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Born to Take Risk? The Effect of CEO Birth Order on Strategic Risk Taking

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BORN TO TAKE RISK? THE EFFECT OF CEO BIRTH ORDER ON STRATEGIC RISK TAKING

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The importance of birth order has been the subject of debate for centuries, and has captured the attention of the general public and researchers alike. Despite this interest, scholars have little understanding of the impact birth order has on CEOs and their strategic decisions. With this in mind, we develop theory that explains how CEO birth order may be associated with strategic risk taking. Drawing from evolutionary theory arguments related to birth order, we theorize that CEO birth order is positively associated with strategic risk taking; that is, earlier-born CEOs will take less risk than later-born CEOs. As evolutionary theory proposes that birth order effects are driven by sibling rivalry, we also argue that this relationship is moderated by three factors related to sibling rivalry: age gap between a CEO and the closest born sibling, CEO age, and the presence of a sibling CEO. Our results provide support for our theorizing and suggest that birth order may have important implications for organizations. We believe this study helps advance strategic management research, the broader multidisciplinary "family science" literature, and the much-needed cross-pollination of ideas between the two.

> "Birth order is a human experience that is one of the most pervasive and universally thought to determine who we are." (Damian & Roberts, 2015: 96)

The importance of an individual's birth order, or the "relative rank of a child in terms of the age hierarchy among siblings in the family," has been of great interest to the public and researchers alike (Steelman, 1985: 354–355). Birth order, which captures early-life experiences within the family domain, has been described as one of, if not the most, fundamental, engrained, and generalizable determinants of individual behavior (Jaskiewicz, Combs, Shanine, & Kacmar, 2017; Sulloway, 1996). Best-selling parenting books and popular press articles have detailed the influence birth order has on children's development and adult behavior (Isaacson & Radish, 2002; Radovanovic & Lebowitz, 2016). Research across disciplines, including education and the health sciences, has also highlighted birth order's influence on diverse behaviors, such as school attendance (e.g., Emerson & Souza, 2008) and smoking (e.g., Juon, Shin, & Nam, 1995).

While birth order captures important early-life family-domain experiences, within upper echelons research, as well as the broader management literature, "this truth has not had much impact" (Jaskiewicz et al., 2017: 309). Theory surrounding the influence of executive experiences on strategic decisions has largely assumed that work-related experiences are of primary importance (Finkelstein, Hambrick, & Cannella, 2009). Considering that the family has been described as the "most important and enduring of all human social groupings" (Smith, 2009: 5), there is reason to believe that this limited focus may be problematic. This is especially true given that evolutionary theory logic suggests that early-life family experiences, which birth order captures, shape an individual's tendency to engage in behaviors in childhood that persist throughout life

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and, as we theorize, into the executive suite (Suitor & Pillemer, 2007; Sulloway, 1996).

We thus attempt to shift the CEO experiences literature to the family domain by developing theory to explain how CEO birth order influences CEOs' strategic decisions, specifically strategic risk taking. Evolutionary theory (Darwin, 1968) suggests that humans adapt to their environment over time to survive. One birth order–related adaptation is sibling rivalry (Buss, 2007; Sulloway, 1996). Humans developed the tendency to engage in sibling rivalry since historically many children did not survive to adulthood (Buss, 2007). By engaging in sibling rivalry siblings compete for parental investment, which may lead to resource allocation differences that historically increased the likelihood of survival (Buss, 2007; Sulloway, 1996).

When engaging in sibling rivalry, siblings use different behaviors to increase their parents' investment in their welfare; birth order drives these behavior choices. Specifically, siblings use different behaviors so that they fulfill "niches" within the family to garner additional parental resources (Plomin & Daniels, 1987; Wang, Kruger, & Wilke, 2009). Evolutionary theory suggests that birth order is a powerful determinant of the behaviors siblings use in this rivalry (Steelman, 1985; Sulloway, 1996). Indeed, birth order "causes siblings to experience family relationships in dissimilar ways and to pursue different ways of maximizing their parent's investment" (Sulloway, 2001: 40). As a result of birth order, different behavioral tendencies become engrained (Sulloway, 1999, 2001) and "persist into adulthood" (Suitor & Pillemer, 2007; Sulloway & Zweigenhaft, 2010: 414).

