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STAR PERFORMERS IN TWENTY-FIRST CENTURY ORGANIZATIONS

HERMAN AGUINIS
Indiana University

ERNEST O'BOYLE JR.
University of Iowa

We argue that changes in the nature of work in 21st-century organizations have led to the emergence of star performers—a few individuals who contribute a disproportionate amount of output. We describe how stars negate the long-held belief that the distribution of individual performance is normal and, instead, suggest an underlying power law distribution. In addition, we offer 9 propositions to guide future empirical research on star performers and an underlying power law distribution of individual performance. We describe how the presence of stars is likely to affect all individual-, team-, and firm-level management theories addressing individual performance directly or indirectly, but focus on specific implications for those addressing human capital, turnover, compensation, downsizing, leadership, teamwork, corporate entrepreneurship, and microfoundations of strategy. In addition, we discuss methodological considerations necessary to carry out our proposed research agenda. Finally, we discuss how a consideration of star performers has important implications for management practice.

Since reassuming the role of Starbucks CEO in 2008, Howard Schultz has achieved a market capitalization of $33 billion, more than $11 billion annual sales, and net annual profits of $1.7 billion (Starbucks Corporation, 2012). In a still struggling US economy where the average growth of S&P 500 companies was −.4% in 2011, Starbucks' share price increased by more than 40%. Thirty years earlier, a young Japanese programmer named Shigeru Miyamoto developed a bizarre game involving a gorilla

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Correspondence and requests for reprints should be addressed to Herman Aguinis, Department of Management & Entrepreneurship, Kelley School of Business, Indiana University, 1309 E. 10th Street, Bloomington, IN 47405; haguinis@indiana.edu.

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throwing barrels for a near-bankrupt company named Nintendo. The success of *Donkey Kong* helped fund Nintendo's launch of a home-gaming system where Miyamoto continued to work and develop some of the most successful franchises in gaming history, including *Mario Brothers* and the *Legend of Zelda* (Suellentrop, 2013). More recently, in Bangalore, India, dropout rates in the public school system were soaring due to students' malnutrition until an engineer named Shridhar Venkat overhauled the failing lunch program with a series of logistical and supply chain adaptations (Vedantam, 2012). Venkat's continued enhancements of the program have so significantly improved both children's health and school attendance that the Bangalore Public School System is now a Harvard Business School case study.

Schultz, Miyamoto, and Venkat typify star performers who consistently generate exorbitant output levels that influence the success or failure of their organizations and even society as a whole. Although their production is extraordinary, their prevalence is not (O'Boyle & Aguinis, 2012). In adddition, although it is likely that such star performers have existed throughout history, their presence is particularly noticeable across many industries and organizations that make up the 21st-century workplace. They occupy roles ranging from frontline workers to top management. Moreover, their addition can signal the rise of an organization and their departure can portend decline and even organizational death (Bedeian & Armenakis, 1998). We do not single out these elite performers based on some bundle of traits or combination of ability and motivation. Rather, we conceptualize stars based on their output. What makes them special is that their production is so clearly superior.

In spite of their central role for organizational success, we do not have a good understanding of star performers. In fact, their presence is often treated as a data "problem" because the normal distribution cannot account for such extreme levels of productivity. Reliance on existing theories of individual performance, which often rest on the assumption that performance is normally distributed (Hull, 1928; Schmidt & Hunter, 1983; Tiffin, 1947), results in identifying these top performers as "anomalies" that must be fixed through data transformations or even deletion of cases from the analysis (Aguinis, Gottfredson, & Joo, 2013). Moreover, supervisors involved in performance appraisal systems are often trained to ignore stars and, instead, force a normal distribution on performance scores they assign to their subordinates (Motowidlo & Borman, 1977; Schneier, 1977).

Situational constraints that restricted individual performance in the past, such as geographic distances, lack of good communications, inability to access information and knowledge, and slow technological dispersion, are now being minimized by the Internet and flow of information and knowledge around the world. The organizational hierarchy including control, command, and centralization has been replaced by an organic, web-like organizational structure (Cascio & Aguinis, 2008; Way, Lepak, Fay, & Thacker, 2010), and there is an increasing awareness that the majority of overall productivity is due to a small group of elite workers (Ready, Conger, & Hill, 2010). The result of this new organizational landscape is that many of our theories so firmly rooted in the manufacturing sector, corporate hierarchy, and the human capital of the "necessary many" may not apply to today's workplace that operates globally and is driven by the "vital few."

The goal of our paper is to serve as a springboard for a research agenda on star performers. First, we define star performers based on their performance relative to others and discuss the role of time in the identification of stars. Second, we offer a research agenda including nine research propositions to guide future empirical study of star performers. Third, we discuss implications for future theory and empirical research in several mainstream theories in the field of management and offer recommendations regarding methodological approaches that will be instrumental regarding the implementation of our proposed research agenda. Finally, we discuss implications of star performers and an underlying power law distribution of individual performance for management practice.

Star Performers

Stars are defined by their location on the production distribution. Accordingly, a star is a relative position and their identification is only possible by viewing them in relation to the productivity of others. In addition, time is an important element to star identification because stars are identified by their exceptional output over time and not just a single exceptional result. The minimum amount of time required to identify a star performer is the same as the minimum amount of time needed for important results to be produced and observed in various organizational contexts. For example, the minimum amount of time that a CEO's actions generate a stable estimate of firm financial performance is typically considered to be a quarter—and this is why the performance of CEOs is usually evaluated on a quarterly basis. As a second example, it usually takes 2 to 3 years for a researcher in the field of management to produce a refereed journal article—and this is why many universities evaluate the performance of their management professors based on a 2- to 3-year window. Although there are minimum time frames needed to identify star performers, it is possible to also accumulate several such time windows to identify star performers over longer periods of time such as the number of citations accumulated by researchers over 5-year windows and even over their entire careers (e.g., Podsakoff, MacKenzie, Podsakoff, & Bachrach, 2008).

Finally, performance can be defined in terms of behaviors (i.e., how people do their work) or results (i.e., the output of people's work). Our definition of star performers is based on results, which does not consider the traits that workers possess or how they do the job and, instead, focuses on what they produce. According to the performance management literature, a focus on results rather than behaviors is most appropriate when (a) workers are skilled in the needed behaviors, (b) behaviors and results are obviously related, and (c) there are many ways to do the job right (Aguinis, 2013). Although we readily acknowledge that for more traditional industries such as farming and manufacturing, which are still important components of the economy in the United States and other countries, these conditions may not fully apply, a focus on results seems appropriate for a vast number of occupations and organizational settings in today's knowledge-intensive economy dominated by the service industry.

A practical consideration regarding the identification of star performers relates to sources of data regarding an individual's output. This is not an issue unique to our paper but a topic that is relevant for all performance management theories and practices that include a results component. Thus, there is an extensive literature that offers guidelines regarding this point (e.g., Aguinis, 2013, chapter 5; Cascio & O'Connor, 1974). Fortunately, due to today's analytics movement as well as the sharp decrease in cost of data storage technology (Davenport, Harris, & Shapiro, 2010), most organizations regularly collect data not only on employees but also on customers and many other issues. In fact, Berry and Linoff (2004) argued that firms are faced with the problem of too much data rather than too little. However, we readily acknowledge that it will not be possible to identify star performers if data regarding results and outcomes are not available.

Star Performers and the Performance Distribution

When attempting to compare stars to average, or even very good workers, the output attributable to stars is inconsistent with what would be expected using a traditional normal (i.e., bell-shaped) distribution. For example, in academics, where top-tier journal publication is one of the most influential antecedents to rewards such as salary and tenure (Gomez-Mejia & Balkin, 1992), individuals whose publication record is three or more standard deviations above the mean should be roughly .15% of the sample size according to a normal distribution. In other words, in a sample of 10,000 academics, approximately 15 are predicted to be at or above three standard deviations. However, O'Boyle and Aguinis (2012) found that the number of individuals above this threshold far exceeded what would be predicted under a normal distribution. Across 54 scientific disciplines, this star effect was found in both the natural sciences such as agriculture where a normal distribution predicted 35 academics when there were actually 460, as well as social sciences such as clinical psychology where a normal distribution of performance predicted 16 individuals, but results showed 162 academics above three standard deviations (O'Boyle & Aguinis, 2012).

