Personnel Selection as a Signaling Game

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Abstract

Personnel selection involves exchanges of information between job market actors (applicants and organizations). These actors do not have an incentive to exchange accurate information about their ability and commitment to the employment relationship unless it is to their advantage. This state of affairs explains numerous phenomena in personnel selection (e.g., faking). Signaling theory describes a mechanism by which parties with partly conflicting interests (and thus an incentive for deception) can nevertheless exchange accurate information. We apply signaling theory to personnel selection, distinguishing between adaptive relationships between applicants and organizations, among applicants, and among organizations. In each case, repeated adaptations and counteradaptations between actors can lead to situations of equilibrium or escalation (arms races). We show that viewing personnel selection as a network of adaptive relationships among job market actors enables an understanding of both classic and underexplored micro- and macro-level selection phenomena and their dynamic interactions.

Personnel Selection as a Signaling Game

Personnel selection involves exchanges of information between applicants and organizations. Many commentators have noted that this exchange is as much a competitive as a cooperative endeavor, that is, applicants and organizations approach employment relationships with goals that may not be perfectly aligned. Personnel selection is the moment when these goals are confronted for the first time. For example, Porter, Hackman, and Lawler (1975, p. 131) stated that "the search for a fit between the goals of a particular individual and the goals of a particular organization typically begins with the selection process. Individuals seek a work organization where they can fulfill their goals, and organizations try to hire people who can help them reach their objectives."

The degree of goal misalignment undoubtedly varies, and, as the budding relation between applicant and organization unfolds, both parties may discover ways to better align their goals. However, at the moment of personnel selection, this misalignment can have far-reaching consequences for information exchanges in selection situations. Indeed, parties with imperfectly aligned goals have little incentive to exchange accurate information unless it is to their advantage (Frank, 2006). That is, organizations are interested in accurately assessing applicants' abilities and their commitment to the employment relationship, but applicants may not be motivated to provide accurate information regarding these qualities unless it serves their candidacy. Moreover, applicants and organizations each react to their counterparts' actions. Cycles of behavior with potentially unanticipated consequences may then emerge. In the selection interview, for example, applicants may try to detect selection criteria and produce the answers they

think recruiters want to hear in order to appear qualified for the job. Repeated exposure to such behavior may lead recruiters to be concerned with detecting what applicants are really like behind such performances. Kirkwood and Ralston (1999, p. 64) wrote that "interviewers' attempts to penetrate applicants' performances only invite more sophisticated applicant performances, producing an ongoing spiral of mistrust in which each party tries to outdo the other."

Based on these observations and many others, we argue in this article that (a) personnel selection situations present powerful incentives for job market actors to adapt their behavior to those of other actors, (b) actual behavior of job market actors reacts to these incentives, and (c) repeated cycles of such individual-level behaviors lead to *signaling systems* which organize information exchanges. A signaling system consists of a sender, a receiver, and a signal that correlates with an unobservable characteristic of the sender (Spence, 1973). Signaling systems allow actors to determine what information is reliable for making job market choices (e.g., choosing among applicants). Signaling phenomena and their implications have not been sufficiently recognized in research on personnel selection, which has historically focused on only one side of the employment relation (either the organization's or the applicant's perspective; e.g., Phillips, 1998; Schmidt & Hunter, 1998; Smither, Reilly, Millsap, Pearlman, & Stoffey, 1993) and overwhelmingly on individual-level behavior.

We use signaling theory, a general framework derived from evolutionary biology, game theory and economics, to describe how signaling systems in personnel selection evolve over time as a result of behavior of individual job market actors. This framework is innovative because it is explicitly based on the incentives that operate in personnel

selection situations. It is useful for linking micro-level processes (individual choices) and macro-level processes (evolution of signals, including market trends in the emergence and decline of selection devices) relevant to personnel selection (Morgeson & Hofmann, 1999). It therefore can lead to theoretical progress and implications for research, including novel testable propositions and focusing attention on hitherto ignored phenomena.

Signaling Theory: Basic Principles and Applications

In this section, we review signaling theory in detail as a foundation for applying its principles to personnel selection, which we then do in the next three sections. We first explicate the structure of cooperative behavior and the dilemma it poses for individuals. We then describe the principle of honest signaling and its wide-ranging explanatory power in the study of nonhuman and human behavior. We then focus on signaling in economics and management before describing three types of adaptive relationships in personnel selection: between applicants and organizations, among applicants and among organizations.

Dilemmas of Cooperative Behavior

Signaling theory seeks to explain cooperative behavior between rational organisms – *rational* meaning the efficient pursuit of the individual organism's interests (Frank, 1988). Two basic domains of such behavior exist. The first concerns behavior of nonhuman organisms like animals and is traditionally investigated by evolutionary biology. Although largely instinctive, the behavioral repertoire of nonhuman organisms is "rational" in the sense that it has emerged through processes of natural and sexual selection (Darwin, 1871), thereby representing successful solutions to recurrent problems

posed by past environmental pressures. Because the unit of natural and sexual selection is the individual organism carrying the genes that determine a particular behavior or trait, behavior is rational if it furthers the reproductive or survival chances of the individual. The second domain concerns human behavior, which is of course at least partly guided by conscious intentions (Dennett, 1987). Human behavior is also rational in the sense that it is self-interested, i.e., human beings seek to further their individual interests (Frank, 2006)[1]. In both domains, individual organisms may seek to cooperate with other individuals to achieve better outcomes than they could achieve by acting in isolation (as we will see, such cooperation is even possible among individuals belonging to classes of organisms with diametrically opposed interests, like predators and prey). In situations of potential cooperation, individuals are motivated to discover information about the ability of the other party to cooperate usefully and about its trustworthiness, or commitment to the relationship (Zahavi & Zahavi, 1999) (indeed, humans have an evolved capacity to rapidly detect these two dimensions of warmth and competence in conspecifics, Fiske, Cuddy, & Glick, 2007). At the same time, being self-interested, individuals have an incentive to deceive their partner to exploit the relationship for their own gain. The problem that each party must then solve is how to gain accurate information of the other's abilities and intentions.

Signaling theory therefore addresses the conditions under which exchange of accurate information is possible among rational individuals with partly divergent

[1] We do not intend to suggest that individuals are motivated purely by self-interest, or that altruistic behavior does not exist. Indeed, a host of commentators in various fields have long noted the ubiquity of such behavior. However, altruism can often be explained as being in the best interests of an individual (i.e., as an extended form of self-interested behavior), and even altruistically motivated individuals face the problem of assessing whether potential cooperation partners have exploitative intentions or not (Frank, 2006).

interests. Principles of signaling have been successfully applied to dilemmas of cooperative behavior in many disciplines, including evolutionary biology (Zahavi & Zahavi, 1999), political science (Poundstone, 1993), anthropology (Cronk, 2005), economics (Spence, 1973), management (Connelly, Certo, Ireland, & Reutzel, 2011), and organizational behavior (Deutsch Salamon & Deutsch, 2006). As suggested by the opening comments of this article, personnel selection is also a situation where rational actors with partly incompatible interests interact (Palmer, Campion, & Green, 1999), and thus constitutes another promising but unexplored field of application.

The Handicap Principle

Individual organisms need to obtain accurate information about potential cooperation partners. Absent an altruistic incentive to reveal such information to others, how can this be accomplished? Accurate information (e.g., about an animal's genetic fitness) can be communicated between organisms with diverging interests if sending a message imposes a cost on the sender that only certain individuals (e.g., a truly fit individual) can bear. This is called the *handicap principle* (Zahavi, 1975), and signals that transmit such information are variously termed *honest* signals, *reliable* signals, *costly* signals, or *hard-to-fake* signals (Bergstrom, 2006; Cronk, 2005).

The handicap principle is widespread in animal behavior. One example from predator-prey interaction is so-called stotting behavior, observed in the Thomson’s gazelle and other hooved animals (Walther, 1969). When a gazelle spots a predator, it sometimes jumps high in the air. Such behavior is apparently maladaptive because it attracts the predator's attention and wastes precious energy that the gazelle would need to escape if the predator did pursue it. Initially interpreted as altruistic behavior (i.e. alerting

other gazelles to the presence of a predator), stotting has since been explained as a signal of fitness directed towards the predator. It credibly demonstrates that the gazelle is fit because it can afford to waste energy. Stotting benefits both the gazelle and the predator, because the gazelle avoids the expenditure of energy related to a long and tiring chase, while the predator gains information about which individual gazelles are fit and therefore probably harder to catch. Indeed, sick or weak individuals will need all their energy in a chase and thus cannot afford to stot. Stotting allows predators to identify these individuals. Empirical studies of gazelles in the field support these conjectures (Caro, 1986a, 1986b; FitzGibbon & Fanshawe, 1988). By stotting, then, a fit individual imposes a handicap on itself. This handicap is proof of the credibility of the signal, because less fit individuals are unable to produce it without incurring unbearable costs.

Another class of situations where honest communication is possible through displaying a handicap is constituted by within-species interactions, in particular by sexual signals between males and females assessing potential mating partners, as exemplified by the peacock’s tail. Naturalists since Darwin have wondered how the peacock's extravagant tail, obviously a survival disadvantage because it is cumbersome and energetically expensive to maintain, has survived natural selection. The theory of sexual selection (Darwin, 1871; Miller, 2000) posits that ornamental characteristics like antlers and tails can constitute an honest signal to females about their bearer's genetic fitness. Indeed, that the bearer can afford to invest in and carry a wasteful ornament is proof that he has resources to squander, and thus that he is fit and a good mating partner. This conjecture is empirically supported (Petrie, 1994; Petrie & Halliday, 1994; Petrie, Halliday, & Sanders, 1991).

Stotting and sexual signals illustrate situations where senders and receivers of a signal have a broad conflict of interests, for instance predators and prey, or male and female potential mating partners. But within that conflict of interests, individual organisms have converging interests. The fit gazelle and the predator both have an interest in avoiding a chase. It is to their mutual benefit if they can signal this state of affairs to each other. Likewise, the conflict of interest between male and female arises from the fact that, in certain species, females invest more resources into parenting than males. But the fit peacock and the discerning peahen have an interest in mating together. It is also to their mutual benefit if they can signal this state of affairs to each other.