Building on this logic, we theorize that birth order is positively associated with an individual's penchant for risk taking. Evolutionary theory logic suggests that an individual's birth order directly relates to the tendency to engage in risky behaviors (Sulloway & Zweigenhaft, 2010). Parents invest more in earlier-born children and these individuals have a greater tendency to "not take unnecessary chances [or risks]" (Grable & Joo, 2004: 81). In contrast, later-born children tend to receive less parental investment and resources (Hertwig, Davis, & Sulloway, 2002). Evolutionary theory thus suggests that younger siblings are more likely to engage in risky behaviors to try to "recalibrate parental investment in their favor" (Sulloway & Zweigenhaft, 2010: 414). As scholars suggest that one's birth order influences their risk-taking propensity, we theorize that this tendency to engage in risky behaviors carries over into the executive suite, such that the later a CEO's birth order, the more strategic risk they will take.

We also examine the boundaries of CEO birth order by developing theory regarding moderators. As moderators can provide evidence for a theorized mechanism (Baron & Kenny, 1986; Shi, Zhang, & Hoskisson, 2017)—in our case, sibling rivalry—we theorize about moderators that scholars have suggested tap into sibling rivalry (e.g., McNerney & Usner, 2001; Stocker, Lanthier, & Furman, 1997). Specifically, we theorize that the extent to which sibling rivalry was present in childhood, as indicated by the age gap between a CEO and the closest sibling, will impact the extent to which birth order effects were engrained—amplifying the main effect. We suggest that the extent to which childhood sibling rivalry is recalled, which we assess using CEO age, will impact the main effect. Finally, we theorize that the extent to which sibling rivalry is ongoing, as indicated by having a sibling CEO, will amplify the main effect.

We test our theory in the context of family-controlled business groups in South Korea, which are collections of legally independent firms operating across multiple industries bonded together by formal (e.g., equity) and informal (e.g., family) ties (Khanna & Yafeh, 2007). This organizational form comprises a significant portion of family firms, which is the most common type of business in the world (La Porta, López de Silanes, & Shleifer, 1999; Villalonga & Amit, 2010). Indeed, business groups are a prevalent organizational form across much of Asia, Europe Latin America, and the Middle East (see Table 1), allowing our findings to generalize to a large portion of global businesses (Colpan, Hikino, & Lincoln, 2010). To enhance generalizability, we also include quotes from two U.S. sibling CEOs we interviewed and, in a supplemental analysis, find support for our theory in a small sample of U.S. public firm CEOs.

Our study makes four main contributions. First, we shift the theoretical conversation around executive experiences toward the family domain and an important construct that captures early-life family domain experiences—birth order. In focusing on birth order, we also introduce a characteristic that captures early-life experiences that may shape executives' strategic decisions. In fact, to better understand birth order's generalizability, we searched for and found studies demonstrating birth order differences in the 15 largest world economies (see Table 2). Thus, unlike some CEO characteristics that may occur and be interpreted differently across

TABLE 1
Family Business Group Representation Around the World

Country	Family Group %	Family Group Market Cap %	Country GDP Rank
Argentina	19.48	11.03	21
Belgium	24.39	28.50	24
Brazil	20.91	15.31	8
Canada	5.16	13.15	10
Chile	46.19	44.52	41
Colombia	48.21	52.13	39
Demark	9.73	20.06	35
France	11.19	9.20	7
Greece	20.00	19.06	51
Hong Kong	15.63	26.29	33
India	29.31	22.63	6
Indonesia	29.70	53.07	16
Israel	40.09	23.22	31
Italy	19.24	26.34	9
Malaysia	17.03	38.51	37
Mexico	26.24	49.47	15
Pakistan	22.87	9.89	40
Peru	21.53	43.09	49
Philippines	45.95	30.23	38
Portugal	23.08	9.94	46
Singapore	10.69	41.11	36
Sri Lanka	66.67	43.88	64
Sweden	20.41	25.66	22
Thailand	21.72	47.06	25
Turkey	50.00	46.43	17

Notes: These data were sourced from Masulis, Pham, and Zein (2011). Family group % refers to the percentage of all listed firms in a country that belong to a business group. Family group market cap % refers to the proportion of aggregate market capitalization attributable to business groups. Country GDP rank data were taken from WorldBank (2017b).

cultures (Foster, Campbell, & Twenge, 2003; Hofstede & McCrae, 2004),[1] birth order seems to generalize and generate similar effects worldwide.

Second, drawing on evolutionary theory, we respond to calls to leverage "family science" theories in management, given the enduring importance of family. Our theory and findings have broad implications, as a CEO's birth order should impact risk taking across organizational forms. Indeed, our primary and supplementary analyses provide evidence that birth order impacts the strategic risk taking of CEOs in business groups and public firms. Our moderated finding regarding sibling CEOs, however, is of particular importance for family firms and business groups, where siblings are more often CEOs of separate public firms (Carney, 2008).

