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Good Night, and Good Luck: *Perspectives on Luck in Management Scholarship*

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Abstract

It is not insignificant that seminal contributions to management scholarship have highlighted luck as an alternative explanation for performance differences between individuals and organizations. Yet it has rarely taken center-stage in scholarship. The principal purpose of this paper is to provide a systematic review of the application of luck in the management literature and in such foundation disciplines as economics, sociology, and psychology. Our analysis finds five common perspectives on luck: (a) luck as Attribution; (b) luck as Randomness; (c) luck as Counterfactual; (d) luck as Undeserved; and (e) luck as Serendipity. We outline various ways in which research on luck may

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be advanced along each of these perspectives, and develop an underexplored, sixth, perspective on (f) luck as Leveler to provide a possible solution to such issues as social inequality and (unwarranted) executive compensation.

Introduction

“Good night, and good luck” is how controversial US journalist Edward R. Murrow would routinely sign off his 1950s television broadcasts. Given the lateness of the hour, the former is understandable, but why the latter? Why is it that we wish each other good luck? Perhaps it is because, after all is said and done, we remain firm in the belief that good intentions and hard work may not suffice to bring about a desired result. That ours is an unpredictable world.

Despite their best efforts, individuals and organizations can find it difficult to predict the consequences of their initiatives. When assuming good intentions, how else are we to account for the corporate duds that regularly headline the popular press? Even with the benefit of hindsight, those studying organizations can find it difficult to supply robust, comprehensive explanations for their success. For why is it that some succeed where others fail, or succeed more often, and for longer, than others do? To this question—arguably the central in management scholarship—one finds various explanations. The more familiar of these include exchanges between Mintzberg and Gould on Honda’s success with the Supercub motorcycle (Mintzberg, Pascale, Rumelt, & Goold, 1996), and on the importance of industry for firm success between McGahan and Porter (2002) on the one hand, and Rumelt (1991) on the other. Whereas Rumelt highlighted the predominance of random variations at the macro level, Mintzberg makes the point that luck had to be an important part of the explanation at the micro level (for Honda). Both accounts join a steady line of scholarly contributions in the management literature that explicitly referencing luck as an explanation for performance differences (e.g. Alchian, 1950; Aldrich, 1979; Arthur, 1989; Barney, 1986; Cyert & March, 1963; Denrell, 2004; Denrell, Fang, & Liu, 2015; Hannan & Freeman, 1989; Levinthal, 1991; Lippman & Rumelt, 1982; Nelson & Winter, 1982; Porter, 1991; Starbuck, 1994). Yet such references remain the exception to the rule: a review of the use of luck in six leading management journals (*Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Management Science*, *Organization Science*, and *Strategic Management Journal*) finds that only 2% of articles included the word “luck” in the main text, abstract or title (see Table 1). And the reasons for this may not be hard to find. After all, how is one to operationalize—let alone draw practical implications from—something as, well, fickle and haphazard as luck?

To not have referenced luck explicitly does not also mean that management researchers have discounted its importance. Occasionally they have used alternative constructs to acknowledge something quite similar. Where luck is

Table 1 The Profile of the Use of “Luck” in Six Leading Management Journals up to 2014

	<i>Academy of Management Journal</i> (since 1963)	<i>Academy of Management Review</i> (since 1976)	<i>Administrative Science Quarterly</i> (since 1956)	<i>Management Science</i> (since 1954)	<i>Organization Science</i> (since 1990)	<i>Strategic Management Journal</i> (since 1980)	Total
Articles with have “luck” ^a in title, abstract or main text (A)	116	135	54	77	41	56	479
Articles published (B)	3398	2882	3825	7830	1377	2228	21,540
Percentage (A/B)	3.4	4.7	1.4	1	3	2.5	2.2

^aThe analysis uses “luck” as the search term and thus includes related terms such as “lucky”, “unlucky” and so on.

referenced, its meaning can vary widely. For some, it is the unexplained variances that lack pragmatic value (Porter, 1991). As Barney (1997, p. 17) writes: what prescriptive advice can we give to managers given that the role of luck is important, “that they should ‘be lucky?’” For others, luck is essential for explaining performance differences because randomness in structured environments can produce systematic patterns (Denrell, 2004; Denrell et al., 2015; Henderson, Raynor, & Ahmed, 2012; Levinthal, 1991). Still others argue that while good and bad luck can happen to anyone, some are more prepared than others (Dew, 2009; de Rond, 2014), for example, by being mindful enough to rebound from bad luck (Weick & Sutcliffe, 2006), or by securing a higher “return on luck” (Collins & Hansen, 2011). Some even argue that others’ systematic underestimation of luck can signal profitable opportunities (Denrell & Liu, 2012; Lewis, 2003; Mauboussin, 2012; Powell, Lovallo, & Fox, 2011; Taleb, 2001).

The primary purpose of this paper is to provide a systematic review of the use of luck in the management literature, and in such related disciplines as economics, sociology and psychology on which management scholars frequently draw. This review will identify and unpack five distinct interpretations of the role of luck: (a) luck as Attribution; (b) luck as Randomness; (c) luck as Counterfactual; (d) luck as Undeserved; and (e) luck as Serendipity, before adding a sixth: (f) luck as Leveler. Each perspective is closely tied to a particular literature that entails as yet unsolved puzzles that suggest promising directions for future research. For example, while prior studies in psychology uniformly suggest that people tend to mistake luck for skill when evaluating performance differences (Baron & Hershey, 1988; Kahneman, Slovic, & Tversky, 1982; Langer, 1975; Nisbett & Ross, 1980; Rosenzweig, 2007; Ross & Nisbett, 1991), recent studies point at an asymmetry in the evaluations between successes and failures (Denrell & Liu, 2012; Pizarro, Uhlmann, & Salovey, 2003; Uhlmann, Pizarro, & Diermeier, 2015). While people appreciate the role of (bad) luck in failures, they do not necessarily do the same when it comes to explaining success. Explaining this asymmetry has important implications for organizational learning, executive compensation and responsibility allocation. Moreover, a common theme among these perspectives is that people’s systematic underestimation of (good) luck tends to create a positive feedback loop for only a select few that end up taking all the credit for achievement, for having created opportunities and accumulating wealth even when undeserving (Bebchuk & Fried, 2009; Frank & Cook, 1995; Lynn, Podolny, & Tao, 2009). This suggests an underexplored perspective on luck as Leveler that might help attenuate such problems as exacerbating social inequality and unwarranted executive compensation. We will elaborate on these, and on other relevant, examples.

The paper is structured in three sections. First, we examine how luck is typically used in management scholarship, and in such “root” disciplines as

psychology, sociology, and economics. Based on this review, we outline a potential research agenda for each of the perspectives on luck we identify. We conclude by examining similarities and differences among these perspectives and elaborate their implications for management research and also teaching.

What Is Luck?

The New Oxford Dictionary of English (NODE) defines luck as: “good or bad things that happen to you by chance, not because of your own efforts or abilities”. Implied in this definition are three characteristics. First, luck is a psychological attribution people use to respond to observed events (Hewstone, 1989; Kelley, 1971; Weiner et al., 1971). That is to say, people are likely to attribute an event to luck if they consider that the event happened by chance or randomly (de Rond & Thietart, 2007). Second, attributing an event to luck implies that the event has a salient evaluative status, which can be either “good” or “bad”. Whether luck is “good” or “bad” is beholden to the observer: it is subjective and context dependent (Rescher, 1995, p. 32). Third, whether luck is “good” or “bad”, or plays any role at all, often depends on when one takes stock. As time passes, and with the unfolding of events, one’s assessment of luck can change dramatically (Rescher, 1995). The same event may be interpreted differently depending on the information available, the situation in which the explanation is offered, or the motivation for providing the explanation (Runde & de Rond, 2010). To illustrate, imagine the unpalatable: a car crash with multiple casualties. Let us assume that an exhaustive subsequent investigation finds the crash to have been a freak accident, meaning that chance played an important role. In terms of our definition, the scenario fits the three characteristics. The crash lacked obvious intentional design. Also, it produced salient outcomes that can be evaluated insofar as several people losing their lives, and others their relatives. And it is also true that the crash needs not necessarily be attributed to bad luck. Consider that A is a person who died in the crash, B is a person who would have involved in the crash if he was not delayed by a call and thus had a narrow escape, and C, a person who was not directly involved in the crash and is the unfaithful wife that A was going to divorce. A, apparently, can be considered unlucky to have died in this accident. B can be considered lucky to have avoided the crash, even if B may have initially thought himself unlucky to have been delayed. C is unfortunate to lose her husband in the crash, but if she is now able to inherit all her dead husband’s property, which she would not have been entitled to after divorce, perhaps she (and her lover) might be considered lucky. Perceptions of luck associated with the same crash can be interpreted wholly differently and illustrates the third characteristic of luck attribution: luck attribution is always subjective and can change according to the information available and with a better understanding of the motivations behind the attribution.

The definition of luck used in this paper is consistent with the NODE and aforementioned three characteristics of attribution. The purpose of the analysis that follows is to show how the application of luck in the current management literature can broaden and enrich our understanding of how the interactions between chance, context and human interventions are relevant to management. We proceed by outlining five common uses of luck: (a) luck as Attribution; (b) luck as Randomness; (c) luck as Counterfactual; (d) luck as Undeserved; and (e) luck as Serendipity, before adding a sixth: (f) luck as Leveler.