The evolution of handicaps as a mechanism for guaranteeing accurate communication mitigates the problem of *cheating*. Cheaters are individuals that send a signal that is not related to their true level of ability or commitment. Examples include mimicry, as when certain non-poisonous prey species mimic the coloration of poisonous prey to deter potential predators (Zahavi & Zahavi, 1999). If a signal does not impose a cost on its sender that is related to fitness, then cheating strategies may evolve and spread within a population, ultimately undermining the value of the signal as receivers evolve to ignore it. However, potential benefits of cheating are offset by costs if the cheater is caught; for example by the risk of predation or the fact that many species severely punish cheaters (for example, birds whose coloration patterns are experimentally manipulated to mimic high-status markings get attacked by their conspecifics; Searcy & Nowicki, 2005).

Honest Signaling in Human Behavior

Honest signaling also applies to human cooperation. However, because humans are capable of intentional action, they can make strategic decisions to invest resources in

sending a signal to attain a particular outcome. At the same time, many aspects of human behavior are beyond conscious control. As a result, the catch-all metaphor of an “honest” signal becomes more complex (Cronk, 2005). There are thus two kinds of signals that are honest. First, and similarly to the domain of evolutionary biology, there are costly signals, which are honest because they require investment of resources the cost of which only fit individuals can bear. Then, there are signals that are not costly per se but are hard to fake because they are beyond the conscious control of the individual and thus not manipulable.

For example, Frank (1988) proposed that emotional displays constitute hard-to-fake signals of an individual’s commitment to a particular course of action because they are difficult to consciously manipulate. Thus, displays of rage are a hard-to-fake signal of an individual’s aggressive intentions, and thus a preemptive deterrent to a potential attack (Boster, Yost, & Peeke, 2003). As another example, one ethnographic study (Boster, 2003) documented the polite custom in the Shuar culture of the Andes of repeatedly spitting on the floor when visiting someone's home. Such a display is a hard-to-fake signal of peaceful intent because a guest with aggressive designs would be physiologically aroused and have a dry mouth, and would therefore be unable to muster the saliva necessary for repeated spitting.

Because humans may also be tempted to cheat by sending signals unrelated to their true level of ability or commitment, and because cheating can undermine cooperation, punishment of cheaters is also widespread across human societies (Henrich et al., 2006). Just like for nonhumans, punishment can be considered as indirectly raising the cost of a signal (Searcy & Nowicki, 2005).

How Signaling Systems Evolve: Adaptation, Equilibrium and Escalation

Signals typically evolve from behavior originally designed for another function. This is the *derivation principle*, originally proposed by Tinbergen (1952). According to this principle, a reliable but incidental correlation between an observable feature (behavior, morphology) of an organism and an unobservable parameter (e.g. genetic fitness) can be detected by other organisms. Krebs and Dawkins (1984) coined the metaphor of *mind-reading* to describe this detection process. Those other organisms might use the information to anticipate the future behavior of the organisms exhibiting the observable features. In turn, these organisms might come to produce the observable feature in a more conspicuous way to manipulate the mind-reading organisms (with either cooperative or exploitative purposes). Over time, this reciprocal adaptation, or co-evolution, between mind-readers and manipulators leads to the emergence of a signaling system, where a behavior or morphological feature survives because of its informative value to other organisms.

There are many cases of the emergence of signals from non-signaling behavior. One example concerns how male toads settle contests for possession of females. Instead of fighting rivals, they signal information about body size (and thus about their potential fighting ability) by croaking. The pitch of a croak was probably initially an incidental but reliable signal of body size. Experiments show that croaking has probably evolved to become a signal (rather than an incidental indicator) of body size because deeper croaks are more intimidating to other toads than high-pitched croaks (Davies & Halliday, 1978). The emergence of a signal often corresponds to a process of *ritualization* (Tinbergen, 1952), whereby it becomes more conspicuous, for example by means of exaggerated,

simplified and repetitive movements. Examples like gazelles' demonstrative stotting and oversized peacock's tails illustrate the end result of ritualization processes.

The emergence of a signal thus results from a process of reciprocal interaction between organisms in an ecosystem (or human actors in a market) (Krebs & Dawkins, 1984). Depending on the honesty of the signal and on the intentions of the actors or organisms implicated (either cooperative or exploitative), the emergent system can be more or less stable. It will be stable if senders and receivers' behaviors are mutually reinforcing – such a system is then in a state of equilibrium. If not, other outcomes than equilibrium may emerge, namely *escalation* (Vermeij, 1994). An organism that develops a superior adaptation is at an advantage relative to other competing organisms in the same ecology. For example, a peacock that develops a larger and more extravagant tail is at an advantage relative to other peacocks in the competition for peahens. Or a predator species that evolves a more lethal weapon (a stronger jaw, faster running speed) is at an advantage relative to its prey. But this relative advantage may be short-lived, because it may trigger a counteradaptation that subsequently increases the selection pressure on the original organism. The resulting cycle of adaptations and counter-adaptations, alternatively described as the Red Queen phenomenon (Van Valen, 1973), an arms race (Dawkins & Krebs, 1979), or simply escalation (Vermeij, 1994), is one of the most important motors of the evolution of species. In the domain of human behavior, many applications can be found. For example, human cognitive abilities may have evolved as the result of an intra-species arms race (Flinn, Geary, & Ward, 2005). And of course, the term *arms race* is itself a metaphor derived from the escalation in the production of

nuclear weapons by the US and the USSR during the Cold War – a case famously amenable to analysis by game theory (Poundstone, 1993).

One possible, beneficial outcome of escalation is an overall increase in individual fitness. Another, less beneficial outcome is that individuals may continue to invest resources into staying ahead of competitors while their average relative benefit does not increase (Frank, 2006). Arms races can lead to the domination and exploitation of one party over the other, or may lead to a state of mutually beneficial reciprocal exploitation. Dawkins and Krebs (1979) proposed the *life-dinner principle* to explain the outcome of an arms race. The life-dinner principle is illustrated by a race between a fox (predator) and a rabbit (prey). The rabbit forfeits its life if caught by the fox, whereas the fox forfeits its dinner if the rabbit escapes. Thus, although the fox will eventually starve if it does not catch any rabbits, the selection pressure for running speed operating on it is less severe than the pressure operating on the rabbit. Organisms subjected to stronger selection pressures will tend to evolve better adaptations and a relative competitive advantage.

Signaling in Economics and Management

Human economic behavior has long been described along the lines of the handicap principle. Veblen (1899) suggested that conspicuous consumption (the wasteful display of excess resources by the rich) and conspicuous leisure (the ostentatiously wasteful pursuit of economically unnecessary activities) serves as a signal of social status. In a seminal paper, Spence (1973) independently developed a theory of signaling similar to Zahavi (1975) to explain the effects of information asymmetries in markets. Although he was an economist with no particular interest in personnel selection, he used the domain of hiring as an information asymmetry example. He conceptualized hiring

from the perspective of employers as an investment decision made under uncertainty, as employers only have imperfect information about the qualities of a given applicant. Nor are applicants particularly motivated to provide the employer with accurate information unless it is to their advantage. In such a situation, the employer must decide to offer the applicant high or low wages. Spence outlined a system whereby high-quality applicants can signal their worth to employers. Any signal whose production costs are negatively correlated with the quality of the applicant sending it can be an honest signal. As an example, Spence assumed that education is marginally easier to acquire for high-quality applicants than for low-quality ones. If employers believe that education is a credible signal of higher productivity, they will offer higher wages for educational credentials. This will cause higher-quality applicants to invest in acquiring an education. Lower-quality applicants will not do so, because the costs are too high for them (for example, they may not possess the ability to fulfill the degree requirements). Employers' beliefs about the relation between education and applicant quality will be confirmed, causing them to again offer higher wages in the next round of hiring, and applicants to differentially invest in acquiring an education depending on their quality. In this way, education (or any signal the production costs of which are negatively correlated with quality) emerges as an honest signal between employers and applicants. Although Spence pointed out in a footnote that the same reasoning applies to the decisions of applicants, he did not explore what might constitute potential signals in their case. It is important to note the negative relation between productivity and cost: if signaling costs were the same for all individuals, then all would invest in education, and education would cease to be a credible signal (Spence, 2002). The same would happen if the costs of education would

decrease (for example if grade inflation would reduce the effort necessary to acquire a high-quality degree). In such a situation, its signaling power would also decrease and employers and applicants would need to converge on other signals. Spence's work is foundational in many areas of economics that describe cooperative dilemmas between agents with conflicting interests and asymmetrical information, for example agency theory and contract theory (Eisenhardt, 1989).

Signaling has widely been applied in management. Early scholars have noted the fundamental problem of aligning employees' goals with those of the firm (Porter et al., 1975; Simon, 1947). A recent integrative review (Connelly et al., 2011) found that interest in signaling has increased, especially in the fields of strategy and entrepreneurship, but also in organizational behavior (Nicholson & White, 2006) and human resource management. Deutsch Salamon and Deutsch (2006) described how organizational citizenship behavior (OCB) can serve as an honest signal of otherwise unobservable capabilities to other organizational members. OCB has been traditionally investigated as altruistic behavior (e.g., employees who engage in OCB are "good soldiers"). But the handicap principle suggests that it may be a way of credibly signaling attributes that would not be visible from in-role behavior. For example, a cashier who volunteers to organize an organization-wide social event gains the opportunity to display abilities (e.g., organizing skills, leadership) that would not be visible in her day-to-day job. In doing so, she imposes a cost on herself that less capable employees may not be able to bear (Deutsch Salamon & Deutsch, 2006).