Third, we develop theory around birth order moderators. While scholars have suggested that birth order effects are contingent, birth order research has been criticized for its "failure to assess the role of relevant moderator variables" (Sulloway & Zweigenhaft, 2010: 413). We address this by theorizing and finding that birth order effects are amplified when sibling rivalry during childhood may have been intense and when ongoing sibling rivalry is present, which we suggest age gap with siblings and presence of a sibling CEO captures, respectively. Finally, we advance understanding of strategic risk taking, which is a core strategic decision and the focus of much corporate governance research (e.g., Eisenhardt, 1989; Wiseman & Gomez-Mejia, 1998).

THEORETICAL BACKGROUND

Upper Echelons Theory

Research on CEO experiences has primarily drawn on upper echelons theory (Hambrick & Mason, 1984). Utilizing the concept of bounded rationality (Cyert & March, 1963), "the idea that informationally complex, uncertain situations are not objectively knowable, but rather are merely interpretable" (Hambrick, 2007: 334), this theory suggests that executives filter and interpret situations facing their firms based on their characteristics (Hambrick & Mason, 1984). As such, upper echelons theory assumes that executive characteristics are related to strategic decisions.

Building on this theory, CEO characteristics research has largely developed along two lines (Finkelstein et al., 2009). First, scholars have examined the relation between psychological properties and strategic decisions. These studies have focused on executive personality captured through the Big Five dimensions (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010), as well as other personality constructs, such as narcissism, hubris, and overconfidence (e.g., Chatterjee & Hambrick, 2007; Chen, Crossland, & Luo, 2015). More recent work in this area has focused on CEOs' values, such as political ideology (e.g., Christensen, Dhaliwal, Boivie, & Graffin, 2015), and cognitive aspects, such as temporal disposition (e.g., Chen & Nadkarni, 2017).

The second line of research, and our focus, theorizes about the influence of experiences on strategic

[1] For instance, a culture's individualism influences the likelihood, as well as the interpretation, of narcissism (e.g., Foster, Campbell, & Twenge, 2003). Further, Hofstede and McCrae (2004) found that the prevalence of various personality traits is endogenous to certain cultural dimensions.

TABLE 2
Studies Examining Birth Order's Global Influence

Author(s) and Year	Country	Country Rank (GDP)	Findings
Gilliam and Chatterjee (2011)	United States	1	Later-borns more willing to make risky investments
Xu and Zheng (2014)	China	2	Later-borns more likely to have homosexual orientation
Kusunoki et al. (2012)	Japan	3	Later-borns have less risk of food allergies
Härkönen (2013)	Germany	4	Birth order has a negative effect on educational attainment
Green and Griffiths (2014)	United Kingdom	5	Later-borns have greater risk of post traumatic stress disorder
Adli, Louichi, and Tamouh (2010)	France	6	Positive relationship between birth order and educational achievement
Jayachandran and Pande (2017)	India	7	Positive relationship between birth order and height disadvantage
Bacci, Bartolucci, Chiavarini, Minelli, and Pieroni (2014)	Italy	8	Positive relationship between birth order and birth weight
Emerson and Souza (2008)	Brazil	9	Positive relationship between birth order and school attendance
Davis (1997)	Canada	10	Negative relationship between birth order and status orientation
Juon et al. (1995)	South Korea	11	Later-borns more likely to smoke than earlier-born boys
Rohde et al. (2003)[a]	Russia	12	Last-born child more likely to be the parents' favorite
Milne and Judge (2009)	Australia	13	Later-borns have first sexual experience at younger age
Bertoni and Brunello (2016)[a]	Spain	14	Later-borns switch jobs earlier and more frequently
Lafortune and Lee (2014)[a]	Mexico	15	Birth order negatively related to years of education

[a] Study contained samples from multiple countries. Country rank based on WorldBank (2017b).

decisions. These studies have generally focused on work-related experiences captured by job tenure; exposure to different functional areas, industries, or countries; and formal education (Finkelstein et al., 2009). Executive tenure has largely been related to cognitive inertia (e.g., Luo, Kanuri, & Andrews, 2014), whereas functional background research has centered on the idea that it provides a lens through which executives interpret business problems (e.g., Crossland, Zyung, Hiller, & Hambrick, 2014). Similarly, research on managers' international experience (e.g., Daily, Certo, & Dalton, 2000) and on formal education has focused on how such experiences impact executives' information filtering and ultimately their decisions.