Five Perspectives on Luck in the Management Literature

Luck as Attribution

According to Attribution Theory (Hewstone, 1989; Kelley, 1971; Weiner et al., 1971), people tend to attribute observed outcomes to four possible factors: skill, effort, task difficulty and luck. Consistent with our dictionary definition, people are more likely to attribute an observed outcome to luck when the cause of the outcome is considered to be external, unstable, and uncontrollable.

Attribution biases are the focus of “luck as attribution” in the management literature. For example, when evaluating own performances, self-serving bias suggests that people tend to attribute their successes to skill or effort and consider failures to be bad luck (Miller & Ross, 1975). Such attributions can lead to over-learning from successes and under-learning from failures, resulting in an illusion of control (Langer, 1975) and overconfidence (Camerer & Lovallo, 1999; Hogarth & Makridakis, 1981). People are also notoriously incompetent in interpreting outcomes that involve randomness. For example, both the “gambler’s fallacy” and the “hot-hand fallacy” suggest that people hold illusory beliefs that a random sequence entails a pattern (Ayton & Fischer, 2004; Gilovich, Vallone, & Tversky, 1985; Tversky & Kahneman, 1974). Moreover, instead of seeing luck as an external, random element, people often interpret luck as a personal characteristic (Darke & Freedman, 1997; Maltby, Day, Gill, Colley, & Wood, 2008), and believing it can be manipulated (Tsang, 2004a, 2004b).

Attribution biases are also prevalent when evaluating others’ performances. People tend to evaluate a decision based on its realized outcome rather than the quality and situations at the time the decision was made (Baron & Hershey, 1988). Partly as a result of the Halo Effect (Rosenzweig, 2007), executives whose decisions resulted in success are treated as heroes and those who failed as villains even when their decisions are identical (Dillon & Tinsley, 2008). Such an underestimation of the role of luck is consistent with the Fundamental Attribution Error, or the tendency of people to over-attribute outcomes to dispositional factors such as skill than to situational factors such as luck (Gilbert & Malone, 1995; Ross & Nisbett, 1991). Moreover, selection

bias suggests that people tend to under-sample failures and focus on survivors (Denrell, 2003). This implies that people draw lessons from “lucky” survivors even when the lesson learned can be detrimental to future performance.

To ignore regression to the mean is another common bias when evaluating observed performances. More extreme performances tend to be followed by less extreme ones because extreme performance tends to be associated with extreme luck and such luck is unlikely to persist, suggesting that future performance should regress to the mean (Harrison & March, 1984). Yet people appear unconvinced by statistical accounts of performance change. Instead, they tend to generate their own causal explanations for such changes. For example, regression to the mean suggests that poor performance is likely to be followed by improvement whereas good performance is likely to be followed by a decline. However, we tend to reward others when they perform well and punish others when they perform poorly. This can lead to superstitious learning insofar as we may wrongly conclude that being nice to others can cause decline and being nasty to others can cause improvement (Kahneman, 2011; Kahneman & Tversky, 1973). Nevertheless, these changes in performances may only reflect regression to the mean that requires no causal explanation.

Future directions. The aforementioned attribution biases offer some reasons for people’s misperceptions of luck. People are likely to underestimate the role of luck (e.g. randomness and situational factors) in observed outcomes. One possible reason for this bias is that people tend to apply cognitive shortcuts by substituting a difficult question (e.g. what is the unobserved level of skill of an executive) with an easy one (e.g. what is the observed level of performance of an executive?) (Kahneman, 2011). Such substitutions can be a useful heuristic, not only because they often save time and energy, but because they could be correct (e.g. higher performers are likely to be more skilled) and thus entail Ecological Rationality (Goldstein & Gigerenzer, 2002). That said, such substitution should be avoided in that errors can be costly. This suggests at least three questions to guide future research. First, when is it desirable to apply cognitive shortcuts when evaluating performance differences? The answer to this question will depend on the difference in cost between two possible errors: a false positive (e.g. mistaking luck for skill) and a false negative (e.g. mistaking skill for luck). As we have seen, attribution biases suggest that people tend to err toward false positive errors when evaluating performance. This may entail important motivational functions, for example, people maintain esteem and appetite for taking risk when engaging in self-serving biases. By contrast, a tendency to err on the side of false negatives implies inaction, which is often more costly than action in evolutionary processes (Richerson & Boyd, 2005). This suggests that we may be hard-wired to make more false positive errors that, even if imprecise, are often useful. The difficulty is that cognitive shortcuts that might have once been useful for our ancestors may

now lead to errors that are too costly to bear in modern societies. Think, for example, of the Columbia Space Shuttle disaster, which resulted from evaluating lucky near-misses as successes (Dillon & Tinsley, 2008), or of financial crises that resulted partly from rewarding analysts' and traders' luck (Hilary & Menzly, 2006), or even of (dubious) entrepreneurial ventures which have arisen from the tendency to misevaluate chance as successes (Lowe & Ziedonis, 2006; Shane, 2008). In sum, mistaking luck for skill may be a useful general human attribution tendency but can lead to costly errors in today's more complex situations. Future efforts can focus on specifying the conditions under which such biases can lead to undesirable outcomes before suggesting remedies.

Second, how do aspirations interact with attributions about luck?¹ Aspirations play an important role in performance evaluations (Cyert & March, 1963). People adjust aspirations based on performance feedback and interpret outcomes as successes (or failures) if current performance is above (or below) such aspiration. Given that people tend to attribute success to skill and effort, and failures to luck or circumstance, they are also more likely to attribute outcomes to (bad) luck when entertaining high aspirations, because high expectations are more likely to be followed by perceived failures and disappointments. By contrast, low aspirations are likely followed by perceived successes, and by the attributions that skill and hard work caused these successes. Such asymmetrical attribution patterns can entail two processes: (a) people with lower aspirations tend to improve their skill because they believe skill matters in their successes, whereas people with high aspirations tend not to improve their skill because they believe skill does not matter in their failures; (b) over time the aspiration levels will likely converge because the improved skill of the people who might initially have low aspirations will result in successes that boost these aspirations in the future; the under-exploited skill of those who might initially have high aspirations will result in more failures that subsequently decrease their aspirations. In sum, people's perceived successes and failures depend on their aspirations, and different aspirations can lead to asymmetrical luck attributions that have implications for subsequent actions. These processes are just some of the many possibilities of how aspiration can interact with attribution. Since successes and failures are rarely absolute but depend instead on aspirations and social comparison (Cyert & March, 1963; Festinger, 1954), incorporating the role of aspirations in attributions about luck is likely to be promising in any future research agenda.

Third, how are we to de-bias our misperceptions of luck? It may not always be necessary to de-bias imprecise attributions that entail useful functions, but it is desirable to help people resist the temptation of substituting a difficult question with an easy one in cases when the error can be costly. Prior research has suggested remedies for this, for example, by leading people to believe the stakes are high (Dillon & Tinsley, 2008) or by encouraging an outside view (based on

evidence such as statistics) instead of an inside view (based on intuition and guts feeling) (Kahneman & Lovallo, 1993). Making people aware that they are subject to attribution biases is necessary for all of these de-biasing techniques to work, but arriving at an adequate level of understanding may be difficult in practice. People might come to understand, from first-hand experience, that using intuitive attributions often works well (Hertwig, Barron, Weber, & Erev, 2004) and extend this technique to less familiar situations, but may find that applying their newly gained knowledge in different situations leads to a much less positive outcome (March, 2006). Moreover, the more uncertain the world becomes, the more people seek and rely on apparently guaranteed solutions (Gimpl & Dakin, 1984). This suggests that simple de-biasing techniques are unlikely to convince people to deviate from their intuitions. In accordance with recent research on “nudging” (Thaler & Sunstein, 2008), instead of “changing mindsets”, it may be more effective to “change context” in an effort to direct people’s decisions toward better outcomes (Dolan et al., 2012). Nepotism in succession, for example, has been shown to hurt family business performances (Giambatista, Rowe, & Riaz, 2005). Recent study demonstrates that nepotism may result from “bad luck” having been augmented in an asymmetrical process of impression formation between family and non-family members (Liu, Eubanks, & Chater, 2015). This suggests that de-biasing—or changing mindsets—may not suffice in altering nepotism. Instead, changing contexts by reconfiguring social ties, for example, is more likely to be effective in addressing this challenge (Liu et al., 2015). Future research should take into account how techniques of nudging (or changing decision contexts) can complement conventional approaches of de-biasing (or changing mindsets) to help people attenuate the undesirable consequences resulted from (mis)perceptions of luck.

Luck as Randomness

A second use of luck in the management literature is to highlight the random nature of behaviors in organizations and management (Starbuck, 1994). Even if people have intentions, and make conscious (or non-random) choices based on these intentions, studies show that outcomes can still appear to be dominated by random processes. Below we discuss four main sources of randomness in organizations.

First, organizational outcomes appear random partly because outcomes are influenced by external events that managers have little control over (Pfeffer & Salancik, 1978). Corporate success is influenced by the activities of competitors (Hannan & Freeman, 1989), the government (Pfeffer & Salancik, 1978), and by external events such as fluctuations in exchange rates (Bertrand & Mullainathan, 2001). An innovative firm might be unlucky and launch a product “on budget and on schedule” only for this to coincide with a recession; a

more favorable timing might have propelled this same product, and firm, to success. As Bill Gates admitted “Our timing in setting up the first software company aimed at personal computers was essential to our success . . . The timing wasn’t entirely luck, but without great luck it wouldn’t have happened” (cited in Mauboussin, 2012, p. 13).