Signaling in Personnel Selection

Ironically, although he shared the 2001 Nobel Prize in economics for his work on signaling using hiring as an example, Spence has been little cited in the personnel psychology literature. Research in personnel selection has used signaling theory to study how recruiters infer unobservable information about applicants (e.g., value congruence) from observable attributes (e.g., cognitive ability) (Aguinis, Michaelis, & Jones, 2005; Cable & Judge, 1997). Research in recruitment, on the other hand, has studied how applicants infer unobservable characteristics of organizations from known characteristics (e.g., inferring information about the organization from the characteristics of recruiters encountered during the selection process) (Ehrhart & Ziegert, 2005; Ryan, Sacco, McFarland, & Kriska, 2000; Rynes, 1991; Rynes, Bretz, & Gerhart, 1991). In both cases, however, researchers have focused on only a part of signaling theory, i.e., how actors infer unobservable characteristics of their partners from observable characteristics (Highhouse, Thornbury, & Little, 2007). The notion of honest signals has gone unacknowledged in the twin selection and recruitment literatures, as have the notions of reciprocal adaptation and escalation and their implications for the long-term stability of signaling systems.

To date, then, there has been no systematic application of the most important aspects of signaling theory to the field of personnel selection. The remainder of this article will show that it holds important potential for understanding and integrating research findings in this field. We start by summarizing its main principles. First, signaling theory applies to all interactions (human or otherwise) where individuals with imperfectly aligned motives seek cooperation. Personnel selection is such a situation, because organizations' goals of obtaining accurate information about applicants are

imperfectly aligned with applicants' goals of appearing attractive. At the same time, however, it is in applicants' and organizations' interests to exchange accurate information with each other in order to increase the quality of the selection decision for both the applicant and the organization. Both parties do cooperate in exchanging information to this end, but need to solve the dilemma of cooperation outlined above.

Second, a basic requirement for accurate communication in such situations is that signals must either be hard to fake or impose a cost on the sender such that only fit individuals can bear the cost (otherwise, senders' incentive to cheat will lead some of them to do so, and receivers will learn to rely less and less on the signal over time). Third, signals often evolve from activities originally designed for purposes other than signaling, through reciprocal adaptation between senders and receivers. Fourth, *signaling systems* consist of (a) a population of senders who produce the signal to influence receivers' behavior, (b) a signal that is correlated with an unobservable but relevant characteristic of senders, and (c) a population of receivers who interpret the signal as an indicator of that characteristic. Fifth, signaling systems can vary in stability along a continuum ranging from equilibrium to escalation (an arms race).

We argue that these principles constitute a framework with wide-reaching potential for understanding phenomena related to personnel selection. However, not only organizations and applicants have misaligned interests. Applicants may also compete with each other to distinguish themselves from other applicants and thus stand out to potential employers. Depending on how high the competitive stakes are, such behavior can take various forms. Applicants may try to outdo each other by engaging in noteworthy extracurricular activities (P. Brown & Hesketh, 2004), padding their resumés

(Amare & Manning, 2009) or even directly sabotaging other applicants' progress (Coombs & Virshup, 1998). On the other side of the fence, organizations may also compete with each other to attract and retain the best applicants. This competition is known as the War for Talent, and describes the widespread belief that talented employees are rare yet crucial for the prosperity and survival of organizations (Michaels, Handfield-Jones, & Axelrod, 2001). Waging the War for Talent requires organizations to signal desirable attributes to attract applicants, like high wages and bonuses, fast-track promotion systems, or commitments to employee well-being or corporate social responsibility.

In the next sections, we will therefore examine three types of adaptive relationships among job market actors. The first is between applicants and organizations, and corresponds to the typical personnel selection situation. The second concerns applicants in competition with other applicants for jobs. The third concerns organizations in competition with other organizations to attract applicants. In each case, cycles of individual-level adaptations and counter-adaptations can lead to the market-level emergence of signaling systems, equilibrium situations or arms races (Dawkins & Krebs, 1979; Vermeij, 1994). We discuss these three relationships in more detail and develop general propositions applying signaling theory to personnel selection. Some of these propositions are reconceptualizations of phenomena already studied under current theoretical paradigms, while others are novel statements which can lead to new research questions. Taken together, these propositions constitute a novel, high-level theoretical framework within which many personnel selection phenomena can be studied. We also highlight relevant examples of classic, emerging and declining signaling systems from

research and practice. Relationships between applicants and organizations are the prototypical case of personnel selection, having been most studied by academics and offer many practical examples. They will be therefore developed in more detail. But adaptive relationships among applicants and among organizations are also relevant for personnel selection. Moreover, outcomes from one adaptive relationship may influence another.

Adaptive Relationships Between Applicants and Organizations

Adaptations between applicants and organizations constitute the classical situation in personnel selection where organizations select among applicants for a job. On the one hand, organizations try to identify honest signals of two unobservable qualities of applicants: ability and commitment to the employment relationship. Identifying honest signals of applicant *ability* corresponds to assessment of *person-job fit* (whether the abilities of the applicant correspond to the abilities required by the organization). On the other hand, organizations' interest in identifying honest signals of applicant *commitment* corresponds to assessment of *person-organization fit* (whether the values of the applicant correspond to the culture of the organization)[2]. This distinction between two kinds of fit has a long history in organizational psychology (Kristof-Brown, 2000; March & Simon, 1958; Wanous, 1978). It is analogous to the two fundamental dimensions of competence and warmth evaluated in any human social relation (competence and warmth; Fiske et al., 2007).

[2] This situation makes the adaptive relationship between applicants and organizations analogous to mating games between male and female conspecifics, where ability (genetic fitness) and commitment to a relationship are also qualities females evaluate in males, and where males are selected on their ability to send the right signals (Zahavi & Zahavi, 1999).

On the other hand, applicants try to mindread organizations (Kleinmann et al., 2011; Krebs & Dawkins, 1984), or detect the criteria they are interested in and send the right signals. In turn, organizations may adapt their selection criteria. This may lead to cycles of reciprocal adaptations between the two parties. Over time, these *adaptive dynamics* lead to the emergence and evolution of signaling systems. Figure 1 graphically depicts this process, distinguishing between individual-level behavior and market-level outcomes and featuring Propositions 1-6.

In what follows, we discuss what constitutes an honest signal from the organization's point of view, what strategies applicants use to detect, and adapt to, organizational selection criteria, how counteradaptations emerge, and what consequences these entail for the evolution of applicant-organization signaling systems.

[Insert Figure 1 here]

Organizational Selection Strategies: The Search for Honest Signals of Applicant Ability and Commitment

Organizations and their representatives or allies try to identify honest signals of desirable applicant qualities. Two kinds of honest signals exist in personnel selection, *costly* signals and *hard-to-fake* signals. Costly signals correspond to the handicap principle: they require applicants to invest resources to acquire and display them. These we call *investment* costs. Signals that are hard to fake are typically beyond the conscious control of applicants. Both kinds of honest signals also must be associated with *cheating* costs, in order to deter potential cheaters. A central preoccupation of personnel selection is predictive validity, or the correlation between an observable predictor (a selection device) and an unobservable quantity of interest to employers (typically job performance;

Schmidt & Hunter, 1998). Predictive validity thus describes the empirical strength of a signal at a given point in time. As such, predictive validity is a necessary (but not sufficient) condition for a signal to be honest. In knowing predictive validity, one nevertheless remains agnostic about whether a signal is costly or hard to fake. For example, predictive validity may simply reflect an incidental link between the signal and an unobservable characteristic, as in the case of the typical empirical approach to identifying biodata items (Gunter, Furnham, & Drakeley, 1993). And some signals that have predictive validity may not be costly or hard to fake, for example personality tests. Nevertheless, signaling theory suggests that the predictive validity of a selection device may change over time if the investment costs of the signal change or if cheating costs change. In particular, if such costs decline, validity may also decline. There is some circumstantial evidence that predictive validity may change over time. Van Iddekinge, Roth, Raymark, & Odle Dusseau (in press) found that the predictive validity of integrity tests has decreased over time. They did not offer an explanation for this finding. A recent meta-analysis of assessment center validity for predicting supervisor performance ratings (Hermelin, Lievens, & Robertson, 2007) also found a decrease over time. The authors suggested that this might be due to range restriction caused by stronger pre-selection of applicants in organizational settings, but were unable to directly test this conjecture. A recent meta-analysis of work sample validity (Roth, Bobko, & McFarland, 2005) also found a decrease over time, which was not explained.

We now discuss costly signals, hard-to-fake signals and cheating costs in detail. Costly signals of ability include educational credentials (Spence, 1973), job experience, professional reputation, letters of recommendation or references. Educational credentials

require investment of time, money and effort to acquire. Professional reputations must be built through mindful interactions with colleagues, clients and the like. And letters of recommendation are costly to produce by proxy, that is, letter writers are typically high-status individuals whose time is a precious commodity. Their willingness to "waste" time on a letter is credible proof of their esteem for the applicant. Providing references in one's resumé also constitutes a costly signal of applicants' job experience, because only experienced applicants can provide references. Organizations may also search for costly signals of applicants' commitment to accepting the position if offered it, especially in job markets where unemployed applicants are required to apply regularly for positions to continue to receive unemployment benefits. Such signals may include the applicant's longevity in previous organizations, or credible demonstrations of willingness to incur personal costs in order to occupy the position, e.g. willingness to accept a lower salary to work for an organization or to move to another city, or effort visibly expended to inform oneself about the organization. Many of these signals are inferred from biodata in the resumé (B. K. Brown & Campion, 1994; Thoms, McMasters, Roberts, & Dombkowsky, 1999).

The second kind of honest signal typically involves signals that are hard to fake because they are beyond conscious control. Cognitive ability tests and work samples are examples. They have predictive validity (Roth et al., 2005; Schmidt & Hunter, 1998). Ability tests are hard to fake, because the cognitive processes underlying intelligent performance (e.g., working memory span or processing speed; Jensen, 1998) are not under conscious control. And scoring high on a work sample is impossible without the requisite experience or knowledge. Another kind of hard-to-fake signal may be

constituted by structured interview questions about past behavior (Janz, 1982). Structured interviews have predictive validity (Huffcutt & Arthur, 1994). And because such questions can require applicants to describe their past on-the-job behavior in detail, it can be difficult for them to provide high-quality answers without having corresponding job experience.

