


RESEARCH ARTICLE

CEO overconfidence and firm performance: A meta-analytic review and future research agenda

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Abstract

We provide a meta-analytic examination of the CEO overconfidence–firm performance relationship. Our results support a positive relationship between these focal variables. Drawing from trait activation theory and national cultural differences literatures, we find that cross-cultural effects moderate the focal relationship. More specifically, we find that the CEO overconfidence–firm performance relationship is stronger in high assertive, low institutional collectivistic, low in-group collectivistic, high future-oriented, high gender egalitarian, high performance-oriented, low power distance, and low uncertainty avoidance cultures. Consistent with the resource orchestration literature, we also find that entrepreneurial orientation mediates the focal relationship between CEO overconfidence and firm performance. Taken together, our results present a more nuanced picture of the CEO trait–firm performance relationship. In the future, researchers may consider examining additional CEO traits as well as additional contextual factors including internal, as well as environmental, factors.

Keywords: CEO overconfidence; firm performance; entrepreneurial orientation; cross-culture; meta-analysis

Introduction

How, and to what extent, a CEO's personal characteristics influence organizational performance is a topic of interest in the business press (Adams, 2012; Maccoby, 2003; Sahadi, 2018) as well as in academic fields such as accounting (Olsen, Dworkis, & Young, 2014), cross-cultural psychology (Acker & Duck, 2008; Meisel, Ning, Campbell, & Goodie, 2016), entrepreneurship (Koellinger, Minniti, & Schade, 2007), finance (Nelson, 2005), human resource development (HRD) (HRD is defined as "a process of developing and/or unleashing human expertise through organization development and personnel training and development for the purpose of improving performance" [Swanson, 1995, p. 208]) (Godkin & Allcorn, 2009), and strategic management (Hambrick & Mason, 1984; Nadkarni & Herrmann, 2010). Researchers have traditionally examined CEO demographics such as age, educational level, and functional background experience (Datta & Guthrie, 1994; Hambrick & Mason, 1984) as this data is relatively easy to collect. More recently, however, researchers have begun to examine the "Black Box" of CEO psychological characteristics such as overconfidence (Brown & Sarma, 2007; Chen, Crossland, & Luo, 2015; Hirshleifer, Low, & Teoh, 2012) and its relationship with organizational performance.

Overconfidence refers to one's tendency to overestimate one's abilities, knowledge, and certainty about being right (Chen *et al.*, 2015; Hiller & Hambrick, 2005). Fischhoff, Koriati, and Lichtenstein (1980) suggest that overconfident individuals may have "an unwarranted belief in the correctness of one's answers" (p. 108). A growing stream of literature has linked overconfidence to senior executives and entrepreneurs (e.g., Hirshleifer *et al.*, 2012; Koellinger, Minniti, & Schade, 2007; Malmendier & Tate, 2005; Simon & Houghton, 2003). Research findings suggest that overconfident executives irrationally narrow "error bars" around a prediction, feel that they are "better than average," and underestimate a situation's degree of uncertainty (Grinblatt & Keloharju, 2009). Overconfident CEOs tend to attribute their decision-making errors to external factors such as bad luck rather than internal factors such as incompetence (Chen *et al.*, 2015). Similar to executives at larger organizations, overconfident entrepreneurs may undercapitalize their new venture (Hayward, Shepherd, & Griffin, 2006), make overly optimistic forecasts (Invernizzi, Menozzi, Passarani, Patton, & Viglia, 2017), rely on their perceptions of a situation rather than objective probabilities (Koellinger, Minniti, & Schade, 2007), and remain unaware of poor performance (Shepherd, Wiklund, & Haynie, 2009).

Despite these seemingly negative attributes, empirical results are not as consistent. Researchers have reported a positive relationship between CEO overconfidence and firm innovation performance measures such as patents citations, citations per patent (Galasso & Simcoe, 2011), and patent counts (Hirshleifer *et al.*, 2012). Some researchers have produced negative relationships between CEO overconfidence and firm performance measured as earnings forecast accuracy (Chen *et al.*, 2015) and shareholder losses following acquisitions (Hayward & Hambrick, 1997). Adding additional uncertainty are researchers who have reported nonsignificant relationships between CEO overconfidence and forecast accuracy improvement in the presence of greater managerial discretion (Chen *et al.*, 2015), and conflicting (Simon & Houghton, 2003) relationships between CEO overconfidence and pioneering product introductions. Addressing additional issues pertaining to culture, industry, and construct measurement may serve to clarify what we can conclude from the CEO overconfidence–firm performance literature.

Based on our prior research review, we believe there are several research questions in need of attention, which if answered, make significant contributions to the current literatures. First, what is the overall relationship between CEO overconfidence and firm performance? Building on upper echelons theory (Hambrick, 2007; Hambrick & Mason, 1984) and personality theories (Grijalva, Harms, Newman, Gaddis, & Fraley, 2015), we aim to resolve conflicting findings and explore how and why CEO overconfidence is associated with firm performance. Our research findings will also be of both theoretical and practical significance for the field of HRD. This CEO trait is known to influence important areas of HRD (e.g., career development, executive coaching, organizational learning, and firm performance) (e.g., Ellinger, Ellinger, Yang, & Howton, 2002; Godkin & Allcorn, 2009; Lundgren, Poell, & Kroon, 2019). Our research findings may help HRD researchers explore promising future research areas. HRD professionals may also be guided by our research findings to properly coach upper level employees to make effective use of their traits (Berr, Church, & Waclawski, 2000; Harland, 2003).

The second question we aim to answer is "under what condition(s) might CEO overconfidence influence firm performance?" Chatterjee and Hambrick (2007) and Hiller and Hambrick (2005) suggest that executive traits are associated with extreme and fluctuating performance – either big wins or big losses. Hambrick (2007) notes that there is still much to learn about the conditions under which executives influence firm performance. Engelen, Neumann, and Schmidt (2016) also point out that the executive trait literature is paradoxical, because the existing literature is unclear about whether executive traits have beneficial or detrimental effect on firm performance. To clarify at least some of these paradoxes and to reconcile conflicting findings, we take a contingency approach (Luthans & Stewart, 1977) and examine potential CEO overconfidence–firm performance moderators. Such a contingency approach also answers calls from prior studies which indicated research regarding executive traits should go beyond the "good-versus-bad" discussion to a more refined "it depends" perspective (e.g., Fatfouta, 2019).

Finally, to answer a call from Hambrick (2007), the third question we explore in this meta-analysis is what mechanism translates CEO overconfidence into actions that influence firm performance? Prior research suggests that CEO characteristics are associated with strategic actions which subsequently influence performance (Wang, Holmes, Oh, & Zhu, 2016). Existing research on CEO overconfidence, however, is dominated by studies examining the direct effect of overconfidence on firm outcomes even though potential mediating mechanisms are routinely discussed (e.g., Chen, Ho, & Ho, 2014). Building on the resource orchestration literature (Sirmon & Hitt, 2003; Sirmon, Hitt, & Ireland, 2007), we expect entrepreneurial orientation (EO) – a multidimensional construct describing an organization's strategy-making process including dimensions such as product innovation, proactiveness, and risk-taking behavior (Covin & Slevin, 1991; Rosenbusch, Rauch, & Bausch, 2013) – to mediate the CEO overconfidence–firm performance relationship. We view EO as the means through which CEOs apply their managerial decision-making style to direct how resources are used in pursuit of competitive advantage and higher performance (Sirmon & Hitt, 2003; Sirmon et al., 2007). Thus, EO represents CEOs' resource utilizing visions as discussed in the resource orchestration literature (Chirico, Sirmon, Sciascia, & Mazzola, 2011; Sirmon & Hitt, 2003; Wales, Patel, Parida, & Kreiser, 2013). Aside from contributions to the entrepreneurship and strategy literatures, examining EO as a mediator also has far-reaching implications for the field of HRD. How to manage change and innovation is a critical topic in the field of HRD (e.g., Kontoghiorghes, Awbre, & Feurig, 2005). Since EO is a construct closely linked to change and innovation, our research findings may result in a better understanding of how CEO traits influence top executives to manage change and innovation in order to improve firm performance.