A series of seminal studies on sources of variance in corporate profitability (McGahan & Porter, 2002; Rumelt, 1991) illustrate the importance of events beyond managerial control. Significantly, they find that as much as half of variations in performance cannot be explained by firm or industry attributes (McGahan & Porter, 2002). The unexplained proportion of variance is larger, in most studies, than the proportion of variance explained by any single factor. In some studies, the unexplained proportion is higher than the sum of the variance accounted for by all of other factors (McGahan & Porter, 2002). This implies that much of the variance in profitability cannot be explained by the factors that tend to be the foci in strategy textbooks.

Second, the outcome of carefully planned behavior would appear to be random if choices were based on inaccurate forecasts or on an incomplete understanding of means-ends connections. Empirical studies of forecasting accuracy show that predicting important business outcomes is challenging (Durand, 2003). The average absolute percentage error, that is, $(\text{forecast} - \text{outcome})/\text{forecast}$, in forecasts of macro-economic quantities (e.g. inflation, exchange rates, unemployment) by economists and analysts is about 20% (Armstrong & Collopy, 1992). Forecasts about demand and product success are even less accurate, with an average absolute percentage error of close to 50% (Fildes, Goodwin, Lawrence, & Nikolopoulos, 2009). For fast-moving consumer goods, such as movies and records, even the best methods have an absolute percentage error of 70% (Lee, Boatwright, & Kamakura, 2003).

Forecast inaccuracy limits how much theories that emphasize persistent firm differences can explain. If demand changes in ways that are difficult to forecast, profitability will only be weakly persistent, even if firm capabilities or costs are highly persistent. Forecast inaccuracy also partly explains why firm growth is nearly random (Geroski, 2005). Capable but unlucky firms who bet on the wrong product will not grow, while firms with weak capabilities who happen to bet on the right products will, and this explains why growth rates are almost random (Coad, 2009).

Third, the outcome of organizational decisions may appear random when events are decoupled from the intentions of those who are supposed to be in charge, and this will remain the case even in stable and predictable environments. Managers have less control over important determinants of competitive advantage, such as culture and capabilities, than generally thought (Hambrick & Finkelstein, 1987; Pfeffer & Salancik, 1978). Managers may choose wisely

among alternative strategies, but the strategy that is implemented may be very different from their initial intent (Mintzberg & Waters, 1985).

Realized outcomes may differ from intended ones because those implementing firm strategy may have different incentives, may not understand what is required, or believe they know better (Powell & Arregle, 2007). Inertia is another reason why realized outcomes can differ from those intended. Change programs with the aim of reforming practices and implementing new routines often fail due to inertia (Hannan & Freeman, 1984). Even if organizations do manage to change, the environment may change faster than organizations can adapt. The complicated nature of interactions in organizations and markets can also lead to unanticipated consequences (Perrow, 1984) and changes in one part of the organization may lead to adjustments in other parts (Hannan, Pólos, & Carroll, 2003). Such indirect effects may make the impact of any intervention difficult to forecast. Decision processes and conflict within organizations can also lead to outcomes that are neither understood nor intended (Aldrich, 1979; Cohen, March, & Olsen, 1972). Finally, people in organizations make mistakes that can have significant effects. For example, two Harvard economists dramatically exaggerated the negative impacts of a high debt ratio on GDP growth (Reinhart & Rogoff, 2010). They later acknowledged a mistake with the Excel coding they used which had “averaged cells in lines 30 to 44 instead of lines 30 to 49” (Herndon, Ash, & Pollin, 2014, p. 7), excluding five countries from the analysis. Millions of people’s lives were impacted due to austerity measures justified by this research.

Fourth, an important but often neglected source of randomness in business is competition. Competition leads to randomness because it removes obvious opportunities and equalizes expected returns. Samuelson (1965) provided the first formal demonstration of how competition between skilled and rational actors in financial markets can lead to randomly fluctuating asset prices because of equalized returns. In efficient markets, prices reflect all available information and only change when new information becomes available that could not have been anticipated based on past data. Stated differently, prices should only react to unexpected news. The implication is that price changes will be unpredictable and uncorrelated over time, consistent with empirical evidence. Stock prices are, largely, unpredictable (Fama, 1970). Empirical studies of earnings announcement also show that stock prices mainly react to unexpected changes in earnings (Beaver, 1968).

Competition also leads to randomness due to strategic uncertainty. Even in settings without uncertainty about external events, uncertainty will exist due to the inherent difficulty of forecasting the moves of rational competitors (Camerer, Ho, & Chong, 2004). Consider, for example, the following entry game: a firm can enter three different product markets: A, B, or C. There is high demand for product A (with 100 consumers), moderate demand for B

(30 consumers), and little demand for C (10 consumers). Suppose profitability simply depends on demand and the number of firms joining a given market: firms in market j will make a profit equal to demand divided by the number firms in market j. There are 100 firms that contemplate entry and make their decisions simultaneously. What market should they choose to join? The decision depends on what the other firms will do, but what they actually choose to do is likely to depend on their forecasts of what others firms will do.

The only equilibrium in this game is a mixed strategy: the probabilities of joining markets A, B, and C are 100/140, 30/140 and 10/140, respectively. This equilibrium ensures that expected profitability is the same in each market and an important implication of such a mixed-strategy is that profitability will vary randomly between different realizations of the game, even if all players are rational and adhere to this mixed strategy equilibrium. This simple game illustrates how competition introduces strategic uncertainty. Even if there is nothing uncertain in the specification of the game (e.g. no uncertain external events impact profitability), there is strategic uncertainty that implies that profitability will vary, seemingly by luck, over time.

Future directions. Randomness is often an endogenous organizational outcome produced by intentional actors. Since random processes can dominate organizational phenomena, it is sensible to attribute their associated outcomes to luck. Interestingly, this perspective on luck does not tie to a particular theory in the management literature. Rather, the importance of randomness is highlighted in several different research streams, such as in decision-making (Cohen et al., 1972), in evolutionary modeling (Nelson & Winter, 1982), in studies of the distributions of firm growth rates (Geroski, 2005), and in studies of diffusion (Salganik, Dodds, & Watts, 2006), CEO effects (Fitzmaurice, 2014) and competitiveness (Powell, 2003). While these contributions are not directly connected, the recurrent theme of how randomness in structured environment can produce systematic patterns qualifies a “random school of thought in management” (for a review, see Denrell et al., 2015). Here we discuss three directions for future research.

First, selection is an underexplored process that can increase the importance of luck in outcomes. Selection tends to amplify randomness because it reduces skill differences by removing weak competitors (Barnett, 2008; Barnett & Hansen, 1996), therefore reducing the signal-to-noise ratio. March and March (1977) argue that “almost random careers” are an expected consequence of sorting in organizations that reduces the heterogeneity in skill among managers, especially at the top. If only sufficiently skilled managers make it to the next level, the difference in skills among managers who make it to the top will be small. Unless the variability due to noise (e.g. resulting from external events or unpredictable subjective performance evaluation) is also reduced, the proportion of variance in performance due to unsystematic random variation

will play an increasingly important role in selection processes (Thorngate, 1988). Similarly, if selection reduces the variability in firm productivity (Syverson, 2011), the proportion of variance explained by productivity will decline. This implies that more extreme performances are associated with greater degrees of luck, and that tougher selection criteria can lead to less qualified actors being selected. Future research can also extend this line of research and develop more effective selection mechanisms that depend less on luck, particularly for high-level executives.

Second, management researchers should incorporate randomness into theory building in order to develop stronger null models when examining hypotheses (Schwab, Abrahamson, Starbuck, & Fidler, 2011; Starbuck, 1994). Explanations relying on randomness might seem unfalsifiable: one could always claim that something was due to chance, so how could such a statement ever be tested? By making parsimonious assumptions that there is no difference among actors, these “naïve models” usually make more rigorous and detailed predictions than other theories (Schwab et al., 2011). Many theories in management only make point predictions about the sign of a coefficient in a regression (e.g. we theorize that the effect of x on y is positive). Theories postulating randomness at the micro-level make predictions about the distribution of outcomes, thus allowing more opportunities for the theory to be falsified. This also implies that empirical analyses that can reject a naïve model that assumes no systematic difference among actors or firms can provide more rigorous support for management theories. Management researchers should take randomness more seriously, particularly when luck dominates in phenomena managers care about, such as mergers and acquisition, persistence in performance, and innovation.

Third, given the empirical support for random variation, and the wide range of phenomena that have been explained by models relying on random variation (Denrell et al., 2015), it may be possible for randomness to go beyond “naïve models” and acquire a more prominent role in management theory. In explaining an empirical regularity, a management scholar should consider explaining this regularity as a result of random variation in a structured system. In other words, it makes sense to start the search for an explanation by developing a model relying on random variation. For example, in the area of judgment and decision-making, Hilbert (2012) explored how a model of randomness (as unbiased noisy estimation) could explain several judgment regularities that had previously been attributed to cognitive biases by developing a formal model from which all regularities could be derived. Can a similar unifying formal framework be developed to explain regularities in performance persistence, career development, firm size, risk taking, and survival? Chance models exist for each of these regularities (e.g. Denrell, 2004, 2008; Denrell & Liu, 2012; Denrell & Shapira, 2009; Geroski, 2005; Levinthal, 1991; March & March, 1977) but these separate models have not yet been

integrated theoretically. Can a formal framework be developed from which all of these regularities could be derived? Can identical assumptions about probability distributions be used, and ideally, the same parameter values? A unified chance model to explain various phenomena central to the field of management would seem a tantalizing prospect, and well within the realm of possibility.