Some applicants may be tempted to cheat and mimic an honest signal. Returning to the examples above, applicants can buy a fake degree in what has been estimated as a billion-dollar industry (Bear & Ezell, 2005). They can lie about their experience on their resumés (Aamodt, 2006). Writers of letters of recommendation can "cheat" by reusing templates of previous letters that may not reflect the true qualities of the person they are recommending. And references can also be faked. Thus, for applicants to have a genuine incentive to actually pay investment costs in the long run, there must be some risk of punishment linked to cheating, otherwise many applicants would cheat and organizations would learn to discount the signal over time (we discuss the dynamic evolution of signaling systems below). Organizations thus need to increase *cheating costs*. At least part of the extensive efforts they invest in verifying applicant information can be considered an attempt to increase such costs and to ensure applicants refrain from mimicking costly signals. For example, reference checks are a way of increasing cheating costs. Applicants generally must authorize recruiters to check references (Levashina & Campion, 2009), which then constitute a credible signal that the information has at least not been blatantly faked by the applicant – or a highly risky bluff. Also, organizations can invest in running background checks to investigate applicants' past (Isaacson, Griffith, Kung, Lawrence, & Wilson, 2008).

It is also theoretically possible to cheat on hard-to-fake signals. However, because such signals are beyond conscious control, cheating in this case typically involves, for example, obtaining test questions and answers before completing a mental ability test (Burke, 2009; Lievens & Burke, in press). Organizations also invest substantial resources in guarding the security of such test items and identifying potential cheaters (Burke, 2009). Such actions in turn increase the costs would-be cheaters must incur and therefore act as a deterrent.

Given our focus on imperfectly aligned motives of applicants and organizations, it is worth noting that organizations are themselves composed of multiple actors, each of which may differ in their motives for hiring (e.g., their relative focus on ability vs. commitment). For example, human resource professionals may differ from line managers in their focus on person-job fit vs. person-organization fit or other perspectives (Sanders & Frenkel, 2011). And actors may also differ in their approaches to identifying honest signals. Some actors may rely on experiential learning or past experience (Herriott, Levinthal, & March, 1985; Huber, 1991). However, some organizational allies like academic researchers may engage in systematic research on behalf of organizations (Brief, 2000) to discover and develop honest signals. Thus, validation research (Schmidt & Hunter, 1998) can be considered a systematic, organized attempt at signal detection.

Some organizational actors may intrinsically value the hard-to-fake or costly nature of a signal to the extent that they neglect predictive validity. This can explain why recruiters are sometimes interested in invalid methods like graphology or nonverbal behavior. For instance, if recruiters believe that verbal behavior (i.e. applicants' interview answers) can be easily faked, they may focus more on nonverbal behavior which is more

difficult to manipulate (Ekman & Friesen, 1969) and commonly believed to "leak" information about unobservable states or traits of applicants (Bavelas, 1992). Similarly, the persistence of graphology in some settings may be due to recruiters' beliefs that it is both hard-to-fake and costly. Some recruiters believe graphology is hard to fake because it is more difficult for applicants to manipulate their writing than content (Balicco, 2002). Other recruiters use handwritten application letters because they require more effort to produce. The additional effort is believed to deter potential applicants who are not really interested in the job, and thus handwritten letters purportedly constitute costly signals of the applicants' motivation for the job (Bangerter, König, Blatti, & Salvisberg, 2009; Driver, Buckley, & Frink, 1996).

We summarize the above discussion on organizational efforts around signaling by the following propositions:

Proposition 1a: Organizations try to discover and exploit honest signals of applicant quality and commitment.

Proposition 1b: Organizations invest resources to keep cheating costs high.

Proposition 1c: The predictive validity of a selection device is a function of (a) its costly or hard-to-fake nature, and (b) its cheating costs.

Proposition 1d: Organizational actors differ in how they try to identify and exploit honest signals.

Applicant Adaptation Strategies: Mindreading Organizations and Sending the Right Signals

Organizations' selection criteria are typically not made known to applicants in advance. However, applicants are both motivated and able to detect what organizations are interested in (i.e. to mindread their criteria) and use this information to adapt their strategies accordingly. There are also individual differences in applicants' motivation and ability to engage in these activities (Levashina & Campion, 2006), as well as differences in the extent to which different kinds of honest signals can be adapted to.

There are individual differences in applicant *motivation* to mindread organizations. Brown and Hesketh (2004) distinguished two types of applicants that represent two prototypical categories at opposite ends of a continuum: *players* and *purists*. Players consider the job market as a positional game. They spend time preparing themselves and mindreading employers to maximize the chances of getting hired. On the other hand, purists view hiring as a process based on merit. They believe their individual achievement, capabilities, efforts, and ambition will be sufficient to get them the job they want and expect to be judged on their merit. Applicants also differ with respect to mindreading *ability*, as shown by research on the ability to identify selection criteria (Kleinmann, 1993; Kleinmann et al., 2011; König, Melchers, Kleinmann, Richter, & Klehe, 2006, 2007). Applicants high in this ability can more easily detect and adapt to criteria, thus performing better in the selection process.

The environment is replete with cues that facilitate mindreading. For instance, applicants can prepare for the selection process using the abundant *advice literature* available. Scores of books, websites, or online training videos and programs tell applicants how to play the recruitment game: how to tune their resumés, how to write a remarkable letter, what interview questions they will be asked and what answer they

should provide, how to behave or dress during interviews, how to prepare for tests or even how to cheat on them (P. Brown & Hesketh, 2004; Palmer et al., 1999). Even experienced applicants get coached by headhunters on how to behave during job interviews to conform to hiring organizations' expectations (Finlay & Coverdill, 2002). However, it is unclear whether advice actually improves applicants' future job performance or simply makes them better during the selection process (Palmer et al., 1999). This situation is also interpretable along the lines of signaling theory. Similar to mimicry in zoology (Zahavi & Zahavi, 1999), less qualified applicants can use advice to prepare themselves to look like more qualified ones. Yet by transmitting potentially deceptive signals, they must also accept cheating costs: the risk of getting caught and eliminated from the selection process.

Applicants not only mindread organizations, but may also adapt their behavior during selection encounters. Applicants are motivated to adapt their responses in personality tests (Birkeland, Manson, Kisamore, Brannick, & Smith, 2006; Marcus, 2006) or the way they present themselves in interviews to better fit the job profile and alter interviewers' evaluations (Stevens & Kristof, 1995). During interviews, they can do this using impression management or faking tactics to reduce or eliminate discrepancies between what they think they can offer and the ideal profile the organization is looking for (Levashina & Campion, 2006) or simply to be liked by the interviewer (Gilmore, Stevens, Harrell-Cook, & Ferris, 1999; Kristof-Brown, Barrick, & Franke, 2002). The importance of this phenomenon explains the growing attention given to impression management and faking in selection interview research during the past decades (Ellis,

West, Ryan, & DeShon, 2002; Gilmore & Ferris, 1989; Levashina & Campion, 2007; Sackett & Lievens, 2008; Tsai, Huang, Wu, & Lo, 2010).

Different kinds of honest signals may be differently vulnerable to applicant adaptations. We argue that costly signals are easier to adapt to than hard-to-fake signals. This is because shifts in costliness may change the accessibility of signals, whereas a hard-to-fake signal is intrinsically difficult to manipulate. First, societal and technological changes may radically decrease the cost of a signal and allow applicants to acquire and send it more easily. For example, the increased accessibility of higher education has led to an increase of university graduates in many labor markets, thereby decreasing the signaling value of educational credentials (P. Brown & Hesketh, 2004). And information technologies have led to an increase in information about selection devices available to applicants in recent years, via the mass media discussed above. Moreover, organizations may not always invest sufficiently in keeping cheating costs high, thus creating opportunities for some applicants to cheat (Levashina & Campion, 2006). On the other hand, it seems that hard-to-fake signals are more difficult to adapt to. This is particularly striking for the case of ability tests. Despite the existence of a flourishing test coaching industry, it remains controversial whether such tests can be prepared for effectively (Kulik, Bangert-Drowns, & Kulik, 1984; Powers, 1993; Ryan, Ployhart, Greguras, & Schmit, 1998).

This discussion on applicants' strategies can be summarized by the following propositions:

Proposition 2a: Applicants try to detect organizational selection criteria and adapt their behavior to fulfill these criteria.

Proposition 2b: There are individual differences in applicants' motivation and ability to detect organizational criteria and adapt their behavior.

Proposition 2c: Costly signals are easier to adapt to than hard-to-fake signals.

Counteradaptation

We showed that organizations try to identify honest signals of desirable applicant qualities using selection instruments and that applicants respond by attempting to detect organizations' criteria and adapting to them. In this section we describe *counteradaptation* (the next step in the emergence of signaling systems) and its consequences. Organizations may counteradapt by trying to keep their selection criteria from being identified by applicants. Or they may modify them to keep a step ahead of applicants. For instance, if recruiters realize applicants can detect selection criteria in interviews, they may change their questions or their evaluation process or turn to alternative selection procedures that are perceived as costlier or harder-to-fake signals of applicant qualities. Similarly, recruiters who become aware that applicants use impression management tactics during interviews may learn to discount such tactics (Rosenfeld, 1997).