Existing knowledge and key questions regarding the relationship between CEO overconfidence and firm performance vis-à-vis the contributions of the present manuscript are presented in Table 1. Our manuscript proceeds as follows: (1) theoretical background, including upper echelons theory and trait activation theory; (2) the CEO overconfidence–firm performance relationship; (3) contextual moderators including national culture and firm industry; (4) EO as a mediator of the CEO overconfidence–firm performance relationship; (5) research methods; (6) results; (7) discussion; (8) and conclusion.

Theoretical background

Upper echelons theory, trait activation theory, CEO personality, and firm performance

Upper echelons theory suggests managerial characteristics may influence firm performance through executives' strategic decisions (Hambrick, 2007; Hambrick & Mason, 1984). Upper echelons theory builds upon Simon's (1957) concept of bounded rationality suggesting CEOs are limited in their ability to access, process, and use information. These limitations lead CEOs to rely on personality traits to direct their attention, frame their perceptions, and form interpretations of particular situations or decisions (Hambrick & Mason, 1984; Wang et al., 2016). In particular, CEOs' psychological traits may guide their decisions and actions in a given competitive environment, thus influencing firm performance (Hambrick, 2007; Hambrick & Mason, 1984; Hiller & Hambrick, 2005). Until recently, the process through which executive psychological characteristics influence firm performance has been a "Black Box." Sirmon et al. (2007) have opened this "Black Box" by describing how managers structure, bundle, and leverage firm resources to create competitive advantage and increase firm performance. According to Penrose (1959), how executives choose to use resources is at least as important as the resources possessed by the firm. Zott (2003) provides support for this perspective by demonstrating that firms with similar resources may produce very different performance outcomes depending on how managers choose to use available resources. The key here is that managers make decisions regarding how to structure, bundle, and leverage available resources and that these decisions can impact firm performance. From an upper echelons perspective then, it is important to understand managerial characteristics, such as psychological traits, because these traits influence

Table 1. A summary of existing knowledge, key questions, and contributions from the present study

Existing Knowledge and Key Questions	Contributions from the Present Study
The performance effect of CEO overconfidence is (a) positive, (b) negative, and (c) extreme (i.e., either “big wins” or “big losses”). The performance effect of CEO overconfidence is unclear and conflicting. It remains unknown about the overall performance effect of CEO overconfidence.	The overall performance effect of CEO overconfidence is statistically significant and weakly positive. This finding yields support for upper echelons theory and addresses the paradox in executive traits literature. HRD professionals may be guided by our research findings to properly train upper level employees regarding how to utilize the bright sides of this trait and circumvent the dark sides of this trait.
The contextual approach suggested that the performance effect of CEO overconfidence may be contingent on contextual factors. What are the contextual factors that may condition the relationship between CEO overconfidence and firm performance?	CEO overconfidence has a stronger positive performance effect in high assertive, low institutional collectivistic, low in-group collectivistic, high future-oriented, high gender egalitarian, high performance-oriented, low power distance, and low uncertainty avoidance cultures. Theoretically, these findings open the path for new areas of research to enhance the understanding of the cross-cultural performance effect of CEO overconfidence. Practically, our findings contribute to international HRD research by showing how to capitalize on cultural norms so as to enhance the performance potential of executives’ trait overconfidence.
The performance effect of CEO overconfidence may be indirect and be transmitted via certain intermediating mechanisms. What remains in the “Black Box” for the relationship between CEO overconfidence and firm performance?	The relationship between CEO overconfidence and firm performance is mediated by entrepreneurial orientation (EO). EO explains how overconfident CEOs structure, bundle, and leverage firm resources to pursue bold entrepreneurial opportunities and navigate firms to take “large-stakes initiatives” to influence firm performance. This finding contributes to upper echelons theory and resource orchestration literature. This finding also contributes to the field of HRD by demonstrating that CEO overconfidence may affect CEO decision-making processes and behaviors to manage change and innovation so as to influence firm performance.

managers’ decisions regarding how to structure, bundle, and leverage available resources in search of competitive advantage and superior performance.

Historically, upper echelons researchers have focused their attention on executives’ demographic characteristics (e.g., age, experience, and education, etc.) because it is difficult to directly measure executives’ psychological characteristics (Hambrick & Mason, 1984; Wang et al., 2016). More recently, however, scholars have shifted focus from demographic characteristics to psychological characteristics by applying either direct psychological measures or indirect indicators to capture CEO psychological characteristics (Wang et al., 2016). One CEO psychological characteristic that has received significant attention is CEO overconfidence (Chen et al., 2015).

Overconfident executives are generally viewed as harmful to their organizations (e.g., Adams, 2012; Sahadi, 2018). For example, an overconfident CEO such as Steve Jobs may well be a successful innovator, but his success is often tempered by product failures such as the Apple III, which Jobs insisted have no fans or air vents to minimize noise but which also had the effect of overheating the unit to the extent that connections between chips would melt (Isaacson, 2013). Interestingly, despite these overwhelmingly negative general views, theoretical arguments and empirical evidence regarding the CEO overconfidence–firm performance relationship are inconclusive suggesting a potential disconnect between public perception and reality. For example, one literature stream theorizes a positive relationship between CEO overconfidence and firm performance. This literature suggests that trait overconfidence should influence CEOs to pay attention to positive cues, have favorable views toward opportunities, and identify more opportunities; in addition, overconfident CEOs generally feel confident and optimistic, are more decisive, focus less on their limitations, experience less anxiety, and set higher goals. Additionally, researchers have reported positive relationships between CEO overconfidence and innovation which can lead to first-mover advantages and competitive advantage (Galasso & Simcoe, 2011; Hirshleifer et al., 2012; Tang, Li, & Yang, 2015). Thus, because overconfident

CEOs are more likely to have favorable views toward opportunities and set higher goals, they may make decisions to utilize organization resources in bold and risky ways, thus potentially leading to greater firm performance (Sirmon et al., 2007; Sirmon, Hitt, Ireland, & Gilbert, 2011; Wang et al., 2016).

A second literature stream proposes a negative relationship between CEO overconfidence and firm performance. Overconfident CEOs consistently feel they are “better than average,” underestimate uncertainties, overestimate their acumen, and ignore criticisms and corrective feedback from others (Chen et al., 2015). Due to their arrogance, self-admiration, and strong sense of personal ability, they may utilize resources inefficiently such as by pursuing grand projects that are flawed, naïve, and/or foolish which may ultimately harm firm performance (Gerstner, König, Enders, & Hambrick, 2013; Hiller & Hambrick, 2005; Sirmon et al., 2007, 2011).

A final literature stream suggests CEO overconfidence may create either “big wins” or “big losses” and there may not be a systematic positive or negative relationship with firm performance (Hiller & Hambrick, 2005). On the positive side, if assumptions and calculations are correct, overconfident CEOs who are prone to make grandiose, bold, and speedy decisions to invest firm resources in activities such as large acquisitions, large-scale new product launches, and aggressive international expansion will lead their firms to first-mover advantage and superior performance (Eisenhardt, 1989; Hiller & Hambrick, 2005). Due to these same grandiose, bold, and speedy decisions, however, resources may be incorrectly or inefficiently utilized leading to below-average performance, substantial losses, and firm failure (Finkelstein, 2004; Hiller & Hambrick, 2005; Invernizzi et al., 2017).

As previously stated, the predicted relationship between CEO overconfidence and firm performance is inconsistent across different theoretical perspectives. Due to this reason, we choose to provide a research question rather than formulate a directional hypothesis to examine the effect of this CEO trait on firm performance.

Research Question 1: (How) Does CEO overconfidence relate to firm performance?

