age</td>
<td>524</td>
<td>31.17</td>
<td>5.42</td>
<td>-18**</td>
<td>-09*</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Applicant rank</td>
<td>502</td>
<td>2.22</td>
<td>1.23</td>
<td>-03</td>
<td>-06</td>
<td>44**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Recommender rank</td>
<td>481</td>
<td>5.68</td>
<td>0.89</td>
<td>-06</td>
<td>-29**</td>
<td>.09*</td>
<td>16**</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>6. Coop. relationship</td>
<td>508</td>
<td>0.2</td>
<td>0.40</td>
<td>07</td>
<td>04</td>
<td>04</td>
<td>-12*</td>
<td>18**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Status difference</td>
<td>459</td>
<td>3.45</td>
<td>1.40</td>
<td>-01</td>
<td>-14**</td>
<td>-32**</td>
<td>-80**</td>
<td>47**</td>
<td>-02</td>
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</tr>
<tr>
<td>8. Pub. points</td>
<td>532</td>
<td>14.65</td>
<td>15.12</td>
<td>09</td>
<td>-08</td>
<td>34**</td>
<td>57**</td>
<td>16**</td>
<td>-02</td>
<td>-33**</td>
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<tr>
<td>9. Years since Ph.D.</td>
<td>525</td>
<td>1.74</td>
<td>3.03</td>
<td>-13**</td>
<td>10*</td>
<td>60**</td>
<td>68**</td>
<td>22**</td>
<td>-14**</td>
<td>-47**</td>
<td></td>
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<tr>
<td>10. Favorability of letter</td>
<td>532</td>
<td>5.49</td>
<td>0.85</td>
<td>12**</td>
<td>02</td>
<td>-10*</td>
<td>-06</td>
<td>-06</td>
<td>18**</td>
<td>01</td>
<td>02</td>
<td>-14**</td>
<td></td>
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<tr>
<td>11. Length of letter</td>
<td>531</td>
<td>689</td>
<td>378.2</td>
<td>05</td>
<td>10*</td>
<td>-.12**</td>
<td>01</td>
<td>-09</td>
<td>36**</td>
<td>-08</td>
<td>05</td>
<td>-06</td>
<td>23**</td>
</tr>
</tbody>
</table>

Decimals are omitted from the correlation matrix; * p < 0.05, ** p < 0.01.

Note: Applicant and recommender sex, 0 = male, 1 = female.
Table 2

The Influences of Strength of Cooperative Relationship, Status Competition, and Mating Interests on Letter Favorability and Length

<table>
<thead>
<tr>
<th>Hypothesis 1</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
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<th></th>
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</thead>
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<td></td>
<td>Years since Ph.D.</td>
<td>Letter Favorability</td>
<td>Beta</td>
<td>ΔR²</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of Letter</td>
<td>Beta</td>
<td>ΔR²</td>
</tr>
<tr>
<td>Hypothesis 1</td>
<td>Years since Ph.D.</td>
<td>-.29**</td>
<td>-.04</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>Publication points</td>
<td>.23**</td>
<td>-.04</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>Status difference</td>
<td>-.07</td>
<td>-.04</td>
<td>.00</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>Years since Ph.D.</td>
<td>-.26**</td>
<td>-.18**</td>
<td>.00</td>
</tr>
<tr>
<td>(male recommenders and</td>
<td>Publication points</td>
<td>.23**</td>
<td>.24*</td>
<td>.03</td>
</tr>
<tr>
<td>applicants)</td>
<td>Status difference</td>
<td>-.07</td>
<td>-.04</td>
<td>.00</td>
</tr>
<tr>
<td>Hypothesis 3a</td>
<td>Years since Ph.D.</td>
<td>-.26**</td>
<td>-.17*</td>
<td>.00</td>
</tr>
<tr>
<td>(male recommenders)</td>
<td>Publication points</td>
<td>.19**</td>
<td>.20**</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Applicant sex</td>
<td>.11*</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Hypothesis 3b</td>
<td>Years since Ph.D.</td>
<td>-.23</td>
<td>-.18</td>
<td>.01</td>
</tr>
<tr>
<td>(male recommenders and</td>
<td>Publication points</td>
<td>.24</td>
<td>.12</td>
<td>.03</td>
</tr>
<tr>
<td>female applicants)</td>
<td>Applicant age</td>
<td>-.01</td>
<td>.30</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note: * p < 0.05, ** p < 0.01.
FIGURE CAPTIONS

Figure 1: Developing Human Resource Research Hypotheses from Evolutionary Theory *

Figure 2: Type of Information and Hiring Methods

* After Buss (1995)
**General Evolutionary Theory**

**Evolution by Natural Selection**

**Middle-Level Theories**

- **Theory of Reciprocal Altruism**
  
  *In species that live in groups, individuals will use a tit-for-tat strategy as the basis for cooperation among non-kin.*

- **Theory of Parental Investment and Sexual Selection**
  
  *In species where the sexes differ in parental investment, the lower investing sex will be less selective in choice of mating partners.*

**Evolutionary Hypotheses**

- **Specific Evolutionary Predictions**
  
  *Individuals will be more inclined to help others with whom they have had an established relationship of social exchange.*

  *Male humans evolved preferences for women who show cues indicating high fertility.*

  *Human males will be more solicitous toward younger females than older females and males.*

- **Human Resource Hypotheses**
  
  *The strength of the cooperative relationship between a recommender and an applicant will be associated with more favorable and longer letters of recommendation.*

  *Male recommenders will write more favorable and longer letters for female applicants than male applicants.*

  *Male recommenders will write more favorable and longer letters for younger female applicants than older female applicants.*
Letters of Recommendation

Universal
(applies to many situations)

Diffuse
(information about many characteristics)

Specific
(Information about one or a few characteristics)

Particular
(applies to one or a few situations)

Multiple Test Battery

Cognitive Ability Test

Test of Conscientiousness

Letter of Recommendation

Face-to-face Interview

Probationary Period

Work Sample Test
BIOGRAPHICAL NOTE

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