While research on executive experiences has enhanced our understanding of CEOs' strategic decisions, family science research, in particular evolutionary theory logic on birth order, has suggested that the limited focus on CEOs' work-related experiences may be problematic. Indeed, the family has been described as the "most important and enduring of all human social groupings" (Smith, 2009: 5); thus, these experiences may have important implications—even for CEOs. In particular, we suggest that family domain experiences may influence how CEOs perceive and react to their environment.

Birth order captures fundamental early-life family experiences that come with growing up under the care of parents along with siblings (Jaskiewicz et al., 2017; Sulloway, 1996). In addition, scholars have suggested that birth order might impact CEOs' strategic decisions (Jaskiewicz et al., 2017). We thus advance theory on executive experiences by developing new theory surrounding the family and birth order—a topic to which we now turn.

Birth Order and Evolutionary Theory

Birth order research has a storied history. Most trace its roots to Sir Francis Galton, who noticed that first-borns were overrepresented among renowned English scientists (Galton, 1874). This insight caught the attention of two prominent psychologists, Sigmund Freud and Alfred Adler, who developed competing birth order perspectives. Freud's birth order research centered on psychoanalysis and sexual desires (Daly & Wilson, 1990), while Adler linked birth order with neuroses, with first-born and last-born children being more likely to develop neuroses (Adler, 1928). As a first-born child, Freud took offense to Adler's theory, and so, birth order became a cause of "one of the most heated scientific disputes of all time" (Damian & Roberts, 2015: 96).

Birth order research remains a popular topic; scholarly explanations, however, have shifted to an

evolutionary theory perspective, which is based on the concept of evolution—change over time in living structures among species (Buss, 2007). Darwin (1968) is credited with introducing evolutionary theory, but other scholars set the stage for his research. Lamarck (1809) noted that species change, suggesting that giraffes developed long necks to reach high leaves. Further, early evolutionists suggested that many animals had adaptations; for example, turtles have protective shells and porcupines have quills to fend off predators (Buss, 2007).

Missing from early research, however, was an explanation of how these adaptations develop. Drawing on Malthus (1798) regarding the principles of population, Darwin (1968) provided an answer. Darwin (1968: 13) recognized that, "More [organisms] are produced than can possibly survive," and so, "there, must [. . .] be a struggle for existence;" he thus introduced the concept of natural selection, a process whereby organisms adapt and change over time to increase their ability to survive in the environment. Building on Darwin (1968), scholars have investigated a number of adaptations, or "inherited or reliably developing characteristic[s] that came into existence through natural selection" to help with an adaptive problem for an organism's ancestors (Buss, 2007: 39; see also Tooby & Cosmides, 1992).

An adaptation related to birth order is sibling rivalry, which is driven by conflict between siblings over parental investment (Hamilton, 1964; Trivers, 1974). Indeed, as Buckley (2005: 295) noted, "family life is filled with frequently gory and often fatal struggles between offspring." Added parental investment results in resource allocation differences that may increase a child's likelihood of survival (Sulloway, 1996). Thus, because "children cannot survive without parental help" (Buss, 2007: 68), sibling rivalry deals with the survival problem.

Research has noted the prevalence of sibling rivalry across species. In some species, siblings increase their suckling to drain their mother's milk to the detriment of their siblings, and some bird species siblings jockey for food (Buss, 2007; Royle, Hartley, Owens, & Parker, 1999). The most extreme form of rivalry is infanticide, whereby an organism kills its kin. Indeed, "infanticide, long considered a rare and aberrant phenomenon, has turned out to be widespread among insects, fish, birds, and mammals" (Sulloway, 1996: 61). Sand sharks, for example, often devour one another while in the mother's womb until only one shark is left alive (Sulloway, 1996). Further, among some bird species it is common for siblings to try and exclude siblings from the nest, or even poke each other to death (Buss, 2007; Sulloway, 1996).

Human sibling rivalry, while typically less extreme, is still consequential. Historically, many children did not survive to adulthood. As Buss (2007: 62) noted, "Our ancestors. . .did not have it so easy. Many obstacles lay between waking up hungry and dozing off at night with a full belly." Humans thus engage in sibling rivalry to compete for parental investment because differences in parental investment and resources, such as food, historically increased a child's likelihood of survival (Sulloway, 1996).