Luck as Counterfactual

Several management scholars have broadened the application of luck by including consideration of counterfactuals (Durand & Vaara, 2009; March, Sproull, & Tamuz, 1991). Thus, an event can be considered to be a matter of luck if it only happens in the realized world but not in most possible counterfactual worlds (Pritchard, 2005). That is, realized history is not necessarily efficient (Carroll & Harrison, 1994) and can be considered as drawn from a pot of possible histories (March et al., 1991). If one could rerun the draw, how likely is it that an alternative history to that realized could be obtained (Tetlock & Belkin, 1996)? If counterfactual simulations show that the realized history is, in fact, an unlikely outlier in the distribution of possible histories, what actually happened can be considered to be luck.

The analysis of counterfactual histories can be problematic because the course of history is often sensitive to changes in initial conditions and these changes can be augmented in a path dependent process (Denrell, Fang, & Zhao, 2013; Dierickx & Cool, 1989; Page, 2006). For example, observed performance differences may seem to result from differences in skill rather than luck. But if we consider the developmental process of skill, differences in skill may be due to small differences in initial conditions, for example, as being at the right place at the right time. An exceptional performer may be better than any of her counterparts in realized history (i.e. what actually happened) but may not have been able to acquire those very skills in most other, counterfactual histories (i.e. what could just as likely have happened). The exceptional performer may be better than others but her acquisition of superior skill can be attributed to luck (Pritchard, 2005; Pritchard & Smith, 2004; Teigen, 2005), or situational factors (Frank & Cook, 1995).

Consider an example popularized by Malcolm Gladwell: Ice hockey is easily the most popular professional sport in Canada (Barnsley, Thompson, & Barnsley, 1985). Many Canadian children aspire to become a professional hockey player, but how can this be achieved? Research has found a robust empirical regularity in the profile of Canadian professional hockey players: in every elite group of hockey players studied, at least 40% were born between January and March (Barnsley et al., 1985). This regularity seems to suggest that those born between January and March are more talented at playing hockey than the others and the secret of becoming a professional hockey

player in Canada lie in birth dates (Gladwell, 2008). This example is actually quite a useful illustration of how luck is amplified by path dependency. High performers from each age group of hockey-playing Canadian children are selected and groomed for inclusion at the next level. But there is a rule: the cut-off age for each new hockey league is the 1st of January. This means that those who are born in the first three months are older and likely to have greater physical maturity than their peers in the same age class. They are more likely to be chosen to play more often and at higher levels, where they will have better teammates, better training, and more game experience (Pierson, Addona, & Yates, 2014). Their advantage is not so much that they are innately better at hockey, but only that they are older and stronger. Nevertheless, after a few years of this selection process and the advantages that come from it, the players who are born in the first three months will likely end up being better than their peers who may have had the potential to have been as good or better.

In the aforementioned example, situational factors such as chance (in this case the birth date of Canadian children) and context (selection and training in Canadian hockey leagues) are likely to play more important roles than skill in determining who ends up becoming a professional hockey player. Both elements of chance and context are beyond the foresight and control of Canadian children (but not their parents, of course, who have a reasonable expectation of being able to plan the child's conception). The initial slight difference in birth dates, and thus physical maturity, can be augmented in a path-dependent process and produce huge differences in eventual outcomes. This is occasionally referred to as a "relative age effect" (Musch & Grondin, 2001). If history could be rerun with slight difference in the initial condition (e.g. the age cut-off point is 1st of July instead), it is sensible to predict that a large fraction of the current professional hockey players would have had to settle in different career paths.

The aforementioned example suggests that luck can have enduring effects in determining performance differences. The slight advantage gained due to factors beyond one's control is usually augmented in a path dependent, rich-get-richer process, that is, a "Matthew Effect²" (Merton, 1968). Exceptional performances may have little to do with initial levels of skill, but merely reflect contexts where rich-get-richer dynamics are stronger. Similar processes have been documented in a variety of research. For example, performance differences can be considered a matter of luck in the context of wealth accumulation (Levy, 2003; Samuelson, 1989), status hierarchy (Gould, 2002), technology adoption (Arthur, 1989; David, 1985), cultural markets (Chung & Cox, 1994; Salganik et al., 2006), business competition (Lieberman & Montgomery, 1988) and even academia (Levitt & Nass, 1989; Merton, 1968). This research all suggests that the eventual performance distribution can reflect an exaggerated or even distorted initial skill or quality distribution due to luck (Lynn et al.,

2009). Exceptional performers in these contexts should not necessarily impress us because the winners are likely to have enjoyed early luck of the draw and differences can be seen between alternative histories.

However, people's perceptions do not necessarily reflect the role of luck for at least two reasons. The first arises from the challenges involved in gaining the materials that are necessary for constructing alternative histories. Perfect counterfactual analysis is impossible if one cannot specify all of the initial conditions that could have altered the course of history. This constraint makes counterfactual analysis less practical. The second reason is due to the way people construct alternative histories in retrospect. Consistent with hindsight bias (Fischhoff, 1975), the realized history is more salient than others, making people's counterfactual imagination anchor in it and underestimate how histories could have unfolded differently (Byrne, 2005; Kahneman & Miller, 1986; Roese & Olson, 1995). Instead of mentally simulating possible counterfactual histories, people create positive or affirming stories that emphasize how human intention and intellect trumps uncertainty and difficulty (March, 2010). These positive stories offer their tellers and audiences a sense of identity and practical lessons for future actions, despite the fact that they may not provide the best reflection of what might have been: "a good story is often less probable than a less satisfactory one" (Kahneman & Tversky, 1982, p. 98). These human-centric stories "can be seen as possibly reflecting elements of human conceit about the role of human intention and intellect in human behaviors" (March, 2010, p. 41). As a result, people often overestimate the role of skill and underestimate the role of luck in their counterfactual imaginations, mistaking luck for skill.

Future directions. To consider luck in terms of counterfactuals broadens its application by considering how likely the realized history could have happened differently. By simulating the distribution of possible histories, a realized history may be attributed to luck if most alternative histories could have unfolded in very different ways. While offering a useful, normative approach of conceptualizing luck, rigorous counterfactual analysis is often difficult because one is unlikely to exhaust all initial conditions that could change the course of history. On the other hand, the way people construct counterfactual histories is often biased. We tend to focus on realized history, and do not consider how things might have unfolded differently, and even when we do, the focus is very much on how changes in human interventions rather than situational factors could have undone the outcomes. Although these mental simulations can entail useful function of maintaining motivations and identity, they do not necessarily accurately reflect reality. This suggests at least three directions for future research.

First, future research could examine the role of luck by enhancing the effectiveness of counterfactual analysis. By computationally or mentally

simulating the distribution of possible histories, one may be able to define the degree of luck of a realized event. For example, if a risky alternative would lead to bankruptcy in most imagined counterfactual scenarios, the fact that it is actually realized as a lucky success should not entail attention and rewards. But such a counterfactual analysis is not easy because controlling for all initial conditions and their interactions with path dependency is difficult. Recent studies have suggested novel approaches to address this challenge (Cornelissen & Durand, 2012; Durand & Vaara, 2009; Vergne & Durand, 2009). For example, some have suggested a “contrast explanation” approach: one should start by holding all causal factors constant except the one of interest when developing alternative histories for an event (Tsang & Ellsaesser, 2011). Another approach suggests that one should start by relaxing key assumptions of existing explanations and develop alternative histories in a more open-ended fashion (Alvesson & Sandberg, 2011), in contrast to the lab experimental fashion of a “contrast explanation” approach. These approaches all help to generate plausible counterfactual histories more systematically. Management researchers could apply them when analyzing management phenomena (MacKay, 2007), as has been done in the such fields as political science (Tetlock & Belkin, 1996) and military history (Cowley, 2002, 2003), in order to refine these approaches and enhance the understanding of the role of luck played in management.

Second, failing to mentally simulate accurate alternative histories can be costly. For example, a shared feature of many organizational disasters is the high number of near-misses, successful outcomes in which chance plays a role in averting failures, prior to actual disasters (Perrow, 2011; Starbuck & Farjoun, 2005; Vaughan, 1997). These lucky outcomes are usually interpreted as successes and people do not consider how the same managerial decision could have led to a disaster, boosting a false sense of security and appetite for risk taking (Madsen & Desai, 2010; Tinsley, Dillon, & Cronin, 2012). Using an example from Dillon and Tinsley (2008, p. 1437):

On many shuttle missions before the Columbia disaster, foam debris detached from the shuttle, but luckily never hit a highly sensitive portion of the orbiter. Lacking an obvious failure, NASA managers interpreted the many near-misses as successes and accepted the detachment of foam as an ordinary occurrence. What was originally a cause for concern no longer raised alarms; deviance became normalized.