In challenging the prevalence of normality as a model to describe the distribution of individual performance, several points need considering. First, *normal* is not the same as *common* or *natural*. This is not a new idea, and Thorndike (1913) noted that "there is nothing arbitrary or mysterious about variability which makes the so-called normal type of distribution a necessity, or any more rational than any other sort . . . Nature does not abhor irregular distributions" (pp. 88–89). Second, although the extant research typically finds and reports a normal distribution of individual performance, most research involving individual performance uses supervisory ratings that reflect behaviors rather than results (Aguinis, 2013), and, for decades, supervisors have been trained to place workers along a normal distribution (Motowidlo & Borman, 1977; Reilly & Smither, 1985; Schneier, 1977). Finally, there is some research conceptualizing performance in terms of results that has also shown a normal pattern. Specifically, Schmidt and Hunter compared the best and worst workers' productivity over 40 samples and concluded that, "[t]he low levels of variability for [the estimated population standard deviation] across jobs indirectly supports the assumption of normality of the output distribution" (Schmidt & Hunter, 1983, p. 410). However, of the 40 studies included in their meta-analysis, 38 were conducted in the manufacturing sector.

Given important changes in the economy from manufacturing to knowledge, organizations have changed from hierarchies to webs, capital has changed from land and resources to people and innovation, and work itself has changed from scripted duties to complex interactions. Accordingly, we may not be able to extrapolate the distribution of performance from 20th-century manufacturing environments to 21st-century knowledge-based organizations. More specifically, the distribution of worker productivity seems to have changed from a normal distribution with limited variability to a distribution that allows stars to emerge (O'Boyle & Aguinis, 2012). One potential answer to the shape of production in the 21st-century workplace is a power law distribution. Although normal distributions are defined by their midpoints, power law distributions are defined by their tails. Put differently, instead of a massive group of average performers dominating production through sheer numbers, a small group of elite performers seem to dominate production through massive performance.

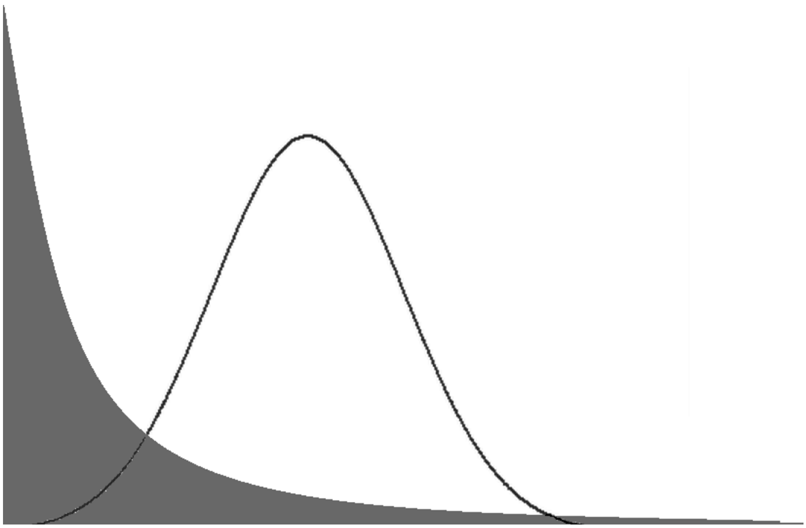

Figure 1: **Normal Distribution Overlaying a Power Law Distribution.**

Power law distributions, such as the one overlaying a normal distribution in Figure 1, are found in a number of contexts such as biodiversity (Crawley & Harral, 2001), crime waves (Johnson, 2008), stock market performance (Gabaix, Gopikrishnan, Plerou, & Stanley, 2003), and increasingly among jobs that comprise the modern economy. For example, in entrepreneurship research, star effects are so extensive that nearly every metric of productivity including sales, profits, and growth requires log transformations to create a distribution more aligned with theoretical and statistical assumptions based on normality (e.g., Audretsch, Dagnino, Faraci, & Hoskisson, 2010). For scientists, inventions and innovations whether quantified in frequency or returns on investment show a power law distribution with the top decile capturing between 48% and 93% of the patents and National Science Foundation grants (Marsili, 2005; Scherer & Harhoff, 2000). In addition, sales positions and jobs with complex, nonscripted duties (e.g., dentists, physicians, attorneys) show extreme variances and highly skewed distributions relative to their blue collar and low-complexity counterparts (Schmidt, Hunter, & Judiesch, 1990). Even in industries where one might expect a normal distribution such as the military, given their emphasis on uniformity, hierarchy, and regimented activity, stars still emerge when performance is operationalized based on outcomes such as the number of downed aircraft (Toliver & Constable, 1998). Most recently, O'Boyle and Aguinis (2012) conducted a study involving 198 samples of academics, athletes, entertainers, and politicians and found 94% of the samples better conformed to a power law distribution than a normal distribution.

In sum, evidence for a normal distribution of production is primarily found among two sources: low-complexity jobs that reflect the prominent industries of the 20th-century workplace (Boisot & McKelvey, 2010; Schmidt et al., 1990) and samples that rely exclusively on ratings of behavior (as opposed to actual production or results). Alternatively, power law distributions seem to best model productivity among the types of jobs found in the sales, service, technology, research, and white-collar sectors as well as the high-complexity occupations and industries that are increasingly dominating the 21st-century workplace. Accordingly, we offer the following proposition:

> *Proposition 1*: In organizations that adapt to and typify the 21st-century workplace of increased job complexity, reduced situational constraints, and flexible hierarchies, the distribution of individual performance will be better modeled by a power law compared to a normal distribution.

If star presence creates a power law distribution, their exit may eliminate it. However, if certain properties of power laws extend to individual performance, then the shape of the distribution may remain unchanged even if star performers leave. This is because dynamic systems, be they genetic (Weng, Bhalla, & Iyengar, 1999), biological (Koch & Laurent, 1999), ecological (Gallagher & Appenzeller, 1999), social (Barabasi & Albert, 1999; Watts, 2003), economic (Podobnik, Fu, Jagric, Grosse, & Stanley, 2006; Scheinkman & Woodford, 1994), or finance based (Andriani & McKelvey, 2009; Aoyama, Yoshikawa, Iyetomi, & Fujiwara, 2010; Arthur, 1994; Souma, et al., 2006), demonstrate a property of power laws known as *scale invariance*. Sometimes referred to as fourth dimension modeling or fractal geometry, the classic example is a cauliflower stalk where a branch can be cut from the stalk, a smaller branch can be cut from the first branch, and so on. When the branches are lined up, they all maintain the same shape and structure (Mandelbrot, 1982).

If the property of scale invariance extends to worker production, the shape of the performance distribution will be the same for growing, stagnant, and declining organizations. For example, consider stars in professional basketball. Michael Jordan led the Chicago Bulls to six National Basketball Association (NBA) championships in 8 years during which time he was named NBA's Most Valuable Player five times. While a member of the team, the distribution of points scored conformed to a power law with Jordan at the tail of the distribution dominating offensive productivity. This is consistent with Proposition 1. But, what makes Michael Jordan a particularly interesting case is that he retired twice from the Bulls, once in 1993 and again in 1998. The effect at the organizational level following these retirements was disastrous, particularly in 1998 when the Chicago Bulls went from winning three consecutive championships to becoming the worst team in their conference. However, despite the tremendous cost to organizational success and significant drop in individual player production (i.e., points per game), the right panels of Figure 2 show that the shape of the point distributions for the 50 prior to Jordan's retirement and 50 games after his retirement are nearly identical.[1] The loss of Jordan had a profound impact on every aspect of the Bulls' performance and success, except the shape of the distribution of individual performance.

Michael Jordan was a high-profile star that fundamentally altered the industry he worked in, but star distributions and scale invariance may become increasingly common among 21st-century jobs. In the words of Bill Gates, "A great lathe operator commands several times the wage of an average lathe operator, but a great writer of software code is worth 10,000 times the price of an average software writer" (Veksler, 2010, point 2). There is empirical evidence to support Gates' claim as the distribution of programmer performance follows a nonnormal distribution that is consistent across task (e.g., debugging programs, writing code) and experience (e.g., novice or experienced programmers; Curtis, Sheppard, Milliman, Borst, & Love, 1979; Darcy & Ma, 2005; DeMarco & Lister, 1985; Sackman, Erikson, & Grant, 1968).