Birth Order and Sibling Rivalry

The primary driver of sibling rivalry is birth order (Sulloway, 1996). Birth order is thought to be a powerful determinant of behaviors siblings use in this rivalry (Steelman, 1985: 354–355). Due to differences driven by birth order, research has suggested that siblings develop tendencies to use specific behaviors to fill niches within the family, which may help them gain parental attention and resources (Sulloway, 1996). Indeed, birth order "causes siblings to experience family relationships in dissimilar ways and to pursue different ways of maximizing their parent's investment" (Sulloway, 2001: 40). Evolutionary theory research has thus concluded that birth order fundamentally shapes how individuals tend to behave, and is thus "one of the ultimate causes of [. . .] development" (Sulloway, 2001: 40) regardless of an individual's gender (e.g., Argys, Rees, Averett, & Witoonchart, 2006; Badger & Reddy, 2009).

This tendency to utilize certain behaviors associated with birth order "foster[s] individual differences in terms of how individuals can be expected to behave" (Wang et al., 2009: 79). Different tendencies to use specific behaviors are thus "developed in childhood, as part of niche differentiation, including differences arising from disparities in parental investment" (Sulloway & Zweigenhaft, 2010: 413). Research has also suggested that these behavioral differences "persist into adulthood" (Sulloway & Zweigenhaft, 2010: 414), including for samples with individuals in their 60s and even their 90s (Jefferson, Herbst, & McCrae, 1998; Suitor & Pillemer, 2007).

Further, "the underlying psychological mechanisms [. . .] are not culture specific" (Denny, 2004: 13), and these effects seem to generalize across countries and cultures. Scholars have found support

for birth order differences in a diverse set of countries, such as Australia (Davis, 1997), Brazil (Milne & Judge, 2009), China (Xu & Zheng, 2014), India (Emerson & Souza, 2008), and South Korea (Juon et al., 1995). Consistent with this idea, we found research showing birth order effects in each of the top 15 global economies (see Table 2).

Building on this logic surrounding birth order, scholarly research traditionally focused on developing theory and empirically testing its association with the Big Five personality traits, and subsequent behaviors these traits influence (Sulloway, 1995). A growing body of research, however, has also suggested that birth order influences an individual's risk-taking propensity, an important and stable aspect of personality outside of the Big Five[2] (Frey, Pedroni, Mata, Rieskamp, & Hertwig, 2017; Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005) that indicates an individual's tendency to engage in risk across contexts. For example, birth order has been shown to be positively associated with risky behaviors, such as risky adolescent behaviors (Argys et al., 2006), participation in risky sports (Nisbett, 1968), and risky financial decisions (Gilliam & Chatterjee, 2011). Meta-analytic evidence, albeit in the sports context, has suggested that birth order's relationship with risk-taking propensity may even be stronger than its relationship with other personality aspects, such as the Big Five (Sulloway & Zweigenhaft, 2010)

CEO BIRTH ORDER AND STRATEGIC RISK TAKING

Risk taking is a core CEO decision; thus, the notion that birth order may be related to risk taking is consequential for scholars and practitioners. Indeed, above and beyond being a core decision, numerous corporate governance mechanisms, such as executive compensation and board of directors composition, are intended to influence CEOs' strategic risk taking (e.g., Eisenhardt, 1989; Wiseman & Gomez-Mejia, 1998). We thus develop theory about CEO birth order and its relationship with strategic risk taking.

We theorize that CEO birth order relates to strategic risk taking because birth order influences the extent to which individuals may engage in risky behaviors to deal with sibling rivalry and foster their niche within the family to gain parental attention and resources. This tendency to engage in risky behaviors in childhood should become engrained and, as previous studies have found, become a key driver of an individual's risk propensity, which "persist[s] into adulthood," influencing subsequent behaviors (Sulloway & Zweigenhaft, 2010: 414).

In considering what behaviors siblings use to deal with sibling rivalry and gain parental favor, we theorize that the earlier a sibling is in the birth order, the less they will attempt to garner parental investment and thus the lower their tendency to engage in risky behaviors to carve out a niche. Scholars have noted that earlier-born children tend to be endowed with greater parental resources (Hertwig et al., 2002). This is partly because older siblings "tend to be larger, stronger, and more intellectually developed" than their younger siblings (Freese, Powell, & Steelman, 1999: 211). As a result, earlier-born children tend to get their own way, which grants them easier access to resources (Beck, Burnet, & Vosper, 2006; Hotz & Pantano, 2015). Because earlier-born children are endowed with greater resources, there is less need for them to try to gain favor by engaging in risky behaviors. They are thus expected to have a lower risk-taking propensity. As Grable and Joo (2004: 81) noted, parents invest more in earlier-born children so they tend to act more responsibly and do "not take unnecessary chances [or risks]."