Proposition 3: Over time, cycles of repeated adaptations and counteradaptations (hereafter: adaptive dynamics*) to a selection system will occur between organizations and applicants.*

An important question at this point is whether one party is systematically at an advantage over the other. Signaling theory offers an answer to this question, by invoking the different selection pressures put on applicants and organizations depending on the job

market situation (the life-dinner principle as described above; Dawkins & Krebs, 1979) and the cost of failure (Vermeij, 1994). This account predicts that applicants have more influence on signaling games (e.g., by preparing themselves, trying to identify selection criteria, or by cheating) and are at an advantage relative to organizations (Kador, 2006; Ralston & Kirkwood, 1999). Indeed, the selection pressure on organizations seems weaker than on applicants. If there are few jobs available and unemployment is high, failing to recruit a good applicant may not endanger the organization's survival, because there will be other qualified applicants on the market. On the other hand, applicants often need to find a job in a relatively short period of time out of pure financial necessity (P. Brown & Hesketh, 2004). They will thus be more motivated to adapt quickly, influencing the evolution of signaling systems and developing a potential advantage over recruiters (Ralston & Kirkwood, 1999). The prediction that applicants have a systematic advantage over organizations seems to be supported for the case of faking in personality tests, where attempts to identify fakers and correct their scores often fail (Griffith & Peterson, 2008; Morgeson et al., 2007; but see also Ones, Dilchert, Viswesvaran, & Judge, 2007). Another case is maintaining the security of item pools in ability testing using internet technology, which experts have claimed will be "ultimately a losing battle" (Davey & Nering, 2002, p. 187).

Of course, the situation may be reversed when there are more job openings than qualified applicants, or when fluctuations in applicant pool quality (Connerley, Carlson, & Mecham, 2003) limit the number of qualified applicants on the market. Organizations may then be subjected to more pressure to counteradapt than applicants. This may lead to

increased competition among organizations (see the section on “Adaptive relationships among organizations” below).

Proposition 4: The pressure to adapt and counteradapt is moderated by market forces: It will be stronger on applicants when there are few jobs available, but stronger on organizations when there are more jobs than qualified applicants.

The Evolution of Signaling Systems

Over time, adaptive dynamics between applicants and organizations can affect the evolution of signaling systems, leading to various market-level outcomes like the decline of existing signaling systems or the emergence of new ones. We distinguish between two paths of evolution, equilibrium and escalation. As discussed above, a signaling system is in a state of equilibrium if senders' and receivers' behaviors are mutually reinforcing. A paradigm example of equilibrium is Spence’s (1973) example of education as a signal of applicant quality. If employers believe that education discriminates between high-quality and low-quality applicants, if they structure wage differentials accordingly, and if applicants invest differentially in education depending on their quality, then employers’ beliefs will be confirmed by applicants’ behavior, and they will continue to pay more for better-educated applicants.

But reciprocal adaptations can also *undermine* the stability of signaling systems, leading to escalation (arms races). One prominent arena for an arms race is the selection interview. We showed above that applicants can use advice books to prepare for interviews. But recruiters can adapt their questions, for instance by asking unexpected questions, trick questions, or use puzzles (Poundstone, 2003). Recruiters may also

counteradapt by using new interview techniques such as the patterned behavior interview, a technique designed to measure applicants' past behavior in job-related situations (Janz, 1982). But, as new interview techniques are adopted, so does new advice become available to applicants. For example, advice books now propose ready-made techniques to help applicants adapt to behavioral interview questions (Ralston & Kirkwood, 1999). And applicants have been reported to routinely devise answers to such questions when preparing for an interview (Martin & Pope, 2008). In sum, both recruiters and applicants try to find ways to take the control of the interview (Palmer et al., 1999), constantly adapting and counteradapting, and the interview becomes a game in which both applicants and interviewers are trying to trick and outguess the other (Kirkwood & Ralston, 1999).

Another prominent example of an arms race involves personality testing. Since personality tests are self-report measures, they are vulnerable to faking (Cook, 2009). Thus, this arms race is driven by applicants' well-documented propensity to fake on personality tests (Ones & Viswesvaran, 1998). Many popular personality tests have been leaked and their structure and desirable responses are now widely available (e.g., Hoffman, 2001). Counteradaptations by organizations consist in the development of techniques for detecting fakers, dissuading would-be fakers, and camouflaging the selection criteria. Examples of attempts of detecting fakers include the use of social desirability scales or trick questions to test honesty. Examples of dissuasion include telling applicants that faking can be detected and will be punished (Dwight & Donovan, 2003). Camouflaging selection criteria involves the use of more subtly formulated items. A recent development in this respect is the conditional reasoning test of aggression,

where individuals solve dilemmas camouflaged as inductive reasoning problems. These allow inferences about applicants' potential for dysfunctional behavior (Berry, Sackett, & Tobares, 2010; James, 1998; LeBreton, Barksdale, Robin, & James, 2007).

Proposition 5a: Selection systems that are relatively difficult to adapt to (i.e. that are based on costly or hard-to-fake signals) will remain in stable use over time.

Proposition 5b: Selection systems that are relatively easy to adapt to will lead to processes of escalation.

Signaling theory predicts that escalation will lead to more sophisticated adaptations over time, and a cursory look at the case of personnel selection seems to support this. Taking faking in personality testing as an example again, we can observe an evolution in this direction. One of the earliest attempts to control faking was the invention of a lie scale (Ruch, 1942). Later on, researchers tried to use response latencies to detect fakers (e.g., Holden & Hibbs, 1995), whereas latest developments consist of the conditional reasoning tests described above (James et al., 2005) or even eye-tracking technology (Van Hooft & Born, in press).

Resumé screening seems to follow the same pattern of increasing sophistication. Organizations have developed scanning software to automatically select resumé based on the number of appropriate keywords (Amare & Manning, 2009). The advice literature then advised applicants to “write for the robot” (Amare & Manning, 2009, p. 35) by directly copying keywords from job ads into their resumés to better match criteria. Some applicants even use more subtle techniques, such as typing key words in microscopic

fonts or in white colors that are invisible to the human eye but detectable by a scanner. Organizations then developed more sophisticated scanning software to thwart applicants.

The rise of computerized aptitude testing constitutes yet another case of an arms race. Computerized tests of aptitude show great promise because they can reduce administration costs (e.g., via unproctored testing) and speed up the selection process (Lievens & Burke, in press). However, several issues have emerged, including applicant cheating and the threat of systematic item piracy by unscrupulous test coaching vendors. Pirates can attempt to breach tests by sending a large set of applicants to take the test and memorize items they encounter (Schnipke & Scrams, 1999). These items can then be deposited on so-called “braindumps” on the Internet and sold to applicants. Test vendors have reacted by creating so-called “web patrols”, or search devices that troll the Internet to detect piracy, or by implementing forensic analyses of test takers’ responses to detect items that have been compromised (Burke, 2009). All of these efforts may be construed as increasing cheating costs (Proposition 1b).

Social networking websites (e.g., Facebook) may constitute another emerging battleground for arms races between applicants and organizations. Currently, many applicants openly post personal information on such sites, even to the point of exhibiting problematic content (e.g., related to sexual activity or drug or alcohol abuse). Posting such information also correlates with certain personality traits (Karl, Peluchette, & Schlaegel, 2010). However, organizations are increasingly using this information to check on applicants' backgrounds, sometimes even infiltrating student groups or getting access to private information (Brandenburg, 2008). This situation can be interpreted along the lines of the derivation principle (Tinbergen, 1952): Observable features (a

Facebook profile) are incidentally but reliably correlated with unobservable characteristics (personality traits) of an organism (an applicant), and other organisms (recruiters) are learning to detect this correlation (mind-reading; Krebs & Dawkins, 1984). In the near future, applicants might learn to manipulate this information to influence potential employers (e.g., self-censoring the content they post when they go on the job market or even strategically posting content designed to impress recruiters).

These examples suggest that, in the long run, escalation may affect the stability of signaling systems. Less sophisticated systems may decline if receivers learn to discount information channeled by the signal, eventually becoming extinct. Another interesting moment in the evolution of a signaling system is its emergence, as when job market actors try to establish the honesty of a signal. Users' mistrust and discounting seems to be an initial sign of the decline of a signaling system. An example of this comes from impression management research. Repeated exposure to impression management may lead recruiters to mistrust applicants in the long run, or even to discount their responses. This may lead to an adversarial relationship between recruiters and applicants or a cynical view of the interview as an empty ritual where parties "simply go through the motions" (Ralston & Kirkwood, 1999; p.199) and no information of use is exchanged.

The history of personnel selection contains several examples of extinct or declining signaling systems. Graphology as a selection device is, arguably, near extinction (Bangerter et al., 2009). The letter of recommendation is a case of a system in decline. Letters of recommendation are widely used (Ryan, McFarland, Baron, & Page, 1999). However, there are many signs that their stability as an honest signal is compromised. They exhibit rather low reliability and validity (Colarelli, Hechanova-Alampay, & Canali,

2002; Hunter & Hunter, 1984; Moser & Rhyssen, 2001; Reilly & Chao, 1982) because they are uniformly positive. As a result, many recruiters question their utility in selection decisions (Nicklin & Roch, 2009). Letters of recommendation are amenable to a signaling game analysis (e.g., Farrell & Gibbons, 1989) based on divergent interests of the three parties involved: the applicant (or target), the letter writer and the organization. Writers' interests are often more aligned with the applicant and less with the organization (Colarelli et al., 2002). Thus, writers often face a kind of prisoner's dilemma: if they are honest (e.g. by mentioning negative as well as positive information) while others are not, the applicants they recommend will be at a disadvantage. This problem is exacerbated by the fact that applicants have implicit ways of pressuring the writer (e.g., threat of litigation, access to the letter, Farrell & Gibbons, 1989; Paetzold & Wilborn, 1992). Interestingly, mistrust of the content of letters of recommendation has also led to counteradaptations. For example, some efforts have focused on extracting reliable information from the text of the letter (Peres & Garcia, 1962) or mindreading the true intent of the writer by deciphering purportedly "coded" language (Thornton, 2003). Other possibilities involve focusing on peripheral aspects of the letter like its length. Writers write longer letters for applicants they favor (Mehrabian, 1965), and readers are sensitive to this feature (Kleinke, 1978). It seems like a good candidate for an honest signal, because it is hard to fake: Since writers are often high-status individuals, their time is a precious commodity. Their willingness to "waste" it on a long letter is thus credible proof of their esteem for the applicant. In sum, the evolution of adaptations and counteradaptations has led to mistrust of letters of recommendation as an honest signal a

decline in their use, and the evolution of alternative ways of extracting credible information from them.