As an additional example, a study involving the number of scholarly publications produced by researchers in 178 radiology departments participating in the National Resident Matching Program found that a power law distribution resulted in better-fit indexes compared to a normal distribution (Morelli & Bokhari, 2013). Moreover, results suggested scale invariance because a power law distribution had a better fit to the data regardless of whether analyses were based on the total number of 14,219 journal articles produced by 163 departments from 1987 to present or only a subset of 4,252 journal articles produced by 142 departments that appeared in the past decade only.

Finally, scale invariance is also likely to be observed in jobs that require less training and credentials. For example, we gained access to performance data for call center representatives described by Grant (in press) and Grant and Sumanth (2009), and results showed that a power law distribution emerges whether looking at sales, revenue, or calls per hours.

[1]Due to a player's strike in the 1998–99 season that shortened the season to 50 games, we limit the comparison to the 50 games pre- and post-Jordan retirement.

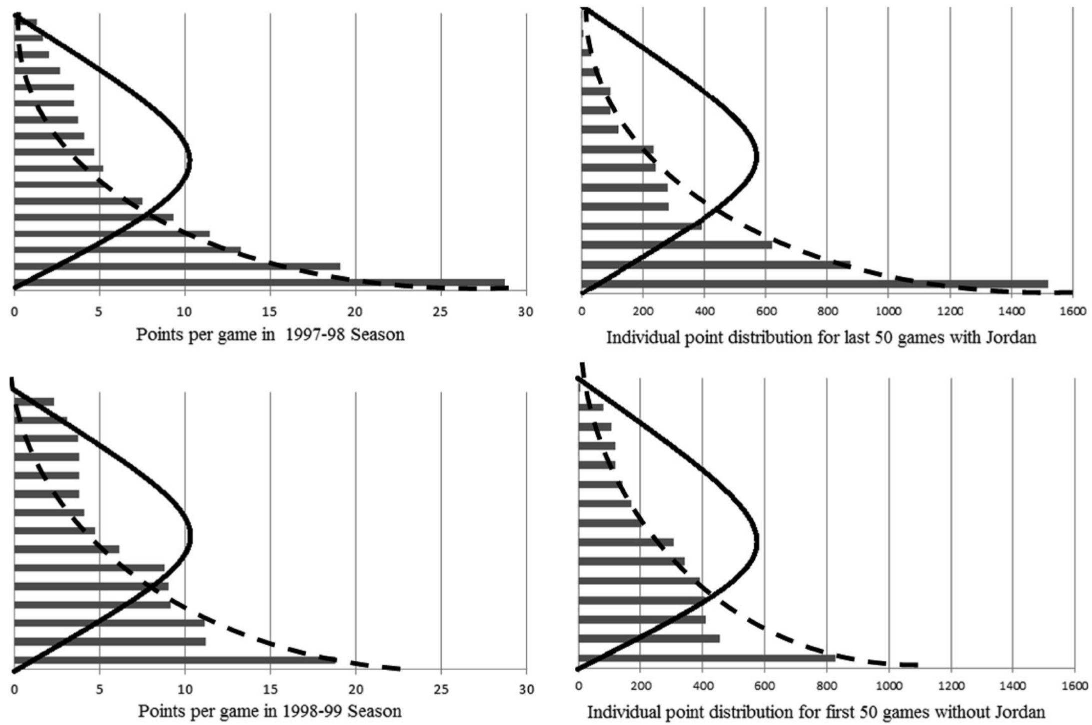

Figure 2: **The left panels show the points per game distribution of Chicago Bulls players in the season prior to Michael Jordan's retirement in 1998 (top left panel) and the season following his retirement (bottom left panel). The right panels show the total point distribution in the 50 games preceding Jordan's retirement (top right panel) and the 50 games following Jordan's retirement (bottom right panel). Each panel is overlaid with a normal (solid line) and power law (dashed line) curves.**

Note. Each panel is overlaid with a normal and power law curves. *Source*. nba.com/statistics.

In sum, whether comparing the best organizations to the worst or examining a single organization once or over time, power laws seem to still model the individual performance distribution, and the addition or subtraction of stars does not seem to influence its shape. Accordingly, we offer the following proposition:

Proposition 2: The addition or departure of stars will have extraordinary consequences on overall organizational productivity; but, due to scale invariance, the shape of the individual production distribution will continue to conform to a power law.

Star Performers and the Performance-Value Function

Our discussion thus far suggests that stars create a stable power law distribution of production that models many occupations in the 21st-century economy. This idea not only changes our conception of individual performance but also the value placed on performance at the tails of the distribution. Star performers often earn exceedingly large compensation relative to average workers and even workers that perform only slightly below stars. For example, there is increasing concern in both the academic literature and popular press about the increases in CEO compensation (Cowherd & Levine, 1992; Crystal, 1991). Putting aside understandable critiques about golden parachutes or disproportionate compensation relative to other organizational members (e.g., a CEO who earns hundreds of times more than the average worker), critics assert that, among the population of CEOs, presumed differences in performance are not large enough to justify the observed differences in CEO compensation (Baron & Pfeffer, 1994). Put differently, a CEO earning $10 million a year is not 10 times better than a CEO earning $1 million. This view is grounded in the belief that there is a linear relation between performance (i.e., individual production) and value (i.e., firm performance). As such, *X* amount more performance only justifies *X* amount more compensation. Because performance is assumed to be normally distributed and CEO compensation is heavily skewed, the conclusion is that top CEO earners are overpaid relative to other CEOs. This is an additive model of production where incremental differences in performance yield similarly incremental differences in value regardless of location in the distribution.

Our conceptualization of star performers offers an alternative explanation to understand the skewed CEO compensation that has been established through market-based mechanisms. If the performance–value (*P*–V) function is exponential rather than linear, as shown in Figure 3's top panel, a highly paid CEO making 100 times more than the average CEO does

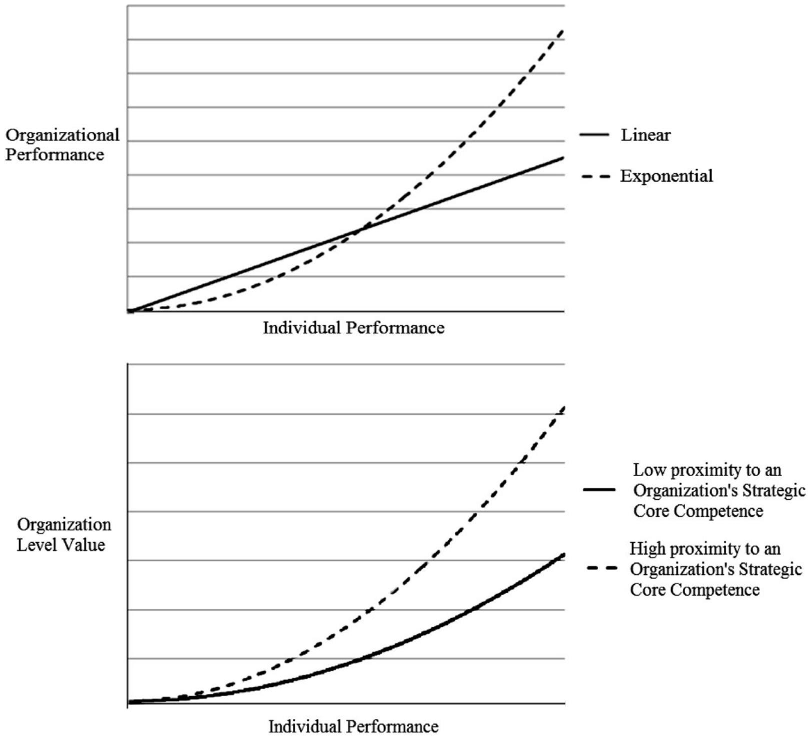

Figure 3: **Graphic Representations of Propositions 3 and 4.**

Note. The top panel shows an exponential relation between individual performance and value overlaying a linear relation, and the bottom panel shows that the performance–value relationship is moderated by the degree of a position's proximity to an organization's strategic core competence.

not have to perform at a level that is 100 times higher to justify their compensation. Instead, top CEOs only need to perform slightly better than the next best performer. This is because at the tails, marginally less performance is a poor substitute for superior performance such that minor differences in performance create dramatic differences in value (Kelley & Caplan, 1993; Lepak, Takeuchi, & Snell, 2003; Narin, 1993; Rosen, 1981). Furthermore, the complexity and dynamism of both industries and corporations in the 21st century create environments where among elites "certain tiny events get amplified into extreme outcomes" (Boisot & McKelvey, 2010, p. 426).