Later-born siblings, in contrast, tend to receive less parental investment and resources (Hertwig et al., 2002), and thus, we theorize, will take greater risks to establish a niche to gain attention and material support. Scholars have noted that, "In a Darwinian world," risk taking is "adaptive wherever the chances of survival or reproduction are limited" (Sulloway & Zweigenhaft, 2010: 414). This makes sense, given that the costs of risk taking are reduced when life expectancy is lower (Daly & Wilson, 1990; Wang et al., 2009). Relative to older siblings, younger siblings historically faced lower life expectancies. Puffer and Serrano (1973), for example, found that fifth-borns have "2 to 3 times the mortality rates of firstborns in many Latin American countries" (as cited in Sulloway & Zweigenhaft, 2010: 403). Similar mortality rates have been found in other developed countries (Hertwig et al., 2002).

Evolutionary theory perspective on birth order thus suggests that the later a sibling is in the birth order, the greater their tendency to engage in risky behaviors to try to convince parents to "recalibrate

[2] While research has indicated that risk propensity is a personality trait outside the Big Five, research has also indicated that sublevel aspects of the Big Five, such as sensation seeking, are facets of risk propensity (e.g., Nicholson et al., 2005).

parental investment in their favor or, failing that, as a way of compensating for reduced parental investment" (Sulloway & Zweigenhaft, 2010: 414). Specifically, Bertoni and Brunello (2016: 265) suggested that "later-borns are put under greater pressure to obtain the same returns from more limited resources and thus need to take riskier moves."

Research across varying contexts and samples has illustrated the positive relationship between birth order and risk taking. Indeed, research has noted that a striking finding from birth order research is that siblings differ in "risk preferences as much as strangers" (Wang et al., 2009: 79). Argys et al. (2006), for example, found that birth order is positively associated with risky adolescent behaviors—stealing, carrying a gun, and using marijuana. Similarly, Juon et al. (1995) found that later-born South Korean high school students are more likely to smoke, while Jobe, Holgate, and Scrapansky (1983), in a sample of U.S. military males, found that later-borns are more likely to volunteer for a risky experiment.

Researchers have also explored how birth order influences risky sports outcomes. A number of studies (e.g., Nisbett, 1968) have found that birth order is positively related to playing risky sports (e.g., football and rugby). Meta-analytically, Sulloway and Zweigenhaft (2010) found that younger-born siblings are 1.5 times more likely to participate in risky sports. Scholars have also found that birth order is related to risky behaviors when playing a sport. Alberts and Landers (1977), for example, found that later-borns are more likely to take the risk to jump from a height of 1.8 meters. In a sample of Major League Baseball (MLB) players, Sulloway and Zweigenhaft (2010) found that younger siblings are 10.6 times more likely than older siblings to attempt the high-risk activity of base-stealing.

Scholars have also examined the relationship between birth order and risk taking in the business context. Gilliam and Chatterjee (2011), for example, surveyed students and found that later-borns were more willing to make risky investments. Morgan (2009) examined financial investments decisions, and found that later-borns tend to take greater financial risks and are more willing to gamble for a higher payoff. Further, Bertoni and Brunello (2016) found that later-borns switch jobs earlier and more frequently due to their tendency to engage in risky behaviors.

If individuals engage in behaviors suggested by their birth order, and sibling differences in risk-taking propensity do persist into adulthood (Sulloway & Zweigenhaft, 2010), then a CEO's birth order should be associated with the strategic risk CEOs take in the executive suite. Indeed, CEOs often make strategic decisions that involve risk—i.e., decisions that are highly uncertain and have a potential for negative returns—thus, CEO birth order should play a role such that the later a CEO's birth order, the more strategic risk they should take. In support of this notion, we interviewed two U.S. sibling CEOs who each led firms with over $1 billion in annual sales, and the later-born sibling noted that he is "more of a risk taker." We thus theorize:

Hypothesis 1. CEO birth order is positively associated with strategic risk taking; that is, later-born CEOs will take more risk than earlier-born CEOs.