There are also examples of emerging but not yet established alternative signaling systems. Aguinis et al. (2005) proposed that certification could be considered as signals of human resources professionals' potential productivity. They showed that the number of individuals possessing such certification in the US increased by 50% between 2000 and 2003. However, less than five percent of human resources job announcements either required or preferred such certification. Aguinis et al. (2005) concluded that "apparently, employers do not consider HR certification as a signal of employee value-added and future productivity" (p.168). A more recent study found that certification increased job prospects (Lester, Mencl, Maranto, Bourne, & Keaveny, 2010). These conflicting results suggest that human resource constituencies are trying to promote a new signal of applicant quality but that organizations have not yet uniformly accepted it. More generally, institutions of certification can constitute ways to guarantee the quality of the certified individual or organization, and thus constitute sophisticated signaling systems, provided that the certification is costly to acquire (Lizzeri, 1999).

Proposition 6: Over time, escalation will lead less sophisticated signaling systems to decline in use and new, more sophisticated systems to emerge.

Adaptive Relationships Among Applicants

Adaptive relationships among applicants correspond to cases where applicants compete with each other for job vacancies. In principle, as soon as there are more applicants than vacancies, applicants are in competition with each other. Thus, getting a job does not only depend on applicants' abilities to fulfill the requirements of the job, but

also on their relative ability compared to other job seekers (P. Brown & Hesketh, 2004). Positioning oneself as an applicant is related to employability, which means adaptability and personal career-related assets like attitudes, knowledge, skills, and abilities (Fugate, Kinicki, & Ashforth, 2004; Van Der Heijde & Van Der Heijden, 2006). The discourse on employability is increasingly present in the media and has become a preoccupation of individuals, organizations, and governments (Moreau & Leathwood, 2006). The traditional way to signal employability was through education (Spence, 1973), which can be an honest signal of applicant qualities if it reliably distinguishes high-quality from low-quality applicants. However, the development of mass higher education has led to an increasing graduation rate in many countries. Brown and Hesketh (2004) argue that as advanced degrees become more common, the signaling power of education decreases. We agree in part but suggest that, consistent with Proposition 6 above, more sophisticated signals can emerge, such as the reputation of the degree-granting institution in some countries, leading to educational arms races (Winston, 2004). Graduates are acutely aware of this, as well as of the importance of distinguishing themselves relative to their peers (Tomlinson, 2007, 2008).

In response to the above development, new ways for applicants to honestly signal their abilities have emerged. Like many signaling systems we discussed previously, these activities were not originally undertaken for signaling purposes, but under current market forces (i.e., media discourse on employability) they have evolved to become signals interpreted as such by both recruiters and applicants.

Take the example of internships. They are traditionally a source of practical experiences for university graduates. However, a study with German university students

has shown that they consider the internship as a way of distinguishing their resumé from those of other job seekers, for instance based on the prestige of the companies they worked for. In general, students are also aware of what their colleagues are doing and of what kind of activities are useful to include in a resumé (Bloch, 2007).

Extracurricular activities are a second way of signaling employability. These activities can be considered as a costly signal. While participation in some activities allows applicants to acquire competencies related to future work (e.g., managing skills), this does not apply to all activities. For instance, it is unclear how running a marathon makes an applicant a better manager. Yet spending time and energy on these activities means having less time to invest in studying. Therefore only high-quality applicants can bear the cost of such activities without hurting their academic results. However, for these activities to emerge as a signaling system, both senders (i.e. applicants) and receivers (i.e. recruiters) have to consider these activities as a costly and thus honest signal and understand that the other party does. Several anecdotes show that applicants do indeed perceive this, as the following graduate argues: “I’ve been to America for a year, I’ve been doing this, I’ve been doing that – employers go like ‘Wow’! How has she been doing all that and got a degree?’” (P. Brown & Hesketh, 2004, p.130-131). The graduate’s argument (*how has she been doing all that and got a degree*) is an illustration of the handicap principle. On the other hand, there is evidence that recruiters use extra-curricular achievements as signals of applicants’ value. Graduates with higher levels of participation in extra-curricular activities and more leadership positions within these activities are perceived as being of higher quality and invited to more job interviews (Chia, 2005; Nemanick & Clark, 2002). A recent international study (Hustinx et al.,

2010) found that the motivation to engage in volunteering activities was stronger in job markets where such activities are used by potential employers to evaluate productivity. Therefore, extra-curricular activities do seem to constitute a costly signaling system for both applicants and recruiters.

That such activities are valued by employers is not new. What is new is that applicants get involved in these activities not only out of intrinsic motivation, but also with the strategic intention to improve their resumés (Tomlinson, 2007). Organizations are sensitive to this and advertise extracurricular activities they offer using the employability argument. For example, a website writes that "Getting involved in a university related activity is a great way to make new friends - and boost your resumé" (http://www.manchester.ac.uk/undergraduate/studentlife/extra-curricularactivities/). The nature of extracurricular activities has also changed. Older studies of recruiters' preferences (Harcourt & Krizan, 1989; Hutchinson, 1984) focus on traditional activities such as membership in sports clubs or associations. It seems that the activities that were positively viewed by recruiters in the past are now considered as commonplace among applicants, who try to distinguish themselves with increasingly inventive activities (P. Brown & Hesketh, 2004). For instance, MBA students signal their ability by running marathons, sailing regattas, making films, or climbing Mount Everest while still getting top grades (Morris, 2007).

Competition may be particularly intense for new job market entrants like graduates, who are pushed to find means of distinguishing themselves because they lack job experience and because of the steady decrease in the signaling power of their primary

credentials (education). More experienced job seekers are likely to rely on other costly or hard-to-fake signals of quality like job experience or reputation.

Job experience is valued by employers because of its link with performance (Schmidt, Hunter, & Outerbridge, 1986). However, experience is difficult to display in detail. Typically, experience is showcased by applicants in their resumés, in an attempt to induce recruiters to invite them for an interview. Recruiters are indeed sensitive to various aspects of experience, like statements of accomplishments (Thoms et al., 1999) in deciding which applicants to interview (Behrenz, 2001). The interview itself is often focused on evaluating experience (Salgado & Moscoso, 2002). Given these incentives, applicants may be motivated to seek distinctiveness through displays of experience, perhaps to the point of exaggerating their past accomplishments or responsibilities. The difficulty of converting experience to a visible market signal becomes clear when considering the many degree mills that offer bogus degrees based on “life experience” (U.S. Department of Education, 2011).

A primary means of signaling reputation is by enlisting third parties to vouch for oneself, as in letters of recommendation or reference checks. A special case of this is when reputations are guaranteed by institutional membership, e.g., a physician who is a member of a professional society. However, like all costly signals, third-party enlistment can be faked. There are even companies that help applicants fake job references, some going so far as to provide bogus employers, complete with bogus contacts who will answer recruiters’ phone calls in order to bypass reference checks. Counteradaptations to these tactics include cross-checking companies and phone numbers to make sure they are real (Leonard, 2009). As suggested by Proposition 2c, technological innovations can

significantly decrease the cheating costs associated with managing reputation, thereby leading to arms races (Tennie, Frith, & Frith, 2010).

As described in Proposition 2a, applicants' adaptive behaviors may also depend on individual characteristics, such as their motivation or ability to engage in faking (Levashina & Campion, 2006; McFarland & Ryan, 2000) or the extent to which they engage in player or purist strategies (P. Brown & Hesketh, 2004). We therefore suggest:

Proposition 7a: Applicants try to send signals that distinguish them from other applicants to appear more attractive to employers.

Proposition 7b: There are individual differences in the degree to which applicants try to send signals that distinguish them from other applicants.

Proposition 7a goes beyond current conceptualizations of signaling in selection research (e.g., Cable & Judge, 1997) because it emphasizes that applicants do not just try to appeal to organizations (Proposition 2a), but also position themselves relative to each other. It has several implications for research, for example that applicants will try to be aware of what other applicants are doing and that they will integrate this awareness into their own job market choices. Initial evidence for this conjecture comes from research on internships (Bloch, 2007), but much more work could be done.

Although individuals may differ in their propensity to distinguish themselves from other applicants (Proposition 7b), all applicants are subject to market pressure resulting indirectly from the choices of other applicants. Recall the abovementioned distinction between player and purist applicants (P. Brown & Hesketh, 2004). Players view their employability relative to others, whereas purists do not. However, even purists may be pressured to switch strategies in order to avoid being crowded out of the job market.

Frank (2006) discussed the case of legislation prohibiting recruiters from asking female applicants about plans to marry or have children. This legislation can be ineffective to the degree that women who do not have such plans may realize they have an advantage relative to rivals if they spontaneously disclose such information, which may induce some of them to do just that (these women can be called players). If enough players do this, other women (who are purists) may be pressured to do so as well in order to not invite unfavorable inferences about their future family-related plans and thus jeopardize their hiring prospects.

A similar logic applies to faking. Earlier, we discussed how faking during the selection process (Levashina & Campion, 2007; Ones & Viswesvaran, 1998) can be considered part of an arms race between applicants and organizations. But faking is also part of the competition among applicants. In this context, faking can be seen as a prisoner's dilemma. Applicants' behavior in selection situations will depend on what they believe rivals will do. Because faking can modify selection decisions depending on the proportion of applicants who fake, the extent of faking, and the selection ratio (Levashina & Campion, 2007; Marcus, 2006; Stewart, Darnold, Zimmerman, Parks, & Dustin, 2010), applicants who do not fake when many of their competitors do, can sometimes get eliminated by their honesty (Morgeson et al., 2007). Thus, assuming that others may fake, applicants may reason that they improve their own chances by doing so as well.