CEO overconfidence–firm performance moderators

Theoretically, the CEO overconfidence–firm performance literatures need to be reconciled; otherwise, researchers and managers may be unable to make useful, actionable decisions regarding this relationship. CEOs have the authority to spend millions or billions of dollars; thus, if our understanding with respect to CEOs’ overconfidence remains unclear, firms may be placed in precarious financial and/or strategic situations. Comprehending why and how CEO overconfidence leads to better or worse performance may also help stakeholders and CEOs mitigate the corrosive effects of trait overconfidence and amplify their beneficial effects. Drawing on contingency theory (Luthans & Stewart, 1977), we suggest environmental influences may limit or enhance the effect of CEO overconfidence on decision-making. A contingency approach is designed specifically to consider relationships among environmental, management, and performance relationships (Luthans & Stewart, 1977). In this research, we are especially concerned with how environmental factors moderate the relationship between CEO overconfidence and firm performance. More specifically, we examine how environmental contingency variables (e.g., national cultures and industry) influence the relationship between CEO overconfidence and firm performance (Engelen et al., 2016; Gerstner et al., 2013; Maccoby, 2003). Our choice of cultural and industry moderators is guided by the principle that CEOs decisions are embedded in multiple external contexts including national culture and industry characteristics as reflected by the person–environment perspective.

National culture

Trait activation theory suggests that traits are more predictive of outcomes when a context (i.e., job, social, organizational, and societal situations) contains trait-relevant cues that activate trait

expression and prompt one to behave in ways consistent with the cues (Tett & Burnett, 2003). For example, employees' conscientiousness is more likely to be activated into responsible and diligent behaviors (e.g., getting assignments done on time and meeting performance goals) if their leaders monitor and reward goal achievement. Consistent with trait activation theory, an approach motivation orientation (Elliot & Covington, 2001; Foster & Brennan, 2011) also supports a set of cultural contextual cues that may influence individuals to act in accordance with cultural cues. National cultural contexts may contain trait-relevant cues that trigger trait expression because national cultures form social norms that define acceptable behaviors within a society (DiMaggio & Powell, 1983; Scott, 2001) and stipulate values that are rewarded (Oh *et al.*, 2014). For CEOs, this culture effect may even dictate whether they are able to make decisions consistent with overconfidence such as investing in risky projects (Li, Sun, Taris, Xing, & Peeters, 2021; Rabl, Jayasinghe, Gerhart, & Kühmann, 2014). Thus, cultural values influence and constrain individual actions and perspectives (Huang & Van De Vliert, 2003), thereby influencing executive decision-making and behavior (Crossland & Hambrick, 2007; Davis, Schoorman, & Donaldson, 1997; Foster & Brennan, 2011).

For example, in countries scoring high on assertiveness, individualism (low collectivism), and performance orientation (emphasizing agency, achievement, and independence – positive self-concepts/trait-relevant cues for society), CEOs' positive self-concepts/traits such as overconfidence are more strongly activated into trait-relevant behaviors (reflected in EO behaviors) which, in turn, may positively affect firm performance. These are important research questions for cross-cultural management, as our study attempts to address whether and how country-level cultural values are related to the micro-foundation of firm performance (i.e., the role of CEO traits in firm performance). Since national culture may also condition the association between CEO overconfidence and firm performance by constraining executive decision-making and behavior (Crossland & Hambrick, 2007; Davis *et al.*, 1997), it is important to investigate how GLOBE cultural dimensions (i.e., performance orientation, uncertainty avoidance, humane orientation, institutional collectivism, in-group collectivism, assertiveness, gender egalitarianism, future orientation, and power distance) moderate the CEO overconfidence–firm performance relationship. We chose GLOBE cultural dimensions, because the GLOBE cultural project offers the most recent and comprehensive cultural classifications of countries developed by a global team of researchers and has been widely applied in prior studies (e.g., Li *et al.*, 2021; Saeed, Yousafzai, & Engelen, 2014).

Research Question 2: (How) Do national cultural dimensions moderate the relationship between CEO overconfidence and firm performance?

Industry

CEO decision-making studies have frequently noted industry environment as a CEO characteristic–firm performance relationship moderator (Crossland & Hambrick, 2007; Finkelstein & Hambrick, 1990; Halebian & Finkelstein, 1993; Hambrick, Geletkanycz, & Fredrickson, 1993). For example, highly dynamic industries, such as high-technology industries, are characterized by the speed and magnitude of change in consumer preferences and behaviors and by their level of market uncertainty; thus, these conditions complicate a CEO's job, present them with information processing challenges, and decrease their ability to influence firm performance (Davis, Eisenhardt, & Bingham, 2009; Halebian & Finkelstein, 1993). However, it is also possible that overconfident CEOs may underestimate industry limitations and/or overestimate their ability to overcome these limitations. In this case, overconfident CEOs may be more likely to pursue aggressive growth or innovation strategies, because they are more likely to underestimate the likelihood of failure (Galasso & Simcoe, 2011).

Prior research has also provided support for CEOs having less decision-making latitude in more munificent, low discretion industries, such as those found in low-technology industries, and that CEO characteristics may be less strongly associated with firm performance in these industries

(Chen et al., 2015). In low-technology industries where uncertainty is low and change is predictable, CEOs have few strategic decisions to make and thus have fewer opportunities to over or under estimate their abilities (Finkelstein & Boyd, 1998). It is possible then that overconfident and less confident CEOs may be similarly influenced by a low-technology industry environment. Additionally, some notable CEO trait studies (Brown & Sarma, 2007; Chatterjee & Hambrick, 2007; Gerstner et al., 2013) have not considered industry contexts. We therefore believe it is theoretically reasonable to examine whether industry characteristics (i.e., high vs. low technology) moderate the CEO overconfidence–firm performance relationship. We chose industry technology level as a moderator because industry technology level is widely known as a major contingency factor in affecting top executives' behaviors, top executives' decisions, firm structure, firm behaviors, and firm performance (Ang, 2008; Makri, Lane & Gomez-Mejia, 2006).

Research Question 3: (How) Do industry characteristics (high vs. low technology) moderate the relationship between CEO overconfidence and firm performance?

CEO overconfidence–firm performance relationship mediator

Researchers have examined how CEO characteristics influence organization performance (Dalton, Daily, Ellstrand, & Johnson, 1998; Halebian & Finkelstein, 1993; Simsek, 2007), yet less is known regarding processes through which CEO characteristics influence firm strategies that ultimately influence performance (Sirmon & Hitt, 2003). Resource orchestration (Sirmon et al., 2011) suggests firm resources (including CEO characteristics such as overconfidence) are not sufficient to explain firm performance differences. Rather, it is important to understand how and why CEOs might use resources at their disposal to influence performance (Sirmon et al., 2007). EO is a key manifestation of how CEOs use firm resources. An excellent example of how firm resources are used to impact firm performance is the work of Wales, Patel, and Lumpkin (2013) who reported that EO partially mediates the relationship between CEO narcissism and firm performance. This finding suggests that EO may be a key mechanism through which CEO traits ultimately influence firm performance. EO is a multidimensional construct describing an organization's strategy-making process including dimensions such as product innovation, proactiveness, and risk-taking (Covin & Slevin, 1991; Rosenbusch et al., 2013). We expect EO to mediate the CEO overconfidence–firm performance relationship because EO is the means by which CEOs apply their managerial decision-making style to direct how resources are used. Thus, EO represents CEOs' resource mobilizing visions as described in the resource orchestration literature (Chirico et al., 2011; Sirmon & Hitt, 2003; Sirmon et al., 2007). For example, overconfident CEOs are inclined to take aggressive and bold strategic actions to aggrandize themselves and to attract attention from others which coincide with the key characteristics of EO such as new product innovation and risk-taking (Lumpkin & Dess, 1996; Wales, Gupta, & Mousa, 2013). Empirical evidence supports this view as overconfident CEOs have made risky decisions to invest resources in innovative activities (Hirshleifer et al., 2012) and acquisitions (Brown & Sarma, 2007). Irrespective of resource limitations, risks, and/or feedback from others, overconfident CEOs are likely to lead their organization to experiment with high-risk, high return ideas to seek admiration from their followers and to affirm their uniqueness and invincibility (Wales et al., 2013). Additionally, overconfident CEOs may underestimate the likelihood of failure and therefore make riskier decisions (Galasso & Simcoe, 2011). Taken together, overconfident CEOs are prone to utilize firm resources in support of EO characteristics such as risk-taking and innovation to impact firm performance, thus suggesting EO may mediate the relationship between CEO overconfidence and firm performance.