Chance averted failure in the cases of these near-misses, but did not with the eventual disaster. Nevertheless, NASA managers interpreted near-misses as successes and did not consider how near-misses might easily have turned into disasters. Their perceived risk toward the foam-related problem was therefore lowered even if the statistical risk of the problem remained the same. More

generally, near-misses signal the vulnerability of the underlying systems and offer opportunities for organizations to fix the problem, but people's biased responses mean systems remain vulnerable and the potential for "normal accidents" will remain (Perrow, 1984). In sum, the way people mentally simulate alternative histories is problematic, particular for near-misses in interdependent systems. This suggests an urgent need to examine how to help people to construct less biased alternative histories in order to improve their ability to evaluate risk. Future research can examine whether encouraging people to take an outside view (Kahneman & Lovallo, 1993) or inducing people to consider what might have been could help people evaluate near-misses and chance outcomes in general more effectively.

Third, this perspective on luck offers a new angle on an old debate about skill versus luck. Earlier studies have shown that rich-get-richer dynamics, and chance elements, make performance unpredictable and lead to a weak association between ability and success, implying that success is only a weak signal of skill. But prior studies have not challenged the idea that top performers are the most skilled and worthy of reward and imitation. More recent studies show that the belief that the top performers are the most capable is flawed because exceptional success usually occurs in exceptional circumstance (Denrell & Fang, 2010; Denrell et al., 2013; Denrell & Liu, 2012). Top performers have been shown to be lucky for having benefitted from rich-get-richer dynamics that boosted their initial fortune. This implies that if history were to be rerun, fortune is likely to befall others. Imitating the most successful in realized history can lead to disappointment or even disasters. Even if one could imitate everything that the most successful did, one would not be able to replicate their initial fortune and path dependency. In contrast, less extreme performances may be a more reliable indicator of skill. These "second best performers" are likely to achieve similar levels of high, but not the highest, performances in most possible counterfactual histories. There is no rule for becoming the richest above a certain performance level because achieving exceptional performance usually requires doing something different or new and there can be no recipe for such innovation (Levy, 2003). The implication is that the more extreme a performance is, the less one can learn from it because this realized outlier is more likely to indicate unreliability and could likely have happened differently in alternative histories. This also implies that many top performers should be dismissed and less extreme performers, that is, the second best should be rewarded and imitated.

Luck as Undeserved

A fourth application of luck in the management literature centers around the praise and blame associated with the unintended consequences of managerial action.³ Realized outcomes are not determined solely by intentional design—

uncontrollable and unpredictable factors can interfere and produce consequences that are decoupled from intention. This suggests that good intentions do not necessarily lead to good outcomes and vice versa. Nevertheless, laypersons tend to determine praise and blame primarily based on realized outcomes. This thus creates a mismatch: well-intended actions or competent managers are blamed for the failures outside of their control, while ill-intended actions or incompetent managers are rewarded for achievements that were outside of their control. Most of what falls within this category sees luck as the residue of intentional design and focuses on how people and organizations over- or under-reward/punish the actors for their good or bad luck. In particular, there are three lines of distinct literature that elaborates how managers can receive undeserved blames or rewards.

The first line of literature relates to executive compensation, and specifically how it is that executives can receive compensation well beyond what they deserve. This is a central research topic in the literature of agency theory (Fama, 1980; Jensen & Meckling, 1976) because inappropriate incentive structure can distort the motivation of the executives (Milgrom, 1981). Two common observations are that (a) executives are often paid for good luck due to factors beyond their control, such as unanticipated foreign exchange (Bertrand & Mullainathan, 2001), and that (b) executives tend to be overpaid—more than their current performances can justify (Bebchuk & Fried, 2009; DiPrete, Eirich, & Pittinsky, 2010; Wade, O'Reilly, & Pollock, 2006). Research has suggested several reasons for the exaggerated executive compensation. For example, top executives gain power over boards so boards conform to the executives' self-serving request of high pay (Bebchuk & Fried, 2009). Also, executives are aware that they can be made scapegoats when performance declines even when such decline is beyond their control (Boeker, 1992; Wiersma & Bantel, 2006). Requesting a high compensation package is as if buying insurance for situations when they can be blamed for bad luck. Overall, this research suggests that the extent of over-pay increases with executive levels and many top executives' performances cannot justify the high compensation they receive. This can hurt the performances of the firm and create concerns about trust and fairness, which is an important issue we will get back to in subsequent section, when introducing an underexplored perspective on luck as Leveler.

The second line of literature on “luck as undeserved” originates from philosophy, and specifically “moral luck” in moral philosophy (Nagel, 1976; Pritchard, 2006; Williamson, 1981). Moral judgments should never depend on luck. After all, it is reasonable to expect people to take full responsibility for the consequences of voluntary actions and not be blamed for actions and outcomes that are beyond a person's control. Yet, moral judgments often appear to be influenced by luck and circumstances (Nagel, 1976).

Consider two managers facing an identical business scenario—a go/no-go case that requires a judgment call from them. They both feel that they have conducted enough analyses and are abiding all the rules, and so both managers decide to go ahead with the plan. In one case, purely by chance, this business plan created an unanticipated, negative side effect that killed several people while everything went well as planned in the other case.⁴ Normatively, one should not blame one manager more than the other because the difference in the consequences, however dramatic, is due to chance. But people tend to judge otherwise—the former manager tends to be blamed and held responsible for the casualties even when they are due to bad luck.

Why do we then blame people for their bad luck? Researchers in moral psychology have proposed several explanations, all of which center around the second-order inferences one might draw from unlucky incidences. For example, the unlucky incidence that befell the first manager may indicate false beliefs held by that manager (Young, Nichols, & Saxe, 2010). Both managers “felt” they had done enough analyses to justify their decision. But perhaps the bad outcome in the first case indicates that the analyses done by the first manager was simply not rigorous enough. The first manager may have omitted some important information and wrongly evaluated the safety procedure of the plan. So the bad luck the manager experienced would not have been entirely beyond the manager’s control. Another possible inference involves a judgment of the character of the manager based on observed outcomes (Pizarro et al., 2003; Uhlmann et al., 2015). The motivation of moral judgment is ultimately about judging others’ moral character—one should avoid interacting with a person who is perceived to be immoral. The bad luck the first manager experienced may be informative about character: being reckless or imprudent, for example, means the manager deserves to be blamed (Uhlmann et al., 2015). This is also consistent with the research on the belief in luck—lucky or unlucky outcomes are associated with perceived personal characteristics (Day & Maltby, 2003; Maltby et al., 2008). Overall, research on moral luck suggests that people’s moral judgment is not neutral to luck: laypersons as naïve moralists tie their judgment to the consequences and discount the role of luck and circumstances. Nevertheless, there is an ongoing debate about the underlying mechanisms for such regularities in moral judgment.

The third line of literature under this perspective on luck is about how it is people evaluate executive accountability after extreme failures. Executives and operators are often blamed for large scale failures (Perrow, 1984)—be they oil spills, nuclear plant disasters, or financial crises—and expected to assume responsibility and either resign or get fired. Prior studies on disaster dynamics have emphasized the role of bad luck in failures: system failures can result from exogenous factors hitting a fragile system. Systems may be so tightly coupled that even small external shock can cascade and collapse the system due to its

interactive complexity (Perrow, 1984). Consider again how the Columbia Space Shuttle broke apart due to a piece of foam insulation happened to strike its left wing rather than the other places in prior missions (Starbuck & Farjoun, 2005). System failures can also result from endogenous processes. Non-novel interruptions can cumulate to such extent that they create additional interruptions faster than the executives in charge can fix existing ones (Rudolph & Repenning, 2002), leading to inevitable system collapse after passing a tipping point. For example, consider how the Tenerife Air Disaster, the deadliest accident in aviation history, unfolded with several factors such as terrorist attack, weather, airport capacity together exacerbating the situation to such extent that the disaster was set in motion and beyond the pilots' control. Overall these studies suggest that situational factors—such as system characteristics and external circumstances—are necessary for producing extreme failures. The implication is that failed executives do not deserve to take all the blame—they may simply be in the wrong place at the wrong time.

Future directions. This perspective on luck emphasizes a mismatch: realized outcomes do not necessarily reflect intentions. Nevertheless, people tend to judge the quality of the actor by outcomes. This suggests that some individuals can be over-blamed for bad luck while others are over-rewarded for good luck. In particular, top executives can be over-compensated for high performances beyond their control and over-blamed for disasters that are also beyond their control. This creates problems not only for incentive structure, but also for system robustness: unlucky executives are fired and the system remains fragile, awaiting the next “normal accident” (Perrow, 1984). Moreover, management researchers also recognize the importance of moral luck in business (Michaelson, 2008; Velamuri & Dew, 2010). One challenge is that most empirical research on moral luck is based on people's judgment on simplified scenarios like the above illustrative example: two similar individual actions lead to very different outcomes and how people judge the individuals differently based on small modifications of the scenarios. It is not clear whether these findings are readily applicable for managerial contexts where uncontrollable forces are often a combination of social influences and incentive structure. Consider, for example, a case discussed by Arendt (1963), of a German soldier who served in Auschwitz. He was following orders to kill and torture prisoners as did most of his peers, and the cost of disobeying the orders might well have been his own death. To what extent should we blame him for his involvement in the Holocaust? Or consider a less extreme example: if a manager goes ahead with a mission partly because of an approaching deadline and the cost of missing such deadline is likely his job (Perrow, 1984; Starbuck & Farjoun, 2005), to what extent should he be blamed if the plan happens to go wrong? These are the sorts of difficult

questions about moral luck that have not been addressed in management. But there are three further directions for future research.