Using the example of extracurricular activities again, given enough market pressure and an abundance of applicants with similar formal qualifications, such activities are a signal that can potentially lead to an arms race among applicants. In other words, applicants might allocate resources to engaging in increasingly impressive extracurricular

activities over time. At the same time, such a process of escalation may also motivate cheaters to try and cheaply mimic these signals by falsely claiming to engage in impressive activities. For example, one student blithely admitted to adding expertise in martial arts to her resumé depending on the position she applies for (P. Brown & Hesketh, 2004). In general, the above considerations suggest that adaptive behavior among applicants can lead to escalation, if the pressure from the job market is severe enough.

Proposition 8: The higher market pressure is, the more applicants will attempt to distinguish themselves from other applicants, leading to escalation.

One way to test Proposition 8 is by analyzing archives of applicants' resumés over time, quantifying the efforts invested in extracurricular activities, or their originality, and tracking their evolution as a function of past job market pressure[3]. Another possibility that follows from Proposition 8 is that job market pressure may affect rates of applicant faking. Robie, Emmons, Tuzinski, and Kantrowitz (2011) found that mean levels of applicant personality scores increased across three time periods with increasing unemployment rates. They suggested that unemployment may increase market pressure and lead to higher applicant motivation or levels of faking, in line with Proposition 8.

Adaptive Relationships Among Organizations

The third situation we examine is analogous to the previous one: Adaptations among organizations correspond to cases where organizations compete with each other to

[3] This research strategy is similar to that employed by paleontologists who examine the fossil record to investigate evolutionary pressures and adaptations of organisms over time (Vermeij, 1994).

attract applicants. This is a special case of more general processes whereby organizations seek ways to improve their performance relative to their rivals (Barnett & Hansen, 1996). For example, if company A differentiates itself from others by developing a competitive advantage (e.g. better brand image through a new marketing program), its competitor B will face performance shortfalls. It will develop improvements (e.g., its own marketing campaign) to reduce the difference with A. This move will put greater competitive pressure on A to respond, leading to escalation (Van Valen, 1973).

In recruitment, such an arms race exists: the *War for Talent* (P. Brown & Hesketh, 2004; Larkan, 2007; Michaels et al., 2001; Resto, Ybarra, & Sethi, 2007). It is part of the more general problem of labor market shortage that is a prime concern of both practitioners and academics (Lievens, van Dam, & Anderson, 2002). The War for Talent suggests that talented employees are a scarce resource that organizations must compete for in order to survive[4]. Successful organizations are those that adapt successfully to this situation by mindreading applicants' requirements. High wages and bonuses, fast-track promotions systems based on employees' potential, responsibilities given to talented junior managers, and selective hiring have all been used to attain such objectives (Michaels et al., 2001). In addition to such economic tactics, organizations can try to appeal to talented applicants by signaling social reputation. For instance, they can portray themselves as being environmentally responsible (Behrend, Baker, & Thompson, 2009),

[4] The War for Talent rhetoric has been criticized as being based on incorrect facts, flawed assumptions and hype (Pfeffer, 2001). We take no stance on these issues here but note that even skeptical organizations may find themselves pressured into engaging in the War for Talent if most of their competitors do so as well (similarly to the way purists may be pressured into more player tactics in adaptive dynamics among applicants).

supportive of diversity (Ng & Burke, 2005), or committed to stakeholders (Turban & Greening, 1997), even to the point of triggering arms races (Starr, 2008).

Another signal organizations can send is a realistic job preview (Wanous, 1973). Realistic job previews feature candid information about both positive and negative aspects of a position. Inclusion of negative information decreases applicants' initial expectations about a job and favors self-selection on the part of applicants. This in turn has the benefit of increasing commitment and reducing turnover on the part of those applicants who remain in the selection process (Premack & Wanous, 1985). Realistic job previews can be interpreted as honest signals of an organization's commitment to a long-term relationship based on transparency of information. They constitute handicaps because they are costly to design and their utility in a narrow economic sense has been disputed (Buckley, Fedor, Carraher, Frink, & Marvin, 1997). Moreover they disclose negative information about the job and the organization. As such, organizations that use realistic job previews impose a cost on themselves (i.e., going out of their way to decrease their own attractiveness) that constitutes a potential signal they are truly committed to a long-term relationship.

Of course, not all organizations can easily counteradapt to competitors' conditions, nor may they want to. Organizations may compete in a different institutional environment (Klehe, 2004) and may have different dynamic adaptation capabilities (Teece, Pisano, & Shuen, 1997), or may be less inclined to engage in the War for Talent, depending on their organizational culture or values (Pfeffer, 2001).

Proposition 9a: Organizations try to send signals that distinguish them from each other to appear more attractive to applicants.

Proposition 9b: Organizations differ in the degree to which they try to send signals that distinguish them from each other.

Proposition 9a goes beyond current conceptualizations of signaling in organizational attraction research (e.g., Ehrhart & Ziegert, 2005) because it emphasizes that organizations do not just try to attract applicants, but position themselves relative to each other. However, this process may only confer short-lived advantages because, as described above (Barnett & Hansen, 1996), becoming more attractive increases the selective pressure on competitors who can counteradapt in turn, thus eliminating the organization's competitive advantage. For instance, some companies began offering signing bonuses not only to MBAs but also to undergraduate students after learning that their competitors were making such offers (Gardner, 2002). Another development in the arms race among organizations are “golden handcuffs”, loyalty bonuses offered by organizations to retain key employees. But, in a counteradaptation, competitors offer bonuses, called “golden hellos”, to explicitly compensate for the loss of the loyalty bonus (Cappelli, 2000). At the executive level, CEO compensation is strongly influenced by what competitors are paying (Smithey Fulmer, 2009).

Proposition 10: The higher market pressure is, the more organizations will attempt to distinguish themselves from each other, leading to escalation.

One way researchers could track this process is by analyzing the content of companies’ recruitment websites (e.g., mentions of environmentally responsible or diversity supportive claims, description of fast-track promotion opportunities) over time or by comparing different job markets.

As noted above, for signaling systems to develop, both parties need to converge on interpreting the signal. Research suggests that applicants interpret recruitment initiatives as signals of unobservable organizational characteristics. Individuals with high academic achievement (grades and cognitive ability) prefer organizations offering selective hiring practices, merit-based pay, praise and recognition, or fast-track promotions (Trank, Rynes, & Bretz, 2002). Even less ambitious applicants may interpret signals about the organization as a good employer or as socially responsible. Indeed, the literature on organizational attraction and applicant reactions (Ryan & Ployhart, 2000) suggests that the selection process is used by applicants to infer characteristics of organizations. Thus, applicants' preferences both reflect and affect the arms race among organizations.

Advantages of Signaling Theory for Personnel Selection

Signaling theory (Spence, 1973; Zahavi, 1975; Zahavi & Zahavi, 1999) is a broad framework (Cronk, 2005) that describes in a principled and parsimonious manner the incentives involved in cooperative interactions between rational individuals with partly divergent goals. It explains how exchange of accurate information is possible under such conditions (i.e., by making the signals costly or hard to fake), and how repeated cycles of micro-level phenomena (reciprocal adaptations of individual job market actors) can affect macro-level phenomena (the evolution of personnel selection signaling systems). It also describes how macro-level phenomena (market selection pressures) affect micro-level, individual adaptive behavior (e.g., faking). This articulation of phenomena at different levels of analysis (a classic example of the reciprocal relationship between structure and

interaction; Morgeson & Hofmann, 1999) makes a signaling framework theoretically innovative, because most theoretical work in personnel selection research focuses on individual-level processes, and the few studies on macro-level processes (e.g., Klehe, 2004) are not articulated with individual-level theories. We now examine the implications of signaling theory for three levels of theoretical development: the level of neighboring domains of study (recruitment and selection), the level of individual-level theoretical approaches within selection (the psychometric approach, the applicant reactions approach and the social process approach), and the level of macro-level theoretical approaches within selection (institutional theory). We also examine an example of how signaling theory can open up new areas of investigation as well as implications for the practice of selection.

Implications for Neighboring Domains of Study: Recruitment and Selection

The neighboring domains of recruitment and selection have often been treated separately (Barber, 1998). Few theoretical accounts systematically and comprehensively examine interactions or similarities between these fields (but see Wanous, 1980). Particularly striking is the fact that research in selection has focused on how organizations interpret signals from applicants (Cable & Judge, 1997) and research in recruitment has focused on how applicants interpret signals sent by organizations (Ehrhart & Ziegert, 2005), without any recognition of this similarity. And yet, recruitment and selection often occur simultaneously and are interdependent in their outcomes (Barber, 1998). The signaling perspective we have developed links aspects of recruitment and selection in a novel way by specifying analogous adaptive processes in each domain. Adaptive relationships among organizations to attract applicants (an aspect

of recruitment) are analogous to adaptive relationships among applicants trying to maximize their relative attractiveness to potential employers (an aspect of selection). In other words, recruitment and selection may serve similar functions while being accomplished by different structures (Morgeson & Hofmann, 1999). Our approach is similar to related approaches in personnel economics that consider recruitment and selection as two facets of the same problem, namely matching firms and workers (Lazear & Oyer, in press).

Implications for Individual-Level Theoretical Approaches Within Selection

A signaling framework complements existing theoretical approaches in personnel selection such as the psychometric approach, the applicant reactions approach, and the social process approach. The psychometric approach focuses on systematically documenting the properties (reliability and validity) of selection devices. It has been immensely successful (Schmidt & Hunter, 1998). However, it is based on several assumptions that have been questioned in recent years, for example that selection is a unilateral process on the part of the organization. Research has shown that applicants' choices of organizations (Murphy, 1986) affect the utility of selection procedures, thus suggesting that selection is a bilateral process. And applicant reactions research (Ryan & Ployhart, 2000) as well as related theoretical work focused on understanding the effects of applicants' perceptions of selection procedures has shown that selection procedures are not neutral predictors but also transmit information about the organization to applicants (Anderson, 2001). Critics have argued that it has not yet convincingly been shown that applicant reactions really matter (Sackett & Lievens, 2008). Signaling suggests a theoretical rationale for why they should matter, because applicant adaptations are a

prime motor of the long-term evolution of signaling systems. But signaling would also suggest studying the effects of applicants' *repeated* interactions on their perceptions of and attitudes towards selection systems *in general* and about the job market, rather than only towards a particular selection device or a particular organization.