Research Question 4: (How) Does EO mediate the relationship between CEO overconfidence and firm performance?

Method

Literature search

To capture all relevant literature, we utilized a series of keywords (and several variations of them) for our search which are comprised of *chief executive officer(s)*, *CEO(s)*, *executive(s)*, *managerial*, *overconfidence*, *overconfident*, *entrepreneurial orientation*, *strategic orientation*, *performance*, *growth*, and *profitability/profit(s)*. We searched electronic databases, and this database list consisted of *ABI/INFORM*, *EBSCO Host*, *Google Scholar*, *ProQuest Dissertations and Theses*, *PsycNET*, *ScienceDirect*, and *Web of Science*. Google Scholar article search captured both published studies and unpublished studies (e.g., unpublished working papers and conference papers) as long as they are available online, thus further ensuring the comprehensiveness of our literature search. We searched relevant journals in accounting, entrepreneurship, finance, management, psychology, and strategic management, and this journal list consisted of *Academy of Management Journal*, *Administrative Science Quarterly*, *Entrepreneurship Theory and Practice*, *Journal of Accounting Research*, *Journal of Applied Psychology*, *Journal of Business Venturing*, *Journal of Finance*, *Journal of Financial Economics*, *Journal of Management*, *Journal of Management Studies*, *Journal of Organizational Behavior*, *Journal of Personality and Social Psychology*, *Leadership Quarterly*, *Organizational Behavior and Human Decision Processes*, *Organization Science*, *Personnel Psychology*, *Strategic Entrepreneurship Journal*, *Strategic Management Journal*, and *The Accounting Review*. We also searched pertinent conference papers.

Inclusion criteria and coding procedures

Studies were included in our meta-analysis when they met the following criteria. First, the studies must be empirical and quantitative; all qualitative studies were excluded. Second, studies must measure the focal CEO trait (CEO overconfidence). Third, studies had to report at least a correlation coefficient between CEO overconfidence and firm performance and/or between CEO overconfidence and EO. We used Lipsey and Wilson's (2001) method to perform effect size conversions when studies failed to report correlation matrices but reported sufficient statistics that allow effect size conversions. After applying these inclusion criteria to winnow the articles identified in the initial search, we found 50 eligible samples ($N = 269,512$) for the CEO overconfidence–firm performance relationship. References for the included studies are provided in supplemental materials.

In addition to coding effect sizes for the main effect as stated above, we also coded a set of moderators, including national cultural dimensions, industry characteristics, firm performance measurements, and CEO overconfidence scales. Since House, Hanges, Javidan, Dorfman, and Gupta (2004) provided scores for national cultural dimensions, we coded national cultural dimensions of each included study according to House et al.'s (2004) GLOBE study based on the country of each included study. While the way that we coded cultural dimensions is an acceptable practice and consistent with the approaches in previous meta-analyses (e.g., Oh et al., 2014) this approach still relies on approximation because it does not take within-culture heterogeneity into consideration by implicitly assuming within-culture homogeneity. We coded nine GLOBE cultural dimensions, including performance orientation, uncertainty avoidance, humane orientation, institutional collectivism, in-group collectivism, assertiveness, gender egalitarianism, future orientation, and power distance. We performed a mean split on the cultural scores and assigned the studies having cultural scores above the mean as the high-level group and the studies having cultural scores below the mean as the low-level group.

Measurement methods for our focal variables (CEO overconfidence and firm performance) vary across studies, suggesting the need to examine measurement methods as a moderator because measurement heterogeneity may influence meta-analytic effect sizes (Miao, Rutherford, & Pollack, 2017b). For example, many studies used the CEO overconfidence measure developed by Malmendier and Tate (2005). There are studies, however, that adapted Malmendier and Tate's (2005) measurement methods to their specific study context. These alternative approaches leave researchers without

empirical evidence as to whether these measurement differences provide consistent or different results. Similarly, measurement of our outcome of interest, firm performance, varies across studies. The important role firm performance plays for researchers and business leaders warrants close attention to how performance is conceptualized and measured (Venkataraman & Ramanujam, 1986). We examine both market and accounting-based performance measures as some researchers may have a personal or domain-specific preference (Hax & Majluf, 1984). Consistent with our reasoning for examining different CEO overconfidence measures, alternative approaches to measuring firm performance leave little empirical evidence as to whether measurement differences provide consistent or different results (Junni, Sarala, Taras & Tarba, 2013). To be consistent with prior research (e.g., Stam, Arzlanian, & Elfring, 2014; Wang et al., 2016), we coded firm performance into the categories of profitability, growth, and market-based performance. Profitability includes studies that used profits as an indicator of performance such as various types of accounting-based measures of profitability. Growth includes performance measures such as sales growth and asset growth. Market-based performance includes performance measures such as Tobin's Q and shareholder return. We coded CEO overconfidence scales into Malmendier & Tate, adapted Malmendier & Tate, and other measures. Some authors revised the original Malmendier & Tate's scale by altering, deleting, and/or adding items from the original scale to generate adapted scales. This was done typically with the goal of improving the original scale and/or to tailor the scale to the research contexts. The category of other measures refers to scales that have little or no link with the original Malmendier & Tate's scale.

We followed approaches recommended by Stam et al. (2014) to classify the included studies into high- and low-technology industries. High-technology industries are characterized by greater technological turbulence and higher dynamism (Stam et al., 2014). Examples of high-technology industries include electronics, while examples of low-technology industries include banks, manufacturing, and restaurants. Two coders independently coded each included study. The initial coding agreement was 95%. Coding disagreements were resolved via discussion and 100% consensus was achieved after discussion.

Meta-analytic procedures

We performed random-effects psychometric meta-analysis (Schmidt & Hunter, 2015) to synthesize the literature. We used two-tailed significance tests to examine nondirectional research questions in our study. As discussed in Cho and Abe (2013), using two-tailed significance testing is at least more conservative than one-tailed significance testing. The input correlations were weighted by sample size when being synthesized via meta-analysis, which means that larger N correlations were given greater weight than small N correlations if all other things are equal. In line with prior research (e.g., Dalton et al., 1998), we used a conservative 0.8 reliability estimate for the objectively measured variables when correcting for measurement errors. We corrected for measurement errors in both independent and dependent variables for each individual effect size. We calculated $\hat{\rho}$ (corrected sample-size-weighted mean correlation) in addition to \bar{r} (uncorrected sample-size-weighted mean correlation). We calculated corrected 95% confidence interval to assess the statistical significance of effect sizes. An effect size is considered to be statistically significant at 0.05 level when a corrected 95% confidence interval of an effect size does not include zero. Given the use of nondirectional hypotheses (research questions), we used a two-tailed significance level of 0.05 (Type I error), which is closely aligned with the use of 95% confidence interval. That is, if the 95% confidence interval does not include zero, we are at least 95% confident that the expected relationship is unlikely to be zero (either positive or negative), thus statistically significant. However, if the 95% confidence interval includes zero, we are less than 95% confident that the expected relationship is non-zero, thus statistically nonsignificant. Both $\text{Var}_{\text{art}}\%$ statistic and corrected 80% credibility interval were computed to examine heterogeneity in effect sizes and the potential existence of moderators. A meta-analytic distribution may be influenced by moderators if statistical artifacts account for less than 75% of the variance in effect sizes (i.e., $\text{Var}_{\text{art}}\% < 75\%$).