CEOs exhibit varying degrees of individual performance and are presumably matched to varying sized organizations based on said performance (Zajac, 1990). The largest organizations will recruit the top CEOs and compensate them exponentially more than smaller organizations. Beyond their capacity to pay more, larger organizations compensate their CEOs more because they have more at stake than smaller organizations. For CEOs in large corporations in the United States, compensation increased 600% between 1980 and 2003 (Gabaix & Landier, 2008). This represents many millions of dollars in pay raises for these top CEOs, but this must be contextualized with the fact that among these same firms the six-fold increase in pay corresponded to a six-fold increase in market capitalization (Gabaix & Landier, 2008). The small differences in CEO performance among firms at the tails yielded exponential differences in value for the organizations that employed them.

Consistent with our arguments, in industries such as entertainment and in certain occupations such as CEO, labor economics research shows an exponential *P–V* function (Ikeda, Aoyama, Iyetomi, Fujiwara, & Souma, 2008). Moreover, it seems that nonlinear *P–V* functions may become the norm as in industries and occupations beyond entertainment and CEO because many jobs in the knowledge economy require a great deal of innovation and cannot be scripted as easily as those jobs in the manufacturing economy (Cascio & Aguinis, 2008). In other words, it seems that the 21st-century workplace no longer restricts variance in the same manner as the 20th-century workplace, and this creates the potentiality for stars to distance themselves so greatly from the average worker in terms of value added (Lepak & Snell, 2002; Oldroyd & Morris, 2012). Accordingly, we expect that many occupations in the 21st-century workplace will conform to a similar exponential relation between performance and value. For example, sales managers typically find that 80% of unit sales are attributable to 20% of their workforce (Aoyama et al., 2010). An examination across multiple industries at multiple time points suggests that the *P–V* function is exponential with the top decile of performers contributing an average of 30.1% of the total production, whereas the top quartile produced in excess of 50% (O'Boyle & Aguinis, 2012). The best performers dominate production, but the difference in their individual output relative to their peers is often small when contrasted with the differences in resulting value to the organization (Crain & Tollison, 2002). Returning to the top panel of Figure 3, small differences at the tails of the performance distribution likely create very large differences in value. Using conservative estimates, we propose that:

Proposition 3: Within similar organizational positions, the relation between performance and value will follow an exponential function with approximately 30% of value vested in the top decile of workers and 50% of value vested in the top quartile.

Star Performers and Their Position and Work Environment

The nature of the *P–V* relationship is likely to be moderated by a star performer's position and work environment. For example, a member of the housekeeping staff in a large accounting firm might perform at a very high level, but star effects will be limited because although his performance is great so is the distance between his output and organizational-level outcomes. All things equal, organizations should strive to staff the best possible people, but the tasks, duties, and responsibilities most relevant to firm-level outcomes are those that will yield the greatest star effects (Huselid, Beatty, & Becker, 2005; Oldroyd & Morris, 2012).

The need to consider a star's position and work environment is consistent with strategic core theory, which posits that the relationship between individual productivity and firm performance is moderated by its proximity to core competence (Delery & Shaw, 2001). For example, Cappelli and Crocker-Hefter (1997) examined top organizations across a variety of industries (e.g., sports, consulting, retail) and found that the core competencies that led to competitive advantage were only possessed by a small subset of organizational units. If this subset contains stars, then the organization can gain, retain, and extend its advantage. Thus, for star production to generate exponential value at higher levels of analysis (e.g., team, functional unit, organization), it must be aligned with the core competencies of the firm, as shown in the bottom panel of Figure 3. Returning to the accounting firm example, housekeeping is not a strategically core competence of accounting firms, thus the star performance effect on value is not as strong as the effect produced by star performers in positions with greater proximity to an organization's core competence. It is worth noting that although a less explosive *P–V* function is expected at the tail of the distribution for janitors, the *P–V* relation is nevertheless still nonlinear, and janitorial performance is likely still best modeled with a power law distribution. However, in certain positions that are highly distal from strategic core competencies, it is possible that the value of star performance eventually reaches a ceiling and plateaus.

The importance of a star performer's work environment is also apparent when high production output is not valued equally across organizations and work units. For example, articles published in highly regarded academic journals are one form of output not valued equally across business schools, and therefore the *P–V* function varies across organizations within the same industry. A small, private school with a teaching focus may have little interest in recruiting a professor who consistently publishes in top-tier journals. This is not because they fail to understand the market value of a productive researcher or even that they lack the funds to compensate her; rather, the relationship between "A" publications and organizational success is less curved or less exponential as it is at a more research-oriented university (see Figure 3, bottom panel). The strategic core competence of a teaching school is based on knowledge dissemination rather than knowledge creation, and to recruit a top researcher would not leverage resources efficiently (Humphrey, Morgeson, & Mannor, 2009). It is worth mentioning that although the *P–V* function is likely to be less explosive at the tail, if the property of scale invariance applies (as noted in Proposition 2), then there will still be research stars at these small schools who contribute a disproportionate production relative to their colleagues. The shape of the individual performance distribution remains constant even though the *P–V* function varies. In sum,

Proposition 4: The exponential relationship between individual performance and value will be moderated by a position's degree of proximity to an organization's strategic core competence such that the relationship will become more curved as proximity increases.

To summarize our discussion thus far, star performers seem to exist across many occupations and organizational contexts, and their presence creates a distribution better modeled with power laws compared to a normal distribution (as shown in Figure 1). Stars seem to dominate the total production of growing, failing, and stable organizations, and although their turnover can be disastrous to overall production, the shape of the individual performance distribution in an organization is predicted to be relatively constant (as shown in Figure 2). Furthermore, we hypothesized that stars create extraordinary value such that the relation between performance and value is exponential with a sharp steepening of value found at the tail of the performance distribution (as shown in the top panel of Figure 3). The greatest exponential value of star production is predicted to be in organizations and work units that attract and retain elite performers to positions with tasks, duties, and responsibilities most relevant to their strategic core competencies (as shown in the bottom panel of Figure 3). Next, we discuss how our reconceptualization of the individual performance distribution has the potential to account for presumed "anomalies" in previous empirical results as well as inconsistencies in established theories.

Star Performers and the Power Law Performance Distribution: Accounting for Anomalous Empirical Results and Theoretical Inconsistencies

Scientific fields often operate under untenable assumptions that are nevertheless necessary conveniences. For example, neoclassical economics assumes rationality and full information in transactions, neither of which are met in practice (Sen, 1977; Simon, 1986; Slovic, Finucane, Peters, & MacGregor, 2002). However, despite these faulty assumptions, economics researchers have produced theoretical insights that can often lead to satisfactory predictions (Becker, 1962). If current management theories could predict and explain individual performance accurately, then reconceptualizing the distribution of performance following a power law instead of a normal curve would not seem necessary. Unfortunately, the current state of the science is that our ability to predict individual productivity (i.e., observed validity coefficients relating preemployment test scores and performance measures) has changed very little over the past 50 years. Without a series of statistical corrections, even the best predictors correlate with job performance no higher than $r = .30$ (Salgado et al., 2003) and multipredictor tests of theories rarely account for even half of the total variance in individual performance scores. Thus, despite more than half a century of new theories, new constructs, new measures, and new analytic techniques, the increase in predictive accuracy of individual performance has been modest. Perhaps it is not deficient theories, measures, or theories that hamper progress but that we need to revisit our understanding of the performance distribution.