First, when should we blame executives for failure? Normal Accident Theory (Perrow, 1984) suggests that failed executives tend to be overblamed. However, alternative theories have suggested that the persons in charge should be blamed for extreme failures. Extreme failures can result from cascading errors that are beyond the control of the executives. But whether a cascade of errors is triggered is not entirely independent of the executives' skill. Clearly, poorly skilled executives can exacerbate the situations and make system collapses more likely. Tightly coupled systems can still perform reliably and be failure-free if the executives in charge are mindful enough to overcome inertia and be resilient against the unexpected before incurring additional damage (Weick & Sutcliffe, 2006). For example, the Columbia Space Shuttle Disaster could have been averted had executives at NASA paid attention to, rather than having normalized, deviances (e.g. the broken foam insulation) and interpreted prior near-misses not as successes but a cause for concern (Dillon & Tinsley, 2008; Vaughan, 1997). Overall these studies on High Reliability Organizations suggest an important dispositional factor—mindfulness (Langer, 1989)—is crucial for complex organizations with high-risk technologies to continue performing at a highly reliable fashion (Weick, Sutcliffe, & Obstfeld, 1999). The implication is that failures are informative about skill—the failed executives are likely to be the mindless ones who easily succumb to inertia and enable cascading errors to happen in the first place.

Taken together, this literature adds an important consideration when evaluating the extent to which failed executives deserve to be blamed: the interactions between the scope for skill and luck. If cumulated failures do not diminish the scope for skill, this suggests that higher skilled executives are more likely to exercise their skill and stop failures from escalating. In this case, a failure is informative about low skill and the failed executives deserve to be blamed. In contrast, if the exacerbated situations can diminish the scope for skill because cascading errors overwhelm managerial interventions, eventual failure is not informative about skill. Rather, it indicates the system is likely to be tightly coupled and sensitive to external shocks and small errors. Failed executives cannot be blamed here because, however skilled they might be, they could not have averted failure. In particular, the magnitude of the extreme failures should not be proportional to the blame the failed executives receive when small errors can cascade and override skill—the magnitude indicates more about the system characteristics. The interaction between skill (e.g. mindfulness and resilience) and luck (e.g. exacerbating situations like cascading errors) goes beyond the simple scenarios discussed in the moral luck literature and should attract more attention from management researchers.

Second, recent studies suggest an interesting asymmetry in both moral judgment and performance evaluations. In moral judgment, people tend to discount blame to bad outcome but not praise to good outcome (Pizarro et al., 2003). Similarly, people tend to appreciate the role of bad luck for extreme failures but not the role of good luck in exceptional performances (Denrell & Liu, 2012). A second order inference process may account for this asymmetry: most people assume that others do (not) want to experience good (bad) luck, or put themselves in a situation that would increase (decrease) exposure to good (bad) luck. This suggests that they discount the blame associated with failure because it is against that person's "meta-desire". By contrast, people do not discount the praise associated with success because that is consistent with that person's "meta-desire" (Pizarro et al., 2003). While this account is theoretically sound, more empirical and experimental work is needed to examine the reasons for such asymmetry, which has potentially important implications for incentive structure and executive accountability.

Third, when should we reward success? It is sensible to reward higher-achieving performers when performance is a reliable indicator of skill and effort (Fama, 1980; Milgrom, 1981). Otherwise higher-achieving performers are rewarded for their good luck because their performances depend more on situational rather than dispositional factors. Nevertheless, rewarding luck is a common business practice, particularly for the corporate elite (Bertrand & Mullainathan, 2001). On one hand, the difference in skill among the corporate elites is likely to be tiny (March & March, 1977), implying that their successes and failures are more likely to result from situational enablers or constraints. On the other hand, people chase a romanticized perspective on these stars (Khurana, 2002; Meindl, Ehrlich, & Dukerich, 1985), even when star performances are highly likely to result from uncontrollable factors (Bertrand & Mullainathan, 2001; Strang & Macy, 2001). In fact, the supposed top performers can be expected to be less skilled than their lower performing counterparts when extreme performances indicate unreliability such as excessive risk-taking or cheating (Denrell & Liu, 2012). This implies a large discrepancy between people's romanticized perspective on how corporate elites are responsible for firms' destiny and the reality of how luck dominates the performances beyond a certain level.

Moreover, the exaggerated high compensation of top executives creates problems for redistributive justice and endangers the stability of societies. In particular, it hurts the belief in a just world. Belief in a just world is closely related to perceptions of the extent to which outcomes should be attributed to luck (Alesina, Glaeser, & Sacerdote, 2001). It is often an illusion to believe that the world is just. To work hard, for example, does not guarantee the payoff one deserves when outcomes are largely determined by social connections and inherited wealth (Piketty, 2014). Such an illusion often entails desirable outcomes because of a self-fulfilling prophecy: those who believe luck

matters less will be motivated to work harder (Benabou & Tirole, 2006; Gromet, Hartson, & Sherman, 2015). Research shows that belief in a just world is a prevalent illusion (with notable differences between countries) and can explain why GDP growth is higher in the USA (which underestimates luck more) than in many European countries (which underestimate luck less) (Alesina et al., 2001). However, such misperceptions can backfire: Alesina et al. (2001) also show that underestimating luck leads to less social spending in the USA. If the majority believes that luck matters less and one should be responsible for one's own fate, social spending like expenses on medical care is likely to be lower, potentially decreasing social mobility and strengthening social inequality. This in turn can lead to social instability because beyond a certain threshold of social inequality more people will come to realize that the world is less just than they believed. The exaggerated pay to the executives and bankers, particularly after the financial crises strengthen this impression as the demonstrations such as "Occupy Wall Street" would appear to suggest. There may be some rational accounts for why high executive compensation is useful, but executives should also consider the consequences of their high compensation packages for society, lest they should decide to react to such felt injustice in more radical ways. Overall, this discussion suggests that rewards for higher ranked corporate executives should be proportionally less because luck plays a more important role in performance at higher levels in corporations. Otherwise the high compensation of top executives is not only unjustifiable but hurts the belief in a just world and increases instability in societies.

Luck as Serendipity

A fifth usage of luck in the management literature emphasizes why some people and firms are luckier than others, or how "chance favors the prepared mind" as Louis Pasteur put it. Good and bad luck befalls to all, but only some can maximize the return on luck. The focus is not on chance or luck per se, but on individual or firms' traits that make them to be able to see what others do not see, a form of "serendipity". Before we elaborate the role of serendipity in management context, we introduce its origin, which is a closer correlate of creativity, and often associated with scientific breakthroughs and such lucky industrial discoveries as Velcro, X-rays, aspirin, Post-It Notes, the HP Inkjet printer and Scotchguard.

The origin of serendipity. Serendipity has its etymological origins in a sixteenth-century tale told in a letter, sent by Horace Walpole to a distant cousin on 28 January 1754. In it, three princes of Serendip (present-day Sri Lanka), sent by their father to fend for themselves so as to gain practical knowledge of the world, happened upon a camel owner, distraught for having lost his

precious asset. He inquired as to the whereabouts of his camel. While the princes had not seen the camel, they were able to render an accurate description of it: it was blind in one eye, lacking a tooth and lame, was carrying butter on one side and honey on the other, and was being ridden by a pregnant woman. Their description was accurate enough for the camel owner to become suspicious. He took them captive and delivered them to the emperor. Upon interrogation it became clear that the description of the camel had been deduced from observation alone. They explained that they thought the camel blind in the right eye because the grass had been cropped only on the left side of the road. They inferred that it was missing a tooth from the bits of chewed grass scattered across the road. Its footprints seemed to suggest that the animal was lame and dragging one foot. Also, finding ants on one side of the road and flies on the other, they concluded that the camel must have been carrying butter on the ant's side, and honey on other. Finally, as for the presence of a pregnant woman, a combination of carnal desires on the part of the princes, and imprints of hands on the ground sufficed to bring about this final conclusion (Merton & Barber, 2004).

Walpole's tale is instructive because the princes relied on creativity in recombining events (that came about by chance or happenstance) and in exercising practical judgment to deduce "correct pairs" of events so as to generate a surprisingly effective (and, as it happens, entirely accurate) plot (de Rond, 2014). In contrast to other perspectives on luck, serendipity points toward a distinct capability, namely that of recombining any number of observations so as to deduce "matching pairs", or sets of observations, that appear to be meaningfully related (de Rond & Morley, 2010). Serendipity is the "prepared mind" in Louis Pasteur's oft-cited quip, and the question one of how organizations, and the individuals inside them, can increase the likelihood of serendipity occurring. This may be what Porter (1991, p. 110) had in mind when suggesting that "there are often reasons why firms are 'lucky'".

A closer examination of serendipity also suggests a typology (de Rond, 2014). A first distinction is that between "true" and "pseudo" serendipity, where one seeks A but finds B, and where B is ultimately the more highly valued. When it came to the Nobel prize winning discoveries of PCR and DNA, Mullis and Francis and Crick, respectively, found what they were looking for but by way of chance. In each case, the objective remained unchanged, but the route toward achieving this objective proved unusual and surprising.