We examined moderator effects by performing subgroup analyses (to evaluate the statistical significance of between-group differences in effect sizes) and conducted meta-analytic path analysis to analyze the mediating role of EO (Bergh *et al.*, 2016). The path analyses were performed with maximum likelihood estimation. Relative to bivariate meta-analysis, this technique is preferable as it computes effect sizes that control for other variables in the model and provides the degree of model fit. In addition, it also allows us to test mechanisms in the “Black Box” (i.e., mediating mechanisms) and to compare different nested theoretical models, which are conducive to theory development and theory testing. The harmonic mean sample size was computed because sample sizes differed across the cells in the meta-analytically derived correlation matrices and using harmonic mean sample size is a conservative approach (when sample sizes vary greatly) due to less weight given to large samples (e.g., Colquitt, Scott, & LePine, 2007; Landis, 2013; Miao, Humphrey, & Qian, 2018; Viswesvaran & Ones, 1995).

Results

Main and moderator effects

The main effect for the relationship between CEO overconfidence and firm performance is shown in Table 2. The corrected correlation between CEO overconfidence and firm performance is 0.13, which is positive and statistically significant with a 95% confidence interval ranging from 0.09 to 0.17 (see Table 2). Moderators may exist if statistical artifacts explain less than 75% of the variance in the meta-analytic correlations (Schmidt & Hunter, 2015). The CEO overconfidence–firm performance meta-analytic distribution has a small $Var_{art}\%$ value that is far less than 75% (see $Var_{art}\%$ column in Table 2), thus indicating the potential existence of moderators and justifying moderator testing.

Regarding the first set of moderators – national cultural dimensions, we found that eight cultural dimensions are statistically significant moderators. For instance, subgroup analysis demonstrated that the relationship between CEO overconfidence and firm performance is stronger in high assertive cultures (0.15) than in low assertive cultures (0.05). We repeated the same procedure to analyze each of the cultural dimension moderators and tabulated results in Table 3. The last column in Table 2 also shows moderator testing results.

With regard to the CEO overconfidence–firm performance relationship, this relationship does not vary across low- versus high-technology industries, firm performance measures, overconfidence measures, and low versus high humane orientation cultures. Specific to our industry results, we speculate that overconfident CEOs may self-select into high-technology industries where their overconfidence and subsequent decision-making can maximize “big wins” (Hiller & Hambrick, 2005). Overconfident CEOs are prone to make grandiose, bold, and speedy decisions and these decisions are most likely associated with “big wins” in high-technology industries as opposed to low-technology industries where strategies and performance remain relatively stable over time (Chen *et al.*, 2015; Eisenhardt, 1989; Hiller & Hambrick, 2005). Nevertheless, the relationship between CEO overconfidence and firm performance is stronger in high assertive, low institutional collectivistic, low in-group collectivistic, high future-oriented, high gender egalitarian, high performance-oriented, low power distance, and low uncertainty avoidance cultures.

Mediator effect

We performed meta-analytic path analysis to analyze the mediating effect of EO. We analyzed whether EO mediates the relationship between CEO overconfidence and firm performance (see Fig. 1). We found that the standardized path coefficients from CEO overconfidence to EO ($\beta = 0.20$, $p < 0.001$) and from EO to firm performance ($\beta = 0.27$, $p < 0.001$) are statistically significant. In addition, the indirect effect from CEO overconfidence to firm performance is statistically significant (indirect effect = 0.05, $p < 0.001$). Finally, model fit indices also show good model fit ($\chi^2[1] = 2.754$ ($p = 0.097$), CFI = 0.964, NFI = 0.947, RMSEA = 0.064, SRMR = 0.031). In sum, we found that

Table 2. CEO overconfidence and firm performance meta-analysis results

	<i>k</i>	<i>N</i>	\bar{r}	<i>SD_r</i>	$\hat{\rho}$	<i>SD_ρ</i>	<i>CILL</i>	<i>CIUL</i>	<i>CVLL</i>	<i>CVUL</i>	<i>Var_{art}%</i>	<i>Sig. Dif.</i>
CEO Overconfidence–Firm Performance	50	269,512	0.10	0.12	0.13	0.15	0.09	0.17	-0.07	0.32	1	
Assertiveness												
a. High	38	217,382	0.12	0.13	0.15	0.16	0.09	0.20	-0.06	0.35	1	b
b. Low	11	50,898	0.04	0.05	0.05	0.06	0.01	0.09	-0.03	0.13	8	a
Institutional Collectivism												
a. High	9	46,979	0.03	0.03	0.04	0.04	0.02	0.07	-0.01	0.09	17	b
b. Low	39	218,820	0.12	0.13	0.15	0.16	0.10	0.20	-0.06	0.36	1	a
In-Group Collectivism												
a. High	11	51,241	0.04	0.05	0.05	0.06	0.01	0.09	-0.03	0.13	8	b
b. Low	38	217,039	0.12	0.13	0.15	0.16	0.09	0.20	-0.06	0.35	1	a
Future Orientation												
a. High	38	217,039	0.12	0.13	0.15	0.16	0.09	0.20	-0.06	0.35	1	b
b. Low	11	51,241	0.04	0.05	0.05	0.06	0.01	0.09	-0.03	0.13	8	a
Gender Egalitarianism												
a. High	40	219,250	0.12	0.13	0.15	0.16	0.10	0.20	-0.06	0.36	1	b
b. Low	9	49,030	0.03	0.03	0.04	0.04	0.02	0.07	-0.01	0.09	17	a
Humane Orientation												
a. High	44	240,834	0.11	0.13	0.13	0.16	0.09	0.18	-0.07	0.34	1	-
b. Low	5	27,446	0.06	0.06	0.07	0.07	0.01	0.13	-0.01	0.16	6	-
Performance Orientation												
a. High	40	240,136	0.11	0.13	0.14	0.16	0.09	0.19	-0.06	0.34	1	b
b. Low	9	28,144	0.03	0.07	0.04	0.09	-0.01	0.10	-0.07	0.15	6	a
Power Distance												
a. High	11	51,241	0.04	0.05	0.05	0.06	0.01	0.09	-0.03	0.13	8	b
b. Low	38	217,039	0.12	0.13	0.15	0.16	0.09	0.20	-0.06	0.35	1	a

(Continued)

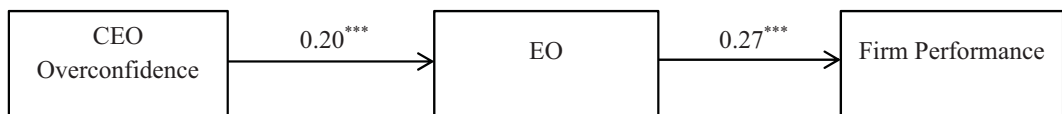
Table 2. (Continued.)