Next, we outline how a reconceptualized performance distribution and the presence of star performers can serve as an explanatory framework for many of the presumed "anomalies" in previous empirical results as well as inconsistencies in established theories. Although we see star production as potentially affecting all management theories addressing individual performance directly or indirectly, we focus on two areas that have both individual- and firm-level consequences and are likely to require important theoretical revision. First, we examine how human capital (HC) changes as a result of most production deriving from a small minority of workers and what effect this has on theories such as the resource-based view (RBV) and the attraction-selection-attrition (ASA) model. Second, we discuss effects of stars and a power law performance distribution on theories regarding voluntary turnover and compensation.

Human Capital

RBV emphasizes HC as key to sustained competitive advantage (Barney, 1991; Barney, Ketchen, & Wright, 2011; Coff & Kryscynski, 2011; Foss, 2011). Because RBV was primarily applied to firm-level research, little attention has been given to individual variations in workers. However, when the microfoundations of HC were sought, a paradox emerged. In order for HC to become a competitive advantage, it must be valuable, rare, inimitable, and nonsubstitutable (Barney, 1991). If production is normally distributed then the majority of HC is found near the center of the distribution. The paradox is that HC becomes competitive advantage through workers that are the most plentiful, produce average value, and whose outputs are easily imitated and substituted. The paradox can only be addressed by speculating that the sum must be greater than the parts, and this has bred a number of Gestaltian theories of HC. For example, the ASA model (Schneider, 1987) posits that through attraction, selection, and attrition, organizational members' knowledge, skills, and abilities (KSAs) homogenize, and this allows HC to more easily aggregate up and create competitive advantage (Ployhart, Weekley, & Baughman, 2006). The aggregation is necessary because under the assumption of a normal distribution, individual workers have little influence on higher levels of the organization, and the only way HC becomes competitive advantage is through group-level phenomena such as culture and norms (Schneider, 1987).

These types of HC models seem most viable in organizations that strove for efficiencies through economies of scale where uniformity of workers was important—just as important as uniformity of products (Groshen, 1991). Homogeneous workers on an assembly line behave alike, resulting in no worker holding up the line and no worker waiting idly for the others to catch up. The similarity breeds commitment, satisfaction, and reduced conflict, and it also frees up resources at the organizational level because it makes it easier for the human resources function to establish practices and thresholds for job applicants and trainees. Furthermore, management only need be concerned with those who deviate from the group (i.e., management by exception), and compensation can be broadly applied as workers who share attitudes, KSAs, and behaviors are also likely to share motivations and expectancies (Coff & Kryscynski, 2011; Mossholder, Richardson, & Settoon, 2011; Ployhart & Moliterno, 2011).

In contrast, HC in 21st-century organizations seems to be generated primarily by stars, and many of the tenets of aggregation models such as the ASA no longer apply. First, a homogenous workforce is best able to create a homogenous product, but when presented with novel problems, as is so often the case in the 21st-century workplace, diversity and heterogeneity in work groups is an asset and avoids many of the pitfalls of groupthink (Forbes & Milliken, 1999). Second, hypercompetitive environments are typified by quick change and rapid obsolescence (Cascio & Aguinis, 2008; Powell & Snellman, 2004). This makes specialization critical and KSA homogeneity impractical. By the time an organization achieves homogeneity for a specific set of KSAs, those KSAs are likely to be obsolete.

Third, if broad human resources policies, especially those concerned with compensation, are applied to stars, there would be a disparity between the extreme production of the elite and the modest increases in rewards offered by the organization (i.e., reward omission; Hinkin & Schriesheim, 2008). Finally, much of the benefit derived from homogeneity is in the form of organizational culture and production norms created through proximity and repeated interactions with peers. With the rise in telecommuting, outsourcing, crowdsourcing, and alternative work arrangements, many of the advantages of homogeneity due to proximity are lost (Ashford, George, & Blatt, 2007).

Our discussion of star performers offers an alternative explanation for how HC results in organizational-level competitive advantage. Stars possess HC that does not require aggregation to influence firm-level outcomes. Their output is so immense that it directly affects performance at the firm level and makes this small minority of workers both valuable and rare. Furthermore, star production is nonadditive and not replaceable with multiple average workers or less productive alternatives (Rosen, 1981), thus avoiding the microfoundation paradox. As such, a view of HC based on the perspective that performance is distributed following power laws avoids the paradoxes of RBV and ASA, and provides a plausible explanation compared to other models of HC that suggest homogeneity is a necessary precondition to competitive advantage.

Traditional models of HC that rely on the mean and the constriction of variance as metrics of competitive advantage implicitly assume that HC derives from the average quality of resources. In light of a nonnormal distribution of individual performance, an implication is that the mean quality of resources provides a rather spurious relation to competitive advantage that can be explained (or mediated) by the quality of the best resources. That is, competitive advantage is better described as the HC possessed by stars. As illustrated in the top panel of Figure 3, we propose that the bend in the curve is attributable to star effects (e.g., the top decile contributes more than a quarter of total production). Thus, if most output is attributable to stars, then this is where the source of competitive advantage resides. In short,

Proposition 5: Within the markets and industries that comprise many 21st-century workplaces, a firm's competitive advantage will be primarily derived from the proportion of the entire set of human resources (i.e., human capital) that can be qualified as being "the best" (i.e., star performers) rather than the average quality of the resources.

Turnover and Compensation

The heterogeneity in performance, value, and HC brought on by the nature of work in today's organizations potentially changes how we view theories of turnover. At the individual level, our current understanding of turnover is that its relation to performance is curvilinear with low-producing workers forced out by the organization (i.e., involuntary and functional turnover) and high-producing individuals leaving for better opportunities (i.e., voluntary and dysfunctional turnover; Allen, Bryant, & Vardaman, 2010). Given our interest in stars, we focus on the latter group, but it is worth noting that under a normal distribution of productivity, the curvilinear relation is the optimal form because it retains the portion of the distribution where most production is derived (i.e., workers clustered at and around the center). We propose that if we continue to apply traditional models based on normality, the curvilinear relation will persist and these organizations will retain the majority of their workers. However, what will change is that they will lose the majority of their productivity to star turnover.

The change from normal curve to power law will likely require significant alterations to turnover theory as well as practice. For example, one of the most consistent mediators of the various antecedents of voluntary turnover is job search behavior, particularly at the later stages of the search process where the worker actively contacts a prospective employer (Hom, Caranikas-Walker, Prussia, & Griffeth, 1992). This contact is proposed to be the final phase in the causal sequence and the most closely related to turnover intention and eventual departure (Steel, 2002). The process may be particularly important as the weakened economy and high unemployment rate reduces most workers' perception of alternatives and ease of movement. However, this critical construct to voluntary turnover may not be relevant to stars because they do not need to contact employers. Rather, employers contact them (Capron & Chatain, 2008; Gardner, 2002, 2005).

Head hunting and employee poaching of stars place the competing organization as the active agent in the job search and circumnavigates the plethora of predictors, mediators, and moderators that play such central roles in current conceptualizations of turnover theory. Although some (e.g., Steel, 2002) have proposed that "spontaneous offers" can accelerate the job search sequence, the link between stardom and these unsolicited employment offers is largely unexplored. Thus, the weak economy may not serve as a sufficient retention strategy for star performers; in fact, it is likely that the most productive workers have employment alternatives and will be sought after by competitors. In short, we offer the following proposition:

Proposition 6: The relation between job search behavior and voluntary turnover will be moderated by worker production such that the relation will be weaker for star performers compared to nonstars.

Although job search behavior is likely very different for star performers, we expect some similarities in other voluntary turnover antecedents. For example, we expect that breaches in psychological contract, perceptions of workplace injustice, and workplace incivility will all play a role in a star's decision to leave in a similar manner to the role they play in the turnover decision of nonstars. However, stars and a power law distribution of production raise two important implications. First, as stated earlier, stars are highly desired assets, and because of this their turnover threshold for perceived contract breaches, injustice, and incivility is likely to be lower compared to their nonelite counterparts.