MODERATING EFFECTS OF SIBLING RIVALRY

While we theorize a direct effect of CEO birth order on strategic risk taking, scholars have suggested that birth order may be influenced by moderators (e.g., Sulloway, 1999). However, birth order research has been criticized for its "failure to assess the role of relevant moderator variables" (Sulloway & Zweigenhaft, 2010: 413). We thus develop new theory about moderators of CEO birth order and strategic risk taking. As evolutionary theory proposes that birth order effects are driven by sibling rivalry (Sulloway, 1996), we theorize that the extent to which sibling rivalry was present during childhood, the extent to which childhood sibling rivalry is recalled, and the extent to which sibling rivalry is ongoing will moderate the relationship between CEO birth order and strategic risk taking. Developing theory about moderators that capture facets of sibling rivalry allows us to provide further evidence for the theorized mechanism suggested in our first hypothesis, and also provides better understanding of the boundary conditions of CEO birth order (Baron & Kenny, 1986; Shi et al., 2017).[3]

Sibling Rivalry During Childhood

As birth order effects develop during childhood (Sulloway, 1996), it follows that the extent to which sibling rivalry was present during this period should

[3] Baron and Kenny (1986: 1178) noted that there is "wide variation in the strategic functions served by moderators." They state, "a moderator has been useful in suggesting a mediator variable." Thus, our moderators that attempt to tap sibling rivalry help provide evidence that this mechanism is driving our results.

influence the degree to which the behavioral tendencies become engrained and influence an individual's risk-taking propensity (Kidwell, 1981). That is, sibling rivalry is the key mechanism behind birth order effects—these effects exist because siblings, in vying for a favorable niche within the family, compete differently based on the order in which they are born. If there is greater jockeying for parental attention and resources during childhood, niche-differentiation behaviors based on birth order should be more engrained. Accordingly, we theorize that the effect of CEO birth order on strategic risk taking will be amplified under conditions of greater childhood sibling rivalry. On the other hand, if an individual's childhood featured little sibling rivalry, birth order–based niche differentiation among siblings should have been less salient, and, we theorize, the relationship between CEO birth order and strategic risk taking should thus be weakened.

We theorize that closest sibling age gap, or the number of years in age between an individual and his or her closest sibling (Freese et al., 1999), captures the extent of childhood sibling rivalry. Research has suggested that age gap influences the extent to which siblings need to compete with one another during childhood and thus use behaviors to fulfill niches in pursuit of parental attention (Sulloway, 2001). When the age gap between siblings is small, siblings are more likely to have to compete for scarce resources and parental attention (Stocker et al., 1997). Indeed, Badger and Reddy (2009: 47) stated that "the closer in age two [. . .] siblings are, the more likely it is that there will be competition between them," and Stocker et al. (1997) specifically found that age gap is negatively correlated with conflict between siblings. This is logical, as small sibling age gaps were traditionally associated with higher infant mortality (Sulloway, 1996). The greater competition between siblings closer in age thus likely promotes mutual "differentiation as a way of avoiding direct conflicts" (Healey & Ellis, 2007: 56)—a condition that amplifies birth order–based differences among siblings.

Siblings further apart in age should have less of a need to compete for parental resources, however, as "constraints on the time that parents can spend with their children will [. . .] be less severe if the births of children are spread out over a longer time period" (De Haan, 2010: 583), and thus it should be easier for parents to meet children's needs if they are widely spaced (Lasko, 1954). Further, "Greater birth spacing between siblings helps to reduce sibling rivalry: there is less resource competition, and it is more likely that the elder sibling will support the younger sibling" (Badger & Reddy, 2009: 47). Research on birth order has thus suggested that as the age gap between siblings becomes larger, siblings feel less of a need to compete for the attention of parents, which mutes the influence of birth order (Sulloway, 1999).

In sum, smaller age gaps with siblings intensifies sibling rivalry during childhood, as well as the salience of niche differentiation behaviors among siblings. As there is more competition among siblings with small age gaps, later-borns in particular should be more likely to develop the tendency to engage in risky behaviors to create their own niche and compete for parental attention when they also have a small age gap with their siblings. This suggests that the effect of CEO birth order on strategic risk taking will be stronger when the gap between siblings is smaller, and weaker when the gap is larger. We thus theorize:

Hypothesis 2. The positive relationship between CEO birth order and strategic risk taking is moderated by the age gap between a CEO and the closest-born sibling, such that the relationship is strengthened when the age gap is smaller and weakened when the age gap is larger.

Recall of Sibling Rivalry

The extent to which childhood sibling rivalry is recalled, we theorize, also influences the relationship between CEO birth order and strategic risk taking. Indeed, the birth order literature has suggested that individuals are most likely to adhere to the behaviors associated with their birth order when they recall "patterns of behavior learned within the family," namely the sibling rivalry experienced during childhood (Sulloway, 2007: 176).