	<i>k</i>	<i>N</i>	\bar{r}	<i>SD_r</i>	$\hat{\rho}$	<i>SD_ρ</i>	<i>CI_{LL}</i>	<i>CI_{UL}</i>	<i>CV_{LL}</i>	<i>CV_{UL}</i>	<i>Var_{art}%</i>	Sig. Dif.
Uncertainty Avoidance												
a. High	8	24,998	0.02	0.04	0.03	0.05	-0.01	0.06	-0.03	0.09	18	b
b. Low	41	243,282	0.11	0.13	0.14	0.16	0.09	0.19	-0.06	0.34	1	a
Industry												
a. High-Technology	2	2,623	0.03	0.00	0.03	0.00	-0.01	0.07	0.03	0.03	100	-
b. Low-Technology	4	14,901	0.14	0.16	0.18	0.20	-0.02	0.37	-0.08	0.44	1	-
Firm Performance Measurement												
a. Profitability	40	246,410	0.11	0.14	0.14	0.17	0.08	0.19	-0.08	0.35	1	-
b. Growth	10	52,173	0.07	0.04	0.08	0.05	0.05	0.12	0.02	0.15	10	-
c. Market-Based Performance	10	58,530	0.10	0.08	0.12	0.10	0.06	0.18	-0.01	0.24	3	-
Overconfidence Scale												
a. Malmendier and Tate	20	58,295	0.06	0.12	0.07	0.14	0.01	0.13	-0.11	0.25	3	-
b. Adapted Malmendier and Tate	20	176,413	0.11	0.11	0.14	0.14	0.08	0.20	-0.04	0.31	1	-
c. Other Measures	10	34,804	0.15	0.16	0.18	0.20	0.06	0.31	-0.08	0.44	1	-

Note. *k* = number of independent samples; *N* = sample size; \bar{r} = uncorrected sample-size-weighted mean correlation; *SD_r* = sample-size-weighted standard deviation of observed mean correlations; $\hat{\rho}$ = corrected sample-size-weighted mean correlation; *SD_ρ* = sample-size-weighted standard deviation of corrected mean correlations; *CI_{LL}* and *CI_{UL}* = lower and upper bounds of corrected 95% confidence interval; *CV_{LL}* and *CV_{UL}* = lower and upper bounds of corrected 80% credibility interval; *Var_{art}%* = percent of variance in $\hat{\rho}$ explained by statistical artifacts; Sig. Dif. = significant difference. Letters in this column correspond to the letters in rows and indicate that effect sizes significantly differ from one another at 0.05 level. The sign “-” shows there is no significant between-group difference. Subgroup analyses are conducted to assess the statistical significance of between-group difference in effect sizes.

Table 3. Summary of meta-analytic results for the CEO Overconfidence–firm performance relationship

CEO Overconfidence–Firm Performance Relationship	Results
Main Effect	The relationship between CEO overconfidence and firm performance is statistically significant and positive.
Moderators	
Assertiveness	CEO overconfidence–firm performance relationship is stronger in high assertive cultures than in low assertive cultures.
Institutional Collectivism	CEO overconfidence–firm performance relationship is stronger in low institutional collectivistic cultures than in high institutional collectivistic cultures.
In-Group Collectivism	CEO overconfidence–firm performance relationship is stronger in low in-group collectivistic cultures than in high in-group collectivistic cultures.
Future Orientation	CEO overconfidence–firm performance relationship is stronger in high future-oriented cultures than in low future-oriented cultures.
Gender Egalitarianism	CEO overconfidence–firm performance relationship is stronger in high gender egalitarian cultures than in low gender egalitarian cultures.
Humane Orientation	CEO overconfidence–firm performance relationship does not differ between high humane-oriented cultures and low humane-oriented cultures.
Performance Orientation	CEO overconfidence–firm performance relationship is stronger in high performance-oriented cultures than in low performance-oriented cultures.
Power Distance	CEO overconfidence–firm performance relationship is stronger in low power distance cultures than in high power distance cultures.
Uncertainty Avoidance	CEO overconfidence–firm performance relationship is stronger in low uncertainty avoidance cultures than in high uncertainty avoidance cultures.
Industry	CEO overconfidence–firm performance relationship does not differ between high-technology and low-technology industries.
Firm Performance Measurement	CEO overconfidence–firm performance relationship does not differ among profitability, growth, and market-based performance measurements.
Overconfidence Scale	CEO overconfidence–firm performance relationship does not differ among Malmendier and Tate, adapted Malmendier and Tate, and other CEO overconfidence measures.
Mediator	
EO	EO fully mediates CEO overconfidence–firm performance relationship.

**Figure 1.** Meta-analytic path analysis results

Indirect effect = 0.05***, $\chi^2(1) = 2.754$ ($p = 0.097$), CFI = 0.964, NFI = 0.947, RMSEA = 0.064, SRMR = 0.031.

Note: Standardized path coefficients are reported. CFI = comparative fit index; NFI = normed fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; EO = entrepreneurial orientation. *** $p < 0.001$.

EO fully mediates the relationship between CEO overconfidence and firm performance. We chose the full mediation model for two reasons. First, the full mediation model is more parsimonious than the partial mediation model. Second, the full mediation model has good model fit and nearly nothing is lost after the removal of the path from CEO overconfidence to firm performance. Hence, a more parsimonious model – the full mediation model – is chosen (Berry, Lelchook & Clark, 2012).

Publication bias analyses

Publication bias (also known as the file drawer effect) represents the degree to which studies with lower effect sizes (correlations) and nonsignificant results are suppressed from publication (put in the file drawer and unpublished/unavailable). To examine the degree to which our meta-analytic results are affected by publication bias, we used Begg and Mazumdar's (1994) rank correlation test and Egger's test of the intercept (Egger, Smith, Schneider, & Minder, 1997). Begg and Mazumdar's rank correlation test indicates the absence of publication bias when the rank order correlation is statistically nonsignificant (Kepes, Banks, & Oh, 2014). Egger's test of the intercept utilized the intercept to examine the presence of publication bias. Publication bias is considered to be absent if the intercept is statistically nonsignificant (Kepes, Banks, & Oh, 2014).

Regarding the distribution of the CEO overconfidence–firm performance relationship, Begg and Mazumdar's rank correlation test yields a correlation of 0.05. This correlation is statistically nonsignificant at the 0.05 level, which shows that publication bias may not exist. Similarly, Egger's test of the intercept produces an intercept of -3.94 , which is also statistically nonsignificant at the 0.05 level. Both tests demonstrated the absence of publication bias for the distribution of the CEO overconfidence–firm performance relationship. In sum, the meta-analytic distribution is robust and is not noticeably influenced by publication bias.

Discussion

Theoretical implications

Researchers studying CEO trait performance effects have reported varied results (e.g., Engelen *et al.*, 2016) perhaps because these CEO traits result in extreme firm performance – either big wins or big losses (Hiller & Hambrick, 2005). This study's purpose then, was to examine the relationship between CEO overconfidence and firm performance. In doing so, our aim was to answer three research questions: (1) is there an overall relationship between CEO overconfidence and firm performance? (2) do cross-cultural and industry conditions moderate the relationship between CEO overconfidence and firm performance? and (3) is EO a mediator of the CEO overconfidence–firm performance relationship? To answer these questions, we meta-analytically assessed the CEO overconfidence literature.

In response to our first research question (is there an overall relationship between CEO overconfidence and firm performance?), our finding demonstrates that CEO overconfidence has a weak, yet statistically significant, positive relationship with firm performance. This result provides some meta-analytic support for upper echelons theory (Hambrick, 2007; Hambrick & Mason, 1984) and addresses a paradox in the executive traits literature (e.g., Engelen *et al.*, 2016). Further, our finding extends prior HRD literatures by providing evidence that personality traits (e.g., overconfidence) influence executive behaviors which subsequently affect firm performance (e.g., Berr, Church, & Waclawski, 2000; Harland, 2003). Despite its small effect on firm performance, we still consider this effect to be practically important. First of all, on a conceptual level, the absolute practical significance of our effect size is reflected by the fact that our criterion of interest is firm (vs. employee or group) performance, which is not only difficult to predict and influence because it is also affected by many extraneous variables which we cannot easily predict (Park & Shaw, 2013), such as economic conditions and pandemic, but also has societal-level implications (for example, when a firm performs well, they tend to invest more, thus creating more jobs and contributing to economic growth and welfare of society in general). Thus, as discussed in Wang *et al.* (2016), “because the outcome is firm financial performance, even “small” effect sizes can have practical significance” (p. 826). Second, typical effect size benchmarks (0.10 = small, 0.30 = medium, 0.50 = strong) have almost no similarity to actual findings in the field (which tend to much lower than the typical rule-of-thumbs). And effect size distributions and benchmarks vary across different research domains or the prediction of different focal outcomes (Bosco, Aguinis, Singh, Field, & Pierce, 2015). Relatedly, these effect size benchmarks and