The second implication is related to compensation. Compensation is one of the primary sources where a worker assesses or perceives the value their organization places on them (Aguinis, Gottfredson, & Joo, 2012), and the rise of stars seems to necessitate a paradigm shift in most theories of compensation. Compensation systems that best retain stars will require considerably higher pay for elites and will also likely entail idiosyncratic work arrangements (I-deals; Rousseau, Ho, & Greenberg, 2006). Both of these strategies can have a deleterious effect on the retention of nonelites and may lead to higher overall voluntary turnover (Rousseau et al., 2006). One reason for this is that increased pay for elites will create pay dispersion. If stars are compensated in ways reflective of their contribution, then it is possible that top performers may not earn just a bit more than their peers; rather, the pay disparity between elite and nonelite could rise to 5-, 10-fold, or even higher. This is not likely to happen when a normal distribution is forced upon salary structures. But, when a "pure" pay for performance system (e.g., straight commission) is applied, pay dispersion seems quite certain.

Research on the effects of pay dispersion is mixed (Bloom & Michel, 2002; Harrison & Klein, 2007; Pfeffer & Langton, 1993) but these results may be indicative of not differentiating between more traditional jobs that operated in static environments with relatively homogeneous production from many current jobs that operate in dynamic environments with heterogeneous worker output. Among occupations where productivity naturally follows a normal curve, as was the case in much of the manufacturing economy of the 20th century, pay dispersion related negatively to higher levels of performance, as heterogeneous compensation did not map well onto relatively homogeneous performance (Bloom, 1999). However, in most 21st-century industries where power laws are likely to apply and stars drive production, pay dispersion relates positively to higher levels of performance as compensation accurately reflects the extensive heterogeneity in individual production levels. The change in the relation between pay dispersion and higher levels of performance is reflective of the change in the nature of production from normal to power law. For example, Trevor, Reilly, and Gerhart (2012) found that when pay dispersion is the result of rewarding stars, the consequences are improved overall performance and greater retention of outstanding performers.

Beyond pay, more heterogeneity in performance will demand more heterogeneity in other forms of compensation. That is, stars not only require higher wages (Scully, 1999), they may more readily engage in I-deals with their employer. Rousseau (2001) recounts the story of Vicky King's tenure at Amerco where she found a number of strategically core individuals engaged in I-deals ranging from taking a year off to do underwater photography to being allowed 2 hours each morning to run a side business. King was initially appalled by what she perceived as superfluous work arrangements, but the supervisors of these I-deal recipients offered one consistent explanation, "I can't lose my best people" (Hochschild, 1997).

I-deals increase the retention of stars, but they can also foster animosity and perceptions of injustice among those not receiving them, especially when the justification for preferential treatment is not clearly explained (Rousseau et al., 2006; Shaw & Gupta, 2007). As a result, for the vast majority of workers who are not stars, the consequence of increased I-deals and rewarding a power law distribution of production with a power law distribution of compensation is likely to increase voluntary turnover. Although nonlinear models of turnover have been offered in the past (e.g., Hausknecht & Trevor, 2011; Jackofsky, Ferris, & Breckenridge, 1986; Trevor, Gerhart, & Boudreau, 1997), we propose that not only is the relation curvilinear but that it is moderated by compensation policy toward stars, specifically the extent of pay dispersion and presence of I-deals. In sum, as shown in Figure 4, we hypothesize that practices that retain the average worker will be the same practices that encourage the departure of star performers and vice versa.

Proposition 7: Within organizations whose compensation systems follow a power law distribution, the relation between individual performance and voluntary turnover will be curvilinear with higher turnover among nonstar compared to star performers (i.e., asymptotically positive among nonstar performers).

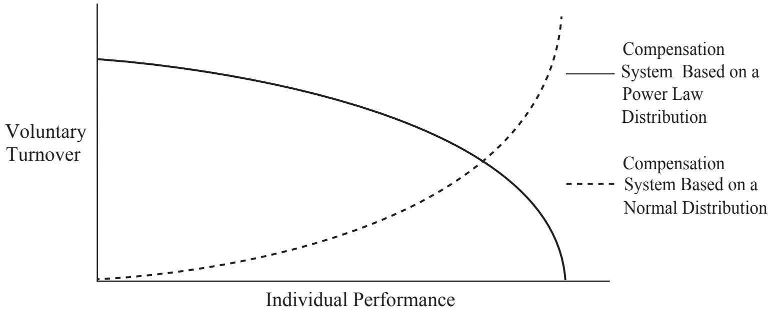

Figure 4: **Graphic Representations of Propositions 7 and 8.**

Note. Relation between individual performance and voluntary turnover under a compensation system that follows a power law distribution compared to a compensation system that follows a normal distribution.

Proposition 8: Within organizations whose compensation systems follow a normal distribution, the relation between individual performance and voluntary turnover will be curvilinear with higher turnover among star compared to nonstar performers (i.e., asymptotically positive among star performers).

Shifting from the relation between individual performance and voluntary turnover to the relation between voluntary turnover and firm performance, the question then becomes: Which form is best for organizational health? The answer centers on whether the increased production as a result of star retention offsets the production decrease due to greater turnover among the nonstars. We argue that because the majority of HC that yields a competitive advantage seems to be vested in stars (as stated in Proposition 5), and star value is not easily replaced by even slightly inferior workers, the turnover that matters most in the 21st-century workplace is star turnover.

Supporting our contention, when researchers make a distinction between the voluntary turnover of stars versus average or below-average worker turnover, results typically suggest that increased retention among the stars is more important than retention of other workers (McLaughlin, 1994). For example, Lazear (1999) examined the effects of switching from a base hourly wage to a piece rate system. The change created greater pay dispersion and increased turnover across the organization as a whole, but the stars were more likely to stay in the organization, which resulted in overall productivity gains. The success of the strategy of matching heterogeneous pay to heterogeneous output was also reported by Cadsby, Song, and Tapon (2007) who found that systems that encouraged compensation heterogeneity were most often selected by better performers and yielded more overall production than homogenous compensation systems preferred by average performers. Among practitioners in the financial markets, the attraction and loss of star analysts is considered one of the most influential factors in attracting quality initial public offerings (Kessler, 2001). There is also evidence that the attraction or loss of a star CEO directly influences abnormal stock returns (Falato, Li, & Milbourn, 2009). In sum, we offer the following proposition:

Proposition 9: The impact of turnover on team and organizational-level performance will be moderated such that the relation will be positive when turnover among star performers is lower relative to nonstars and negative when turnover among stars is higher relative to nonstars.

Discussion

Our paper addresses the distribution of individual performance and, accordingly, has implications for all theories in the field of management that directly or indirectly relate to individual performance. Fields such as organizational behavior and human resource management have a direct interest in this topic, which permeates theories of leadership, motivation, organizational commitment, and job satisfaction, among others. From the perspective of strategic management studies, a better understanding of individual performance is crucial for making progress regarding the microfoundations of strategy, which are the foundations of a field based on individual actions and interactions (Foss, 2011). For example, Mollick (2012) noted that the overwhelming focus on macrolevel process variables in explaining firm performance, rather than compositional variables (i.e., workers), "has prevented a thorough understanding of which individuals actually play a role in determining firm performance [and] to expect that not all variation among individuals contributes equally to explaining performance differences between firms" (pp. 1001–1002). Next, we consider additional implications of our paper for theory and empirical research, research methodology, and practice. Also, we offer a summary of these implications in Table 1.

Implications for Theory and Empirical Research

In addition to implications for HC, turnover, and compensation, which we discussed earlier, our paper suggests that as the normal distribution and

TABLE 1
Summary of Implications of Star Performers and a Pareto Law Performance Distribution for Management Research and Practice

Propositions	Implications for research	Implications for practice
The distribution of individual performance for many 21st-century occupations will follow a power law distribution with the majority of individual production and organizational value attributable to a small cohort of star performers (Propositions 1–3).	Stars provide a means to bridging micro–macro domains by reconciling the human capital paradox in microfoundations of strategy research of how plentiful and average workers at the individual-level metamorphosize into rare and inimitable human capital at the firm level. Because stars rely on a network of other internal and external agents (e.g., subordinates, family), social network theory and methods are needed to better identify the environmental antecedents that allow stars to emerge and sustain high performance levels. Revised leadership theories are needed that abandon the assumption that in order to increase overall productivity, all workers must improve by the same degree (i.e., normality assumption). There is a need to adopt methodologies that allow for nonnormal distributions (e.g., Bayesian techniques) rather than traditional methods that rely on the normality assumption.	Minimizing situational constraints (i.e., ceiling constraints) faced by workers is likely to allow for the emergence of star performers. It may be beneficial to allow star performers to revolve in and out of teams because this widens the star's network and takes full advantage of knowledge transfer to rising stars. Allowing for such rotations also prevents creative abrasion and introduces high performance norms and expectations to a greater number of workers. Training interventions that marginally improve the performance of stars may better increase overall production than interventions that substantially improve the performance of average workers.