Crick and Watson's discovery of the "double helix" structure of DNA was marked by various unplanned events such as Watson's loosely related work on TMV (corroborating their suspicions of a helical structure), and exchanges with Griffith and Donohue (in directing them toward the specific, but unorthodox, pairing of bases). Yet they always

knew that they were after the structure of DNA, believing it to contain the secret of life. Thus, DNA illustrates pseudo-serendipity, insofar as chance events enabled the unraveling of the molecule, yet these events never caused them to deviate from this original target. (de Rond, 2014, p. 10)

In pseudo serendipity, A is sought and A is found, but via a route quite different from that originally envisioned (Roberts, 1989). Thus, in the discoveries of sildenafil citrate (the key ingredient in Viagra) and penicillin, scientists discovered something else than what they had been looking for (cf. de Rond & Thietart, 2007).

Both Fleming and Pfizer's scientists applied creativity and practical judgment in matching observations of unforeseen events with findings reported by others, and in selecting which of these combinations might be fruitful. They rightly interpreted coincidences as meaningful in the context of the knowledge available to them at the time. However, the particle from the mycology labs wafting through Alexander Fleming's open window to contaminate a bacterial culture is a random variation, as were the unusual changes in temperature. By contrast, the unanticipated side effects of sildenafil citrate surfaced in part as a result of research design; after all, toxicity trials tend to use men between the ages of 18 and 30, as did Pfizer's clinical trials. (de Rond, 2014, p. 10)

One can make a further distinction between chance as the unintended consequence of research design, and chance as pure random variation (de Rond, 2014). Thus, in discovering sildenafil citrate and PCR, opportunities arose as a direct consequence of the way the study had been designed: the unintended side effects of sildenafil citrate became apparent precisely because Phase 1 clinical trials use healthy male volunteers. Likewise, Mullis' discovery of PCR relied entirely on his recombination of existing technologies (de Rond, 2014, p. 10). By contrast, penicillin and DNA benefited from random chance occurrences: the spore in Fleming's dish had most likely wafted in from the mycology labs located one floor down. And Crick was fortunate to share his office with a crystallographer, who pointed out the flaws in his original, "textbook-correct", model (de Rond, 2014, p. 10).

Serendipity in the context of management. In the context of management, we can conceptualize how chance interacts with individual capability so as to co-produce serendipity in four different ways (Austin, 1978). The first of these refers to luck that cannot be attributed to the beneficiary in any meaningful way. This application is a base-line case of luck as serendipity and is consistent with the application of luck by Barney (1986). A firm's performance is

determined by the values created by the strategic factors the firm owns. Superior performance is likely to be founded on the firm's superior foresight about the value of its strategic factors and from acquiring these factors for less than they are worth. Otherwise there should be no abnormal returns—any superior performance should be attributed to good luck because profitability is ultimately traced to unexpected price changes. If strategic factors are priced correctly, based on all of the available information, price changes only occur when new, unexpected information becomes available (Fama, 1970). Therefore, this is in fact the base-line case *without* serendipity—gains should be attributed to pure luck or windfall that is independent of the person.

The second variation of luck as serendipity is about how luck favors those in motion—people who are willing to venture new ways to make progress. While good luck may befall the lazy and inert, favorable outcomes are more likely to be the result of hard work joined by chance events, or “practice and you get luckier” (Burgelman, 2003). As Charles Kettering, former head of research at General Motors, put it: “keep on going and the chances are you will stumble on something, perhaps when you are least expecting it. I have never heard of anyone stumbling on something sitting there” (as quoted in Austin, 1978, p. 15). Moreover, the chance of success may be low and unforeseeable. But continuing to try will entail the exclusion of alternatives that would have led to failure, enhancing the chance of success over time. The implication is that experimentation matters and benefits can arise from exposing oneself to situations that increase the chance of realizing favorable outcomes.

The third variation of luck as serendipity is about how luck favors those who look inward. Sometime people or firms can pre-adapt: happen to be endowed with strategic factors that can be recombined into valuable, idiosyncratic strategic advantage (Cattani, 2005, 2006). The holdings of these valuable strategic factors often result from unintended consequences. For example, Cattani (2005) uses the case of Corning to illustrate how an unanticipated use of fiber optics technology enabled Corning to become one of the leaders in long-distance communications. Alternatively, some idiosyncratic strategic factors can result from people opportunistic behaviors when dealing with ambiguity and resource uncertainty (Miner, 1987). This implies that sustainable superior performances are more likely to result from an accurate understanding of firm-specific resources, even when these resources were acquired by accident or opportunism (Cohen & Levinthal, 1990, 1994; Makadok & Barney, 2001; Powell,洛瓦洛, & Caringal, 2006). By extending these unique resources, firms are more likely to gain competitive advantages that cannot be easily imitated by competitors (Wernerfelt, 1984).

Consider the case of Bill Gates, the founder of the software giant Microsoft (as quoted in Gladwell, 2008, p. 55):

If there were fifty [teenagers who had the kind of experience I had] in the world, I'd be stunned . . . all those [opportunities] came together. I had a better exposure to software development at a young age than I think anyone did in that period of time, and all because of an incredibly lucky series of events.

This series of lucky incidents Gates referred to (Gates, 1995) started with his wealthy family sending him to a private school with computers (rare equipment in the 1970s) and this allowed him to develop his hobby of programming and develop a unique competence relative to his cohort and competitors. After gaining superior competence, his mother's connection to IBM's then president facilitated a contract with Gates' startup. Bill Gates augmented all of this by also deciding to decline the most apparently sensible alternative of attending Harvard to start his own company, all enabled by the series of lucky events he enjoyed. The success of Microsoft may seem lucky to many (including Gates himself), because the company would not have been so successful with slight changes in any of these aforementioned conditions. This application of luck as serendipity focuses on the role of human intervention instead: the fact that Gates understood the value of his unique capabilities and decided to start business instead of going to Harvard is crucial for establishing the sustainable superior performances of Microsoft. Stated differently, temporary competitive advantage is possible by looking forward (e.g. forecasting the trends), looking backward (e.g. drawing lessons from histories), working hard or just being lucky. But sustainable competitive advantage is only possible through looking inward, that is, by creating isolating mechanisms through individualized resources and capabilities that cannot be easily replicated by competitors.

A fourth variation of luck as serendipity is about how luck favors those who are alert and flexible. Low-hanging fruits will be exploited quickly as Barney (1986) and the Efficient Market Hypothesis (Fama, 1970) suggest, but other less obvious opportunities are likely to be left unexploited whenever the market is not perfectly efficient. Favorable chance may happen to anyone but only those who pay attention to weak signals and are capable of recognizing and responding quickly to grasp opportunities (Denrell, Fang, & Winter, 2003; Teece, Pisano, & Shuen, 1997; Winter, 2003). The ability to see what others do not is the key to this application of luck, and it is this variation that most closely reflects serendipity's etymological origins. For example, executives of Honda managed to successfully link information that seemed to distract them from their original goal of promoting heavyweight motorcycles in the USA, and concluded that light-weight motorcycles were *the* model to introduce in the US market instead. This serendipity led to the extraordinary success in the USA of its "Supercub" in the late 1950s (Mintzberg et al., 1996; Pascale, 1996). The implication is that looking outward may be useful in addition to

looking inward. Opportunities may exist even for those who do not yet possess any valuable resource, for example, entrepreneurs (Dew, 2009), but can make meaningful combinations of seemingly irrelevant factors that were omitted by others.

Future directions. The application of luck as serendipity recognizes the importance that luck plays in management, but emphasizes that certain characteristics help some to recognize chance opportunities and grasp them where others do not. This perspective on luck is consistent with a primary purpose of management: to reign in randomness and gain more control over outcomes. It is thus perhaps not surprising that many management researchers do not use the term luck in their writing. Even when they do, the focus is not on luck per se but on what managers should do to get lucky. This perspective on luck also entails three directions for future explorations.

First, opportunities may exist when social dynamics discourage others to exploit atypical opportunities—a behavioral source of market inefficiency. Prior studies have suggested people feel more comfortable in conforming to the majority (Asch, 1951) which aligns with the idea that the majority is very often wise so following the crowd is sensible (Lorenz, Rauhut, Schweitzer, & Helbing, 2011). However, majorities can be wrong. For example, Michael Lewis in his book *Moneyball* (2003) documents how a stereotype of what good players should look like biased scouts and coaches in Major League baseball. Opportunities thus existed for less resourceful teams who applied different approaches (e.g. statistical analysis) to find undervalued players who could contribute more than immediately suggested by traditional interpretations. Around the turn of the millennium, the Oakland A's managed to pay less for players than their eventual contribution would suggest they were worth and then resell their best performing players toward the peak of their output. They benefited from this trading strategy because: (a) they were better able to recognize the value of their players when buying and (b) other teams paid more for these players than they might be worth when selling them, reflecting how extreme performances are more likely to regress to the mean in future seasons. Such a strategy led to a higher ratio of win rates relative to salary costs than other teams and suggests that opportunities may exist but are left unexploited because they seem atypical to many due to norms, biases, peer pressure or misperceptions of luck (e.g. ignoring regression to the mean). This implies that opportunities may be left unexploited when they seem atypical or when acting against the norm is risky. Future research can explore such alternative sources of strategic opportunity that can result from misperceptions of luck strengthened by social dynamics.