rule of thumbs are often based on employee- or group-level findings, and, thus, they are not directly applicable to firm-level findings. With all these in mind, one way to better demonstrate the absolute effect size of our findings is using an alternative effect size. As discussed in Wang et al. (2016, pp. 826–827), according to binomial effect size displays (BESD; Rosenthal & Rubin, 1982), the uncorrected mean correlation of 0.10 between CEO overconfidence (assuming there are dichotomies like high versus low levels of overconfidence) and firm performance (assuming successful versus unsuccessful dichotomies) means that companies with CEOs having higher levels of overconfidence have 10% higher success rates than those of other companies (55% success rates vs. 45% success rates). Since the focus of our study is how CEO overconfidence influences firm performance, we compare our result with other meta-analyses that examine either CEOs or top management teams to allow for a suitable comparison because effect size distributions and benchmarks vary across different research domains or the prediction of different focal outcomes (Bosco et al., 2015). For example, according to Bergh et al. (2016), corrected correlations between seven predictors of firm performance were: CEO tenure (0.019), top management team tenure (0.036), top management team diversity (−0.015), top management team size (0.049), board size (0.070), board leadership structure (0.010), and board independence (0.023). Our study reported a corrected correlation between CEO overconfidence and firm performance to be 0.13, which was larger than any of the seven correlations reported in Bergh et al. (2016). Hence, compared to other predictors of firm performance, the performance effect of 0.13 at the firm level may be viewed small in absolute terms yet appears to be practically important in relative terms. In addition to this bivariate relation, we identified sizable CEO overconfidence–firm performance relationship effect size distribution variations, suggesting the presence of moderators. The fact that the moderators didn't alter effect sizes to a noteworthy degree shows further evidence for the consistency with previous research having firm performance as an outcome variable, demonstrating that firm performance is intractable and difficult to influence (e.g., Park & Shaw, 2013). However, it is noted that a majority of meta-analytic distributions across subgroups still have small Var_{art} % values (see Table 2), thus suggesting the presence of further moderators in these meta-analytic distributions. This provides a roadmap for future research to identify more moderators which may influence the effect size distributions for the relationship between CEO overconfidence and firm performance. The findings about moderators are discussed in the following sections.

Results associated with our second research question (do cross-cultural and industry conditions moderate the relationship between CEO overconfidence and firm performance?) revealed several interesting relationships (and statistically nonsignificant relationships). With respect to moderator testing for the CEO overconfidence–firm performance relationship, and consistent with trait activation theory, our results indicate that this relationship is context-dependent on national cross-cultural dimensions. These cross-cultural findings, based on a contingency theory approach, answer the call from prior HRD studies by demonstrating that executive trait research should go beyond the “good-versus-bad” discussion to a more refined “it depends” perspective (e.g., Fatfouta, 2019). Our findings also shed light on the growing body of international HRD research (e.g., Bartlett, Lawler, Bae, Chen, & Wan, 2002; Moon, Choi & Jung, 2012) by demonstrating cross-cultural differences in the CEO overconfidence–firm performance relationship.

With regard to the first cultural dimension – assertiveness – which refers to “the degree to which individuals are assertive, confrontational, and aggressive in their relationships with others” (House et al., 2004, p. 30), we found that the CEO overconfidence–firm performance relationship is stronger in high assertive than low assertive cultures. Overconfident CEOs are inclined to be involved in challenging tasks, to be in control of all activities, and to deviate from proven practices to pursue success (Tang, Qian, Chen, & Shen, 2015); hence, the performance effect of CEO overconfidence is likely to be activated in high assertive cultures where success, progresses, and control over the environment are valued.

In-group collectivism refers to “the degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families” and institutional collectivism refers to “the degree to which organizational and societal institutional practices encourage and reward collective distribution of

resources and collective action” (House *et al.*, 2004, p. 30). High in-group collectivistic and high institutional collectivistic cultures value group loyalty, interest, and interdependence and prioritize relatedness with in-groups. We found that the CEO overconfidence–firm performance relationship is stronger in low institutional collectivistic and low in-group collectivistic cultures. Since overconfident CEOs are inclined to dominate other top management team members (Engelen *et al.*, 2016), their trait overconfidence is likely to be deactivated in high institutional collectivistic and high in-group collectivistic cultures where domination over others is discouraged, thus weakening trait overconfidence’s performance effect.

Future orientation is “the degree to which a collectivity encourages and rewards future-oriented behaviors such as planning and delaying gratification” (House *et al.*, 2004, p. 282). We found that the CEO overconfidence–firm performance relationship is stronger in high future-oriented cultures. Since overconfident CEOs may underestimate the uncertainty of future states of the world and overestimate their certainty about being correct, they are likely to be flexible in making quick entrepreneurial or “out-of-the-box” decisions which a highly future-oriented culture strongly values and promotes (Chen *et al.*, 2015; Engelen *et al.*, 2016; Hiller & Hambrick, 2005), thus activating the performance effect of trait overconfidence.

Gender egalitarianism is “the degree to which a collective minimizes gender inequality” (House *et al.*, 2004, p. 30). We found that the CEO overconfidence–firm performance relationship is stronger in high gender egalitarian cultures. In high gender egalitarian cultures where both men and women enjoy equal workplace opportunities and are expected to undertake dual roles rather than dividing labor along traditional lines (Shockley *et al.*, 2017), this may boost the overall performance effect of overconfidence because both men and women equally benefit from being overconfident in high gender egalitarian cultures.

Performance orientation refers to the degree to which a community supports excellence, innovation, and performance improvement (House *et al.*, 2004; Miao, Coombs, Qian, & Sirmon, 2017a). We found that the CEO overconfidence–firm performance relationship is stronger in high performance-oriented cultures. Overconfident CEOs have a propensity to pursue difficult tasks and entrepreneurial opportunities to enhance firm performance because they are obsessed with their personal abilities to produce success and excellent performance (Engelen *et al.*, 2016). Thus, the performance potential of trait overconfidence will be unlocked in high performance-oriented cultures because such cultures promote and reward the expression of overconfidence.

Power distance refers to the extent of societal acceptance toward power distributions/differences, status privileges, and authority (House *et al.*, 2004). Our result showed a stronger performance effect of CEO overconfidence in low power distance cultures. Followers in low power distance cultures are more willing to share their constructive ideas/advice with CEOs and there may be less CEOs’ dominance in decision-making (i.e., more participative decision-making), thus helping overconfident CEOs make more shrewd decisions and avoid making costly mistakes (She, Li, London, Yang, & Yang, 2020). Thus, the positive performance effect of CEO overconfidence may be enhanced due to improved decision-making processes and idea exchanges in low power distance cultures.

Uncertainty avoidance indicates “the extent to which a society, organization, or group relies on social norms, rules, and procedures to alleviate unpredictability of future events” (House *et al.*, 2004, p. 30). We found that the CEO overconfidence–firm performance relationship is stronger in low uncertainty avoidance cultures. High uncertainty avoidance cultures discourage risk taking due to high levels of formalization and bureaucracy (Covin, Green, & Slevin, 2006; Miao *et al.*, 2017a). The hallmark of CEO overconfidence is risk taking; thereby, cultural norms of high uncertainty avoidance suppress the expression of trait overconfidence.

The moderator effect of humane orientation is statistically nonsignificant, suggesting that the positive CEO overconfidence–firm performance relationship is generalizable across this cultural dimension. Moderator effects of industry technology intensity, firm performance measurement, and overconfidence scales are also statistically nonsignificant, suggesting the generalizability of the positive performance effect of CEO overconfidence across some of these moderator subgroups.