Seen through the lens of signaling theory, the psychometric approach and the applicant reactions approach can be seen as embodying complementary perspectives on the selection relationship. However, they are both silent about the interactive and adaptive nature of that relationship. Some recent theoretical perspectives on personnel selection like social process models (Derous & De Witte, 2001; Herriot, 1993) do emphasize the adaptive, interpersonal, and motivational nature of selection. For example, Herriot (1993; p.372) asserts about the selection relationship that "clearly, information is being processed by both parties, and how each processes the information provided by the other's behavior affects how each behaves and is consequently perceived". But while social process models focus on individual-level processes and outcomes, the signaling framework links individual behavior of job market actors and emergent collective phenomena, and also extends the scope of relevant phenomena to repeated interactions and their long-term, macro-level effects.

Implications for Macro-Level Theoretical Approaches Within Selection

Signaling theory complements the phenomena accounted for by institutional theory, which has recently become more prominent in personnel selection. For example, Klehe (2004) applied institutional theory to the question of how organizations choose selection devices. She developed a model of the various environmental pressures that influence the adoption of selection devices as well as the types of responses organizations

may adopt. An example response is imitation, whereby organizations adopt selection procedures only after other organizations have done so, to reduce uncertainty.

Institutional theory predicts limits to signaling dynamics. For example, the selection interview is arguably an institutionalized aspect of personnel selection (i.e., it is taken for granted by all actors) that will not foreseeably become extinct; it is therefore likely to remain a battleground for arms races between applicants and recruiters. On the other hand, signaling also constrains institutional pressures. For example, imitation may not be a rational strategy for certain actors when the costs of adopting a signal are too high (e.g., not all applicants can afford to imitate their colleagues' more exotic extracurricular activities). In general, then, signaling theory and institutional theory describe opposing pressures and make complementary predictions (Terlaak & King, 2010). We speculate that the specific nature of institutional theory makes it inherently more applicable to adaptive relationships among organizations, whereas signaling is more applicable to adaptive relationships between applicants and organizations. The links between institutional theory and signaling theory in personnel selection should be explored in more detail.

Illuminating Blind Spots of Selection Research: The Advice Industry

Signaling theory can stimulate research on previously under-researched areas in selection. In particular, macro-level factors driving escalation have largely been ignored by selection research so far, and the lack of theory capturing these phenomena has most likely contributed to these blind spots. A prominent example is the *advice industry* for potential applicants. The adaptive dynamics between applicants and organizations leading to applicant adaptations and counteradaptations has driven the emergence of a huge

industry that claims to help applicants to cheaply mimic otherwise costly signals of ability and commitment. This industry operates through media like web forums where one can purportedly learn how to beat commercially sold mental ability or personality tests (e.g., www.jobtestprep.co.uk), books on how to prepare a resumé or answer interview questions, or headhunters who train assessment center participants (see Finlay & Coverdill, 2002). There is even a thriving market for fake degrees of higher education (see Bear & Ezell, 2005), that has been estimated to have generated more than one billion dollars of sales and the degrees to have been bought by at least one million customers. If faked degrees represent such a large market (Bear & Ezell, 2005), it is easy to imagine how huge the advice industry in total must be and how many applicants have been willing to spend money for it. Such topics are rarely mentioned in the academic literature on selection. However, according to signaling theory, the advice market deserves attention from researchers because it is not a side effect of personnel selection, but rather plays a systematic role in affecting individual-level adaptive behaviors of applicants.

Implications for selection practice

A signaling approach to personnel selection also has implications for selection practice. Many of the issues discussed in this article are well-known to practitioners but have been largely ignored by academics. Palmer, Campion and Green (1999, p. 346) suggested that the notion of the selection interview as a competitive arena is much more of an issue in the practitioner literature on interview preparation than it has been for academics: “a sense of inherent conflict between interviewers and applicants is evident in the practice literature, although it is generally downplayed or ignored in the extant research.” This claim is consistent with recurrent examples of competitive rhetoric from

advice books for recruiters. For example, Kador (2006, p. xi) writes “if you repeat questions or use generalized interview questions, you will most assuredly be fooled by a group of well-rehearsed applicants.” And Kanter (1995, p. xvii) writes “few people view the job interview as a joint effort to find a good match or to determine that a match does not exist. Instead, both sides view it as a game.” On the other hand, qualitative research on applicants’ experiences on the labor market often reveals a sense of mistrust, frustration and cynicism (e.g., Billsberry, 2007; P. Brown & Hesketh, 2004). These examples suggest that dilemmas of cooperation are a reality for many job market actors. At the same time, the aggregated individual decisions of these actors affect adaptive dynamics described in this article.

Currently, it seems premature to offer specific recommendations for practice. However, if there is one broad practical issue that emerges from signaling theory as applied to the domain of personnel selection (writ large, i.e., also encompassing analogous processes of applicant choice), it is unquestionably that of trust as a means of defusing escalation. Trust is the mechanism that keeps information exchanges reliable; in its absence, would-be cooperators cannot be sure they will not be exploited or duped. Organizations and applicants, as well as other job market actors like consultants, should be sensitized to the importance of building trust and opportunities for generating trust and cooperation in the selection process should be pursued (Pearce, 2000). This may entail, among other things, renouncing the rhetoric of conflict (e.g., the War for Talent) when creating or diffusing discourses about selection (e.g., advice books) or attempting to analyze and thus better align actors’ incentives. Further, long-term guarantees of trustworthiness in a particular market (e.g., reputations) are a way of solving the dilemma

of cooperation (Tennie et al., 2010). By this logic, both applicants and organizations should invest resources to maintain their reputational standing in the job market.

Developing and maintaining a reputation as a trustworthy actor does not imply blindly trusting one's partners or opening oneself up to exploitation by cheaters. In the prisoner's dilemma, one of the most successful strategies is tit-for-tat, which initially trusts cooperation partners but punishes them if they cheat (Poundstone, 1993). This implies that organizations should both invest in managing reputation but also use selection devices that tap into honest (either costly or hard-to-fake) signals and seek to keep cheating costs high to deter and punish cheating by applicants.

Conclusion

Signaling theory offers a simple yet powerful set of mechanisms for charting the interactive, adaptive and thus dynamic nature of personnel selection relationships, going beyond the current theoretical approaches to personnel selection and linking personnel psychology to related fields of study in management, economics and other disciplines. We have explored three kinds of adaptive relationships: between applicants and organizations, among applicants, and among organizations, showing how many important phenomena can be described in terms of signaling. Signaling theory has important implications for theoretical development between neighboring fields of study and at the level of theoretical approaches in personnel selection. Signaling theory leads to new predictions about selection phenomena, focuses attention on under-researched but important topics and can inform selection practice. The benefits of viewing personnel selection as a network of adaptive relationships among job market actors are numerous.

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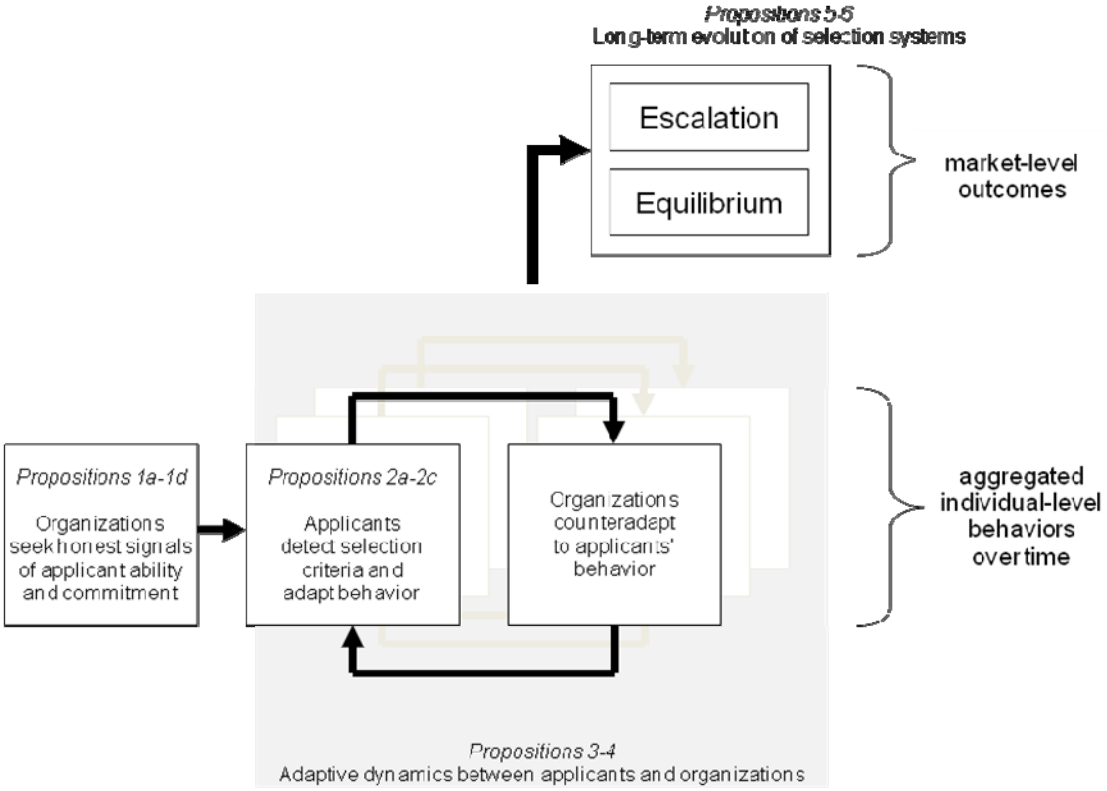

Figure 1. Reciprocal adaptations between applicants and organizations in personnel selection and their consequences.