continued

TABLE 1 (continued)

Propositions	Implications for research	Implications for practice
Competitive advantage in many 21st-century organizations will be vested primarily in resources that are qualified as the best, and the organizations that leverage their best resources (i.e., star performers) by placing them in strategically core areas will have greater competitive advantage than those that do not (Propositions 4–5).	The ability of resource-based and other macrolevel theories to explain firm performance may be enhanced by isolating the human capital of stars rather than aggregating across all human capital. Research that draws from an agency theory perspective may benefit from expanding the focus to include the misalignment of star performers' goals with organizational goals. Personnel selection research is needed to better distinguish and predict performance at the tails of the distribution.	Firms wishing to implement high-performance work systems may benefit from targeting those stars most aligned with the organization's strategic core competencies.
Star performers possess great job mobility and do not need to seek out prospects because competing organizations will seek them out (Proposition 6).	Star performers may serve as a boundary condition for current turnover models that place job search behaviors in the causal sequence of voluntary turnover. Thus, new models of turnover may be needed that explain the process when the active agent is the competing organization instead of the individual worker. The greater job mobility experienced by star performers leads to new research avenues to understand differential perceptions and thresholds for voluntary turnover predictors (e.g., distributive justice, organizational support, psychological contract violation).	To increase star retention, it may be beneficial for organizations to not only manage star performers but also their developmental network (e.g., employment opportunities for spouses and long-term contracting with a star's subordinates). Firms experiencing financial difficulties should pay special attention to star performers as budget cuts, downsizing, and other cost-cutting measures may signal that the organization is in decline, leading to preemptive star departure. Star departure can create a downward spiral of production when "marplots and meddlers" deliberately replace stars with inferior workers.

continued

TABLE 1 (continued)

Propositions	Implications for research	Implications for practice
Compensation systems that follow a normal distribution will retain average workers at the expense of losing stars, whereas compensation systems that follow a power law distribution will retain stars but lose average workers (Propositions 7–8). In both cases, there will be an initial degree of lost overall productivity, but compensation systems that better retain stars will lead to better overall team and organization performance (Proposition 9).	Theories of voluntary turnover could incorporate the polarity of turnover between stars and nonstars. This may require a reconceptualization of turnover that focuses on the amount of productivity lost rather than the number of workers lost. Star human capital and star turnover suggest a network approach to teams research and analysis that considers the differential effects of tie formation between multiple stars and ties between stars and nonstars. Research on teams is needed to address the effect of interactions between star teams both within and outside of the organization. Theory and research are needed that explore alternative conceptions of teams that allow for individuals to directly influence group outcomes without the mediating effect of processes.	Compensation systems may benefit from conforming to the distribution of performance rather than attempting to force workers to conform to the established distribution of the compensation system. Compensation systems that best retain stars will require considerably higher pay for elites and will likely entail idiosyncratic work arrangements (i.e., I-deals). The justification for preferential treatment of stars should be clearly articulated to all workers and applied fairly to reduce unnecessary voluntary turnover among nonstars. Compensation should motivate future star output not reward a star's past glory. Managers investing a disproportionate amount of their resources into stars are likely to generate greater overall output and create positive gain spirals. Management practices such as nonperformance-based incentives, limited pay dispersion, and longevity-based promotion decisions emphasize homogeneity of workers and are unlikely to motivate stars.

average worker give way to power law distributions and stars, management theory and research may need to change the lens through which it views the workplace. Production now seems to be vested in a small number of workers at the tail of the distribution rather than a large number of workers in the middle. As such, substantial improvements in average workers may provide little value to the organization as a whole, whereas very small changes in the performance of an elite worker may determine whether a firm survives or dies.

Micro (i.e., organizational behavior and human resource management) and macro (e.g., strategy) researchers usually adopt different theoretical and methodological approaches (Aguinis, Boyd, Pierce, & Short, 2011; Hitt, Beamish, Jackson, & Mathieu, 2007). The propositions we offered in our paper provide an avenue by which the micro–macro divide may be bridged. Specifically, whereas the macrostudies literature has recognized that the individual is the base component of organizational performance (e.g., Felin & Hesterly, 2007), the specific details of how individual workers influence higher levels of performance continue to be elusive (Coff & Kryscynski, 2011; Kell, Lubinski, & Benbow, 2013). In our paper, we discussed how under a star distribution of production RBV avoids the paradox of trying to transform a normal distribution of abundant, average workers into valuable, rare, and nonsubstitutable HC. In addition, stars also provide microfoundations to other macroconcepts such as agency theory. The central tenet of agency theory is the alignment of individual and organizational goals. This is most often discussed and tested as aligning management goals with owner goals. However, the alignment of star goals with owner goals is an area of research that is likely to become increasingly important. Stars are defined by levels of production that meaningfully influence organizational performance, but given that most conceptions of job performance are that the construct is multifaceted (Bergeron, 2007), aligning the specific facets of job performance to organizational performance is paramount, otherwise the excess production of the star is wasted. For example, in the mid-1970s, a rising star in Hewlett Packard's (HP) calculator division offered the blueprints and prototype of a personal computer five times and was refused by top management all five times. The designer was outputting star levels of production, but it was a form of production not consistent with HP's organizational goals. As such, Steve Wozniak left HP in 1976 with his design of a personal computer and cofounded Apple. Thus, in the rapidly transitioning environment that was the computing industry in the late 1970s, an environment similar to today's in many respects, the alignment of management's goals with ownership's goals (i.e., increasing share of existing markets) was less important than its misalignment with the star's goals (i.e., introduction to an emerging market). In areas of management research such as corporate entrepreneurship, where agency theory has been applied in the past (e.g., Jones & Butler, 1992; Zahra, 1996), a closer consideration of stars may help explain how innovation and elite performance are best leveraged by the organization through star–owner goal alignment.

Our paper leads to additional implications for future research in other research domains such as teamwork. The dominant conceptualization of teamwork is the input–process–output model (Stewart & Barrick, 2000) where the relation between member performance and unit-level performance is fully mediated by team processes (Mathieu, Maynard, Rapp, & Gilson, 2008). Similar to models of HC, team performance relies on aggregation to affect higher-level outcomes. However, emerging network models based on stars may provide an alternative direction for theories of team production. Specifically, a network perspective where nodes are not equally weighted and ties are not equally likely to form between nodes may best be able to explain the role of stars on a team and overall team production. Similar to research demonstrating the importance of certain ties over others (Crawford & Lepine, 2013), incorporating the presence of a star will require more advanced conceptions of networks than traditional Bernoulli graphs where all possible distinct ties are independent of one another. For example, theoretical considerations where the presence and strength of ties to one individual influence the presence and strength of ties to other individuals through characteristics of the performer (i.e., Markov attributes) are needed to understand the influence of the star on the formation of relationships within the team (Newman, 2001; Robins, Pattison, Kalish, & Lusher, 2007; Snijders, 2002). Specifically, do similar performance levels discourage or encourage ties between stars? Perhaps "stacking" a team with stars will result in tremendous synergies and outputs (i.e., a complementary model of star team production), or perhaps the too much of a good thing effect (Pierce & Aguinis, 2013) will create an unstable system and production levels less than the sum of their individual contributions and increased star turnover (e.g., Faraj & Sproull, 2000).

Related to future research on teams, what roles do the links between one star team and another star team play? Research increasingly finds the need for the best workers to have interactions with other elites both within and outside of the organization (Oliver & Liebeskind, 1998; Zucker, Darby, & Brewer, 1998), but it is unclear whether these interactions create greater volatility in the network by way of member poaching and increased turnover. As stars increasingly define the new workplace, the issue of time in the formation, performance, and disbanding of teams seems to deserve greater attention (Mitchell & James, 2001).