In response to our final research question (is EO a mediator of the CEO overconfidence–firm performance relationship?) our result demonstrates that EO fully mediates the CEO overconfidence–firm performance relationship. This finding supports upper echelons theory because it suggests that CEO personality traits may shape EO, which captures firm strategic actions, and in turn influences firm performance (Hiller & Hambrick, 2005; Miao et al., 2017a; Wang et al., 2016). This finding also supports the notion that overconfident CEOs are more prone to pursue bold entrepreneurial opportunities and navigate firms to take “large-stakes initiatives” to enhance firm performance because they perceive these actions and opportunities to be attractive and likely to produce profits (Wang et al., 2016). Our result also supports previous meta-analytic findings (Miao et al., 2017a) regarding EO as a mediator between both human and social capital and firm performance. Taken together, this finding provides evidence that EO is a primary mechanism through which executives inject their personal characteristics into decisions regarding resource utilization and also provides strong support for the resource orchestration literature (Sirmon & Hitt, 2003; Sirmon et al., 2007, 2011) which aims to open the “Black Box” of executive decision-making by describing how managers structure, bundle, and leverage firm resources to create competitive advantage and increase firm performance.

This mediation finding also has implications for EO research, the resource orchestration literature, and the field of HRD. Previous research suggests that researchers know little about EO’s antecedents (Miao et al., 2017a; Rosenbusch et al., 2013; Wales et al., 2013). Our research contributes to the EO literature by examining a new antecedent – CEO overconfidence. In addition, the resource orchestration literature suggests that EO is a conduit or mobilizing vision via which managers use systems of practices and managerial styles to direct how resources are utilized to impact firm performance (Chirico et al., 2011; Sirmon et al., 2011). Managing change and innovation is an important topic in HRD because change and innovation will foster organizational learning and lead to competitive advantage (Kontoghiorghes, Awbre, & Feurig, 2005). Our research findings contribute to the field of HRD by demonstrating that CEO overconfidence may influence CEO decision-making processes and behaviors to manage change and innovation so as to influence firm performance, but through different mechanisms. Practically speaking, excess belief in one’s own abilities (overconfidence) positively influences firm performance through strategic decision-making (EO). In sum, EO plays a critical role in transmitting the performance effect of CEO overconfidence.

Practical implications

Much of the popular business press describes CEO overconfidence in a negative light (Adams, 2012; Maccoby, 2003; Sahadi, 2018), suggesting that this CEO trait should be avoided. Conflicting research results have added to these concerns. Our meta-analytic findings clarify this relationship, provide useful information, and highlight practical implications for practicing managers, board members, and other stakeholders. First, CEO overconfidence positively influences firm performance because overconfident CEOs cultivate a strategic posture (i.e., EO) that positively influences firm performance. Second, this positive performance effect is stable across firms in industries with different technology intensities and different ways of measuring firm performance (i.e., profitability, growth, and market-based performance). Third, CEO overconfidence has a more pronounced positive performance effect in high assertive, low institutional collectivistic, low in-group collectivistic, high future-oriented, high gender egalitarian, high performance-oriented, low power distance, and low uncertainty avoidance cultures. CEOs in these cultures should capitalize on advantages from these cultural norms in order to unlock the performance potential of their trait overconfidence.

From a practical perspective, HRD professionals, managers, board members, and other stakeholders should clearly understand that corporate leaders such as CEOs are generally more overconfident than the general population (Goel & Thakor, 2008; Young & Pinsky, 2006). Recognizing this fact, board of director members (who themselves are likely to be more overconfident), HRD professionals, and policy makers may consider the following ideas to either benefit from positive aspects, or control negative aspects of CEO overconfidence.

For example, HRD professionals may follow the best practices to administer personality tests and provide executive coaching and/or leadership development opportunities to upper level employees, in order to develop and enhance their self-awareness and help them understand their strengths and weaknesses as a result of their overconfidence (Berr, Church, & Waclawski, 2000; Harland, 2003). Such HRD activities or practices will help senior executives comprehend what dysfunctional behaviors as a result of their overconfidence should be avoided and what functional behaviors due to their overconfidence should be practiced more frequently (Berr, Church, & Waclawski, 2000). Changes to CEO compensation structure may be considered such as increasing incentive compensation for overconfident CEOs to best take advantage of their positive bias toward their organization (Humphery-Jenner, Lisic, Nanda, & Silveri, 2016). In addition, international HRD professionals may consider following the best practices to develop and implement effective executive training programs that have a special focus on cross-culture and psychological traits (e.g., Ballou, Bowers, Boyatzis, & Kolb, 1999; Cherniss, Grimm, & Liautaud, 2010).

Research limitations and directions for future research

First, we only investigated EO as a mediator in the present study. Future research may examine additional mediators such as how CEO overconfidence influences strategic flexibility (i.e., the capacity to adapt quickly to environmental changes). For example, a prior study has examined how Big Five personality traits influence strategic flexibility (Nadkarni & Herrmann, 2010). Since CEO overconfidence is related to change and strategic adaptations, it would be theoretically relevant to test how it influences strategic flexibility. Future research may also examine how CEO overconfidence impacts other firm processes related to change and innovation, such as dynamic capabilities and organizational ambidexterity.

Second, most CEO overconfidence studies only examine direct, indirect, or moderated CEO overconfidence effects, while they largely ignore possible curvilinear effects. According to our research findings, the overall performance effect of CEO overconfidence is positive. However, little is known regarding whether there is a “too much of a good thing” effect of CEO overconfidence. Would firm performance decline if a CEO is too overconfident (i.e., an inverted U-shaped relationship)? Behavioral threshold theory of nonlinear effects suggests that low levels of CEO overconfidence may result in adaptive manifestations of overconfidence that can amplify its performance benefits, whereas high levels of CEO overconfidence may lead to maladaptive manifestations of overconfidence that impair CEOs’ decision-making and detract from firm performance (Grijalva *et al.*, 2015). We encourage future research to examine such curvilinear effects based on Grijalva *et al.* (2015) and Palich, Cardinal, and Miller (2000) to explore the complexity that lies in the relationship between CEO overconfidence and firm performance.

Third, although we tested a series of moderator and mediator variables in our study, our examination is still exploratory due to the lack of relevant studies and theoretical rationales. For these reasons, we call for future studies to develop theory regarding boundary conditions and underlying mechanisms for CEO traits–firm performance relationships.

Fourth, we could have used meta-analytic regression analysis (MARA) for moderator testing as this analysis takes less variance from the analysis as it analyzes continuous, rather than, categorical variables. Although MARA has its strengths, we chose subgroup analyses to test moderator effects in order to be statistically conservative. Since the size of our meta-analytic database is not large enough to be suitable for MARA, performing MARA may subject our results to second-order sampling error. Schmidt and Hunter (2015) warned that the number of studies is the sample size in meta-regression; hence, regression estimates are prone to be influenced by second-order sampling error if the sample size in a meta-regression (i.e., number of studies) is not large enough. Thus, MARA results can be biased and statistically nonsignificant if second-order sampling errors exert noticeable impacts on meta-analytic estimates. In order to address this limitation, we performed subgroup analyses because such analyses have higher statistical power than other meta-analytic moderator analyses (Wang, Oh,

Courtright, & Colbert, 2011). In addition, the number of samples in our meta-analyses is also consistent with the sample requirement of subgroup analyses (i.e., a minimum of 10 samples for the sum of number of samples across all subgroups for a moderator) (Kirca, Hult, Deligonul, Perry, & Cavusgil, 2012).

Conclusion

Using meta-analytic techniques, we examined whether there is a relationship between CEO overconfidence and firm performance based on 50 samples with subjects drawn from multiple countries. Our study confirmed a positive performance effect for CEO overconfidence. A set of possible moderators including industry characteristics, CEO overconfidence measures, and cultural dimensions were examined. The relationship between CEO overconfidence and firm performance varied noticeably across a set of cultural dimensions. Further, our results demonstrate that EO fully mediates the positive performance effect of CEO overconfidence. Our study provides multiple avenues for future research and important practical advice for executive decision-makers.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/jmo.2023.58>.

Competing interests. The authors declare none.

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