Second, who can grasp atypical opportunities when others are bounded by norms or peer pressure? One possibility is that luck may favor those who are less sensitive to what others think. For example, extreme failures may indicate

that the system is tightly coupled and sensitive to external shock rather than a lack of skill in executives (Perrow, 1984). The implication is that failed executives should not necessarily get fired because they may just be in the wrong place at the wrong time. However, many executives who experience extreme failures are fired and treated as scapegoats (Boeker, 1992; Wiersema & Bantel, 2006). Opportunities may exist for those who dare to hire the failed executives because they can be hired less than they are worth. Nevertheless, companies who are sensitive to what stakeholders think are unlikely to hire executives associated with failures, even when they understand that the executives are skilled but unlucky, often because there is no certainty that stakeholders will be able to make this inference. More generally, opportunities exist for those who can afford to implement a contrarian strategy. By acting on accurate inference and against the crowd, the prizes can be more substantial due to less competition. In this sense, fortune may favor the insensitive—those who can afford to implement a contrarian strategy and act on atypical inferences such as dismissing the most successful and hiring the failed.

Third, how contextual factors enable serendipitous combinations deserves more research. Applications of luck as serendipity mostly emphasize how actors manage to see what others do not see. Other studies emphasize that such serendipity should be attributed less to the actors and more to the network structure the actors are embedded in. For example, using the analogy of solving a puzzle, Simonton (2003) suggests that most important scientific discoveries should not be attributed to a single scientist at a particular time, but to other scientists who discovered the pieces necessary to solve the puzzle and to the network that enabled the eventually recognized scientist to have accessed all of the pieces that were relevant to solving the puzzle. Some studies in management and sociology also suggest the importance of network structures in enabling innovation and its diffusion (Centola & Macy, 2007; Fang, Lee, & Schilling, 2010; Granovetter, 1973; Schilling & Fang, 2013; Small, 2009). More generally, detailed contextual analyses of serendipitous outcomes tend to undermine the role of the “stars” involved and instead suggest how situational factors play more important roles in enabling the outcomes. This line of research thus undermines the role of actors and emphasizes the role of situational factors such as networks in serendipitous discoveries. Future research can extend this line of research and specify the conditions under which actors are more important than contexts for innovation.

Discussion

We discussed five common perspectives on luck, each of which is tied to a particular literature. In addition to summarizing these literatures, we outlined

several directions for future research. These ideas in combination may make for a research agenda to help us further understand the role of luck in management.

Our review should have made it clear that management researchers typically entertain quite different understandings of how luck interacts with context and human intervention. These differences reflect the distinct focuses of the subfields in management. First, luck as serendipity is mostly studied by researchers in subfields such as Strategy and Entrepreneurship. Their disciplinary background is often Economics, which tends to focus on choice as the product of calculation, and of reasoning applied to predicament. Thus, this perspective on luck as serendipity emphasizes how luck can be tamed by actors' wills. An attribution-based approach (luck as Attribution and Undeserved) is utilized by researchers in subfields such as Organizational Behavior and Judgment and Decision Making. Their disciplinary background is often Psychology, which focuses on how perceptions happen and influence behaviors. This perspective on luck as attributions emphasizes the cause and consequences of the misperceptions of luck.

Last, the applications of luck as randomness or counterfactuals are mostly used by researchers in subfields such as Organization Theory and Population Ecology in the disciplinary background of Sociology, which focuses on how choices are constrained by context. Thus, these two perspectives on luck as randomness and counterfactual emphasize how observed outcomes are largely determined by luck. In short, these perspectives on luck reflect varying assumptions about the actors' degrees of freedom in outcomes: from a high degree (luck as serendipity), to a moderate degree (luck as attributions or undeserved), and to a low degree (luck as randomness or counterfactuals). One perspective on luck does not necessarily represent reality more accurately than the others. Instead, these diversified understandings of luck are desirable for an interdisciplinary field such as management.

This review also suggests an important similarity among the different views of luck: most suggest that misperceptions of luck are most problematic when evaluating exceptional performances. Research suggests that top performances can indicate luck and lower levels of skill because extreme performances are more likely to result from extreme circumstances (Denrell & Liu, 2012). This is particularly true for corporate stars whose skill does not differ much and their outcomes are largely determined by situational factors. Nevertheless, corporate stars and their performances tend to attract media attention and many conclude that these outliers must have done something right to achieve their status. This discrepancy contributes to various problems, in particular increased social inequality and endangering the belief in a just world (Piketty, 2014).

Luck may be one possible solution to the problem of increasing social inequality. This suggests an underexplored perspective on luck: luck as a

Leveler. This idea originates from the ancient Greek and Venetian Republic, known as Demarchy or Lottocracy, where political leaders were elected not by merit but by selected at random (Zeitoun, Osterloh, & Frey, 2014). Recent studies show that random selection can actually outperform more sophisticated governance mechanisms in politics and financial markets, due to perceptions of fairness, resistance to corruption, and robustness in comparison to other approaches (Biondo, Pluchino, Rapisarda, & Helbing, 2013; Pluchino, Rapisarda, & Garofalo, 2010).

Random selection is particularly relevant for evaluating exceptional successes, including those of star performers in corporate life. As we have seen there may only be small differences in skill among corporate stars which, in turn, would seem to imply that beyond a certain corporate level, randomly selected executives are likely to perform as well as their higher performing counterparts. Presumably, a company would not need to pay any randomly selected executives as highly for three reasons: firstly, random selection may be a more robust approach when other approaches tend to be subject to biases such as Halo Effect and stereotype (Thorngate, Dawes, & Foddy, 2008); secondly, the randomly selected executives are chosen on the basis of luck of the draw so the one being picked has no ground to ask for more than his counterpart who also perform above a certain level; thirdly, extrinsic incentives may not matter much for the output at higher corporate levels. Paying the highest ranked corporate executives can in fact backfire by, for example, making them less creative (Ariely, Gneezy, Loewenstein, & Mazar, 2009). The firm may well spend the additional resources made available from this approach for more useful applications such as research and development. The resulting progress in innovation and technology may in turn enhance “the rate of growth of income and output” and allow it catch up with “the private rate of return on capital”, one of the few possible approaches to attenuate social inequality (Piketty, 2014). This can also attenuate the divide between the richest and the rest, maintaining a belief in a just word and its function. Of course, this proposal of implementing random selection needs to developed, but promises an alternative solution to a serious problem and deserves more attention from management researchers. A difficulty with random selection of corporate leaders is, of course, that those being led might have less reason to be confident about their leaders’ ability to direct their efforts in the best possible way. Lack of confidence in leadership might, in turn, become a self-fulfilling prophecy, causing firms to underperform. Assuming that the damages resulted from overconfidence is greater than that from underconfidence, luck as leveler can still work well. Thus, randomly selecting executives from a pool of qualified candidates is more effective than selecting the highest performers, and this is particularly effective for the highest ranked corporate positions such as CEOs.

What is the implication of these perspectives on luck for management education? Misperceptions of luck, particularly when evaluating exceptional successes, have important implications for how we educate the next generation of managers. Many bestsellers in management and case studies in business school education focus on the top performers and how to move from “good to great”. As these perspectives on luck suggest, there are no rules for becoming the richest and luck dominates the outcome beyond a certain level. This implies that preaching how to move from good to great is likely to lead to disappointment or even encourage excessive risk taking, fraud even, because exceptional performances are unlikely to be achieved otherwise. Instead, management research and education should focus more on less extreme performances, that is, the second best, and strive to increase learning from failures, where skill and effort matter more in determining outcomes. We should stop showing our students how a limited number of stars have risen to levels that others are unlikely to achieve. Rather we should present more realistic and potentially beneficial lessons such as how people can move from incompetent to okay.

Concluding Thoughts

In this paper we reviewed five common ways in which luck is used in the management and organizations literature: (a) luck as Attribution; (b) luck as Randomness; (c) luck as Counterfactual; (d) luck as Undeserved; and (e) luck as Serendipity. Each of these five perspectives is tied to a specific literature—whether within management, or in such allied disciplines as economics, psychology and sociology—and generative in terms of future research. We added a sixth perspective, luck as Leveler, to address the specific issues of executive compensation and social inequality. Our review suggests that managers and their stakeholders tend to develop illusions that the world is more controllable and predictable than it actually is, and these illusions can entail costly errors in modern societies. This is the bad news. The good news is that we have the conceptual tools to help us to better understand the role of luck in organizational life, and thus to counter these illusions. We would hope a community of scholars would join us to further develop these tools in pursuit of what remains one of the thorniest issues in the management and organizations literature. To this end, good luck to us all.

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Notes

1. We thank one of the reviewers for pointing out this interesting direction.
2. Merton (1968) coined this term from Gospel of Matthew: "For to all those who have, more will be given, and they will have an abundance; but from those who have nothing, even what they have will be taken away". ~Matthew 25:29, New Revised Standard Version.
3. We thank one of the reviewers for the suggestion of separating this perspective on luck from others.
4. This example is adapted from a now classic example Nagel (1976) developed: two law-abiding drivers, one of whom experienced an unexpected and uncontrollable event-a young child running in front of the car and this driver hit and killed the girl whereas the other driver arrived the destination uneventfully. Philosophers ask: should we blame the former driver more than the latter one? Our adapted example happens in typical management context but the essence is identical to the one developed by Nagel (1976).

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