Finally, future research could examine ties between stars and nonstars. There is a significant team component to stardom as elites rely on developmental networks (Cotton, Shen, & Livne-Tarandac, 2011) and career communities (Guimera, Uzzi, Spiro, & Amaral, 2005; Parker, Arthur, & Inkson, 2004) to achieve their massive output. Nonelites are not merely orbiting the star; they are playing critical roles in the generation of production. For example, Groysberg and Lee (2009) found that star financial analysts suffered significant and long-term drops in productivity when they changed organizations and did not bring their team with them to the new organization. These cross-level ties between stars and nonstars may prove to be an important issue in explaining team performance in the 21st-century workplace.

Implications for Research Methodology

The empirical study of star performers requires different methodological designs and different statistical techniques. For example, split plots, Student's *t*, random assignment, and *p* values were developed for application in agriculture and manufacturing where many of the usual normality and independence assumptions of Gaussian statistics and the central limit theorem hold true. Specifically, these methods and data-analytic approaches are based on the stability of the mean and the finite nature of the standard deviation. In contrast, a power law distribution has an unstable mean and infinite variance (Andriani & McKelvey, 2007; McKelvey & Andriani, 2005). Traditional methods cannot accommodate power laws without compromising the interpretation of findings (i.e., log transformations), deleting data (i.e., dropping outliers), or downwardly weighting those most responsible for production (e.g., robust regression).

Fortunately, there are research designs and data-analytic approaches more appropriate for studying stars. Consider the following possibilities. First, stars are embedded in networks, and there is now the ability in social network analysis for testing hypotheses and using inferential statistics such as exponential random graph models (Robins, Elliott, & Pattison, 2001; Robins, Pattison, & Elliott, 2001). Second, Bayesian statistics offer the possibility of specifying the functional form of the distribution of production a priori, which allows researchers to specify a power law distribution rather than rely exclusively on the normal curve (Kruschke, Aguinis, & Joo, 2012). As a third possibility, Clauset, Shalizi, and Newman (2009) developed and validated a technique for analyzing power law distributions using a combination of maximum likelihood estimators and fit indices such as the Kolmogorov–Smirnov statistics. In short, recent developments in statistical theory and applications have paved the way for a research agenda focusing on stars and power law distributions of performance.

Implications for Management Practice

The rise of the star performer has the potential to have a profound impact on how managers do their job. Management practices of the past are deeply embedded in homogeneity of workers and normality of output. This creates inertia against changing focus from the uniformity of the necessary many to the dynamism of the vital few. The discouragement of heterogeneous output can be seen in human resources systems such as nonperformance based incentives, limited pay dispersion, and longevity-based promotion decisions. These types of practices encourage star turnover and deincentivize production beyond minimum standards (Huselid, 1995; Shaw & Gupta, 2007). The departure of stars is particularly dangerous for firm-level performance because this is not just about losing an elite performer but losing an elite performer to a competitor (Mirvis, 1997). In an unusually vivid description for an academic journal article, Bedeian and Armenakis (1998) noted that systems that foster homogeneity at the cost of total output lead to the cesspool syndrome where "marplots and meddlers," perhaps out of their own inadequacy, seek to replace departing stars with individuals who perform poorly. The consequence is that the "dreck" floats to the top, and within these work units, homogeneity becomes the hallmark of organizational decline.

The implication of stardom for downsizing is particularly relevant given the financial difficulties of many firms in today's economy. Downsizing may signal to elite workers that the organization is in decline, leading to their preemptive departure (Bedeian & Armenakis, 1998). In addition, organizations that in the past have rewarded their stars through pay increases and idiosyncratic work arrangements may find themselves tempted to oust the very individuals most responsible for their success out of a misguided attempt to cut costs (Cascio, 1993). This is a flawed strategy as the output of elites cannot be replaced with inferior workers (Rosen, 1981), and organizations may find themselves in the unenviable position of trying to rehire or, worse yet, contract with the elite for consultant wages (Cascio, 1995).

A consequence of the assumption that workers' performance is normally distributed is that, to increase productivity, supervisors must move the entire distribution forward. These practices assume that because most workers are at or around the mean, the leader's job is to only correct those who deviate too far from the center (i.e., management by exception). However, focusing on low performers advocates a laissez-faire management style toward stars, which not only misdirects management resources to those least likely to produce but may also reduce star retention, as being left alone is a management practice easily replicated by a competitor. Our paper suggests that managers and human resource practitioners may need to accommodate the rise of stars and change focus from the necessary many to the elite few. Specifically, it seems that leaders must address how to leverage star production by removing unique situational constraints (i.e., ceiling constraints) and shifting to a network approach of star management. In other words, it seems that leadership in the new economy requires the investment of a manager's limited pool of resources (e.g., time, effort, rewards) into improving the performance of subordinates most likely to yield the highest payoff (Hobfoll, 1989). The investment with the highest payoff will be stars, as small increases in their performance will yield exponential increases in value added. The increased production generates secondary gains for the manager, who can then reinvest in the star, creating positive gain spirals (Hobfoll, 2001). Therefore, for managers, the disproportionate distributions of subordinate output will require equally disproportionate distributions of supervisor resources.

For stars, resources are allocated to either increase production or decrease turnover. Although there is certainly crossover between the two, increased production will largely derive from the removal of unique situational constraints that generally do not affect the majority of workers. For example, suppose that the time it takes to close a sale at a large brokerage firm is 1 hour, of which 30 minutes are devoted to paperwork. If the average broker closes two sales in an 8-hour workday, the paperwork is a relatively minor constraint to his or her production. However, for star brokers, the paperwork creates a ceiling constraint of eight sales a day. In this situation, resources (e.g., administrative assistant) should be allocated to the star in ways that remove or raise the ceiling constraint of paperwork.

The second target of resource allocation is increasing star retention, and an additional implication is that managers may need to shift from managing the star to managing the star's network. Elites rely on developmental networks that include extraorganizational members (Parker et al., 2004). For example, in Cotton et al.'s (2011) content analysis of elite performers, only 13.5% of a star's production network consisted of managers. Peers, family, and friends all had similar influence on a star's production. Resource allocation should consider how to meet the needs of the network not just the star. As mentioned earlier, one route to accomplishing this objective is the implementation of idiosyncratic work arrangements or I-deals (Rousseau et al., 2006). Because the star's network is likely not as mobile as the star, reduced turnover can be accomplished by integrating these extraorganizational individuals into the teams and organizations that the star serves. If the network on which the star relies on for intellectual stimulation, emotional support, physical health, and other sources of life satisfaction is tied closely to the organization, then this should reduce star turnover. For example, in attracting top candidates in academia, it is not an uncommon practice to help their spouses find employment within the same university, make special childcare arrangements, and assist with the home-buying process.

Finally, sustained star production is a concern, and there are many examples of star's past glory leading to overpayment and reduced production (Byrne, Symonds, & Siler 1991; Malmendier & Tate, 2009). As such, resource allocation that motivates the star and maximizes their positive influence on other workers is critical. For example, revolving stars in and out of teams widens the star's network and takes full advantage of their knowledge transfer to rising stars. In addition, this prevents creative abrasion by reducing repeat collaborations and introduces high performance norms and expectations to a greater number of workers (Skilton & Dooley, 2010). Regardless of past achievement, resources should be allocated in ways that increase or at least maintain production in the future (Aguinis, Joo, & Gottfredson, 2013).

Concluding Remarks

The nature of work in the 21st century is quite different from that of the 20th century. Although industries such as farming and paper are still important components of the economy in the United States and other countries, today's world of work is dominated by organizational settings based on a knowledge-intensive economy and the service industry. Accordingly, situational constraints that restricted individual performance in the past, including geographic distances, lack of good communications, inability to access information and knowledge, and slow technological dispersion, are now being minimized by the Internet and increased flow of information and knowledge around the world. Although it is likely that star performers have existed throughout history, their presence is particularly noticeable across the industries, organizations, and teams that make up the 21st-century workplace. These star performers are the few individuals who account for a disproportionate amount of output in relationship to their peers. We argued that it is likely that all management theories that address individual performance directly or indirectly may have to be revisited to consider the presence of stars and an underlying power law distribution of performance. We hope that our paper will serve as a catalyst for future research on a topic that has implications for bridging the much-lamented micro–macro divide in the field of management. Finally, given the importance of individual performance for firm performance, we also hope that our paper will lead to future research efforts that will be not only rigorous but also relevant for organizations and society at large.

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