A factor that may predict the extent to which sibling rivalry is recalled is age. Research has suggested that age directly influences CEOs' strategic risking. In fact, scholars have suggested that due to emotional aspects, such as the desire to protect their wealth, CEO risk taking diminishes with age (e.g., Prendergast & Stole, 1996; Wiseman & Gomez-Mejia, 1998). Scholars have found conflicting results with respect to this relationship (e.g., Buchholtz & Ribbens, 1994; Serfling, 2014). Researchers have found a positive relationship between age and CEO risk taking (e.g., Hitt & Tyler, 1991; Li & Tang, 2010) and no effect of age on risk taking (e.g., Chatterjee & Hambrick, 2011; Kish-Gephart & Campbell, 2015). Results of a meta-analysis, however, suggested that

CEO age generally has a negative effect on risk taking (Wang, Holmes, Oh, & Zhu, 2016).

While we recognize that research has suggested there may be a direct effect of CEO age on strategic risk taking, we theorize instead that CEO age moderates the direct effect of birth order on risk taking. Though many birth order studies have focused on younger samples, scholars have argued that because birth order effects become engrained, these effects persist throughout their lives. Consistent with this idea, research has suggested that even among mothers over 65 years old, birth order differences persisted in terms of which child they would trust in a crisis and the child with whom they felt the closest emotional attachment (Suitor & Pillemer, 2007). Similarly, in a sample of individuals aged 59–94, much like in younger populations, later-borns scored higher on openness to experience and agreeableness (Jefferson et al., 1998).

While scholars have suggested that birth order differences endure throughout life, research has also suggested that these effects weaken over time. That is, age impacts the recall of sibling rivalry as well as the emotional intensity associated with the recall, and thus attenuates the relationship between birth order and risk taking. The competition for parental investment is "at its peak during childhood and adolescence" (Damian & Roberts, 2015: 97) because children are dependent on their parents for resources and thus are most likely to engage in sibling rivalry and use risky behaviors to differentiate themselves from siblings and carve out their niche (Sulloway & Zweigenhaft, 2010). In support of this notion, McNerney and Usner (2001) found that sibling rivalry peaked between the ages of 10–15 and reduced as people aged, and Scharf, Shulman, and Avigad-Spitz (2005) noted that conflict and rivalry were also reported by emerging adults to be less intense than by adolescents.

Further, individuals tend to be more independent and less reliant on parental resources as they age (Harris, 2000), and they may be less inclined to recall the sibling rivalry and utilize the risky behaviors suggested by their birth order. Indeed, because behaviors that were "once relevant for survival in the family context in early years may no longer be relevant once the child leaves the family environment" (Damian & Roberts, 2015: 97), there is likely to be less emotional intensity associated with the recall of childhood sibling rivalry. Scholars have suggested that as people age they have a greater tendency to seek out individuals with whom they share the longest history—their siblings—to engage in life review (Goetting, 1986). This is a final chance to resolve rivalries and emotional baggage from childhood (White, 2001). Older siblings tend to lay to rest unresolved childhood rivalries (Goetting, 1986), and "people's memories become rosier with time and distance from childhood conflicts, and thus they let go of jealousy and competition" (Greif & Woolley, 2016: 70). We therefore expect that the influence of birth order on risk taking is reduced with age due to the cognitive and emotional aspects related to the recall of childhood sibling rivalry.

Consistent with this idea, research has suggested that while birth order effects persist later in life, the effects weaken over time (e.g., Suitor & Pillemer, 2007). Indeed, Cicirelli (1982: 278) concluded that "the weight of evidence from most sources indicates a lessening of rivalry with age." Specifically, based on a sample of individuals ranging in age from 59–94, Jefferson et al. (1998) found that the effects of birth order were weaker than observed in studies with younger samples. Similarly, in their meta-analysis of risk taking in sports, Sulloway and Zweigenhaft (2010) found that studies of children had larger effects than those of adults and adolescents. Further, Myers and Goodboy (2006) found that the perceived use of verbally aggressive messages between siblings, a potential indicator of sibling rivalry, decreases across the lifespan.

We thus suggest that as CEOs age, they may be less likely to recall the sibling rivalry and associated risky behaviors utilized in their childhood, and that the emotional intensity of recalled sibling rivalry will be weaker. While we accept the imprinting effects of birth order reported in prior studies, we suggest that the potency of these effects diminishes as CEOs age, such that the relationship is stronger for younger CEOs and weaker for older CEOs. More formally:

Hypothesis 3. The positive relationship between CEO birth order and strategic risk taking is moderated by CEO age, such that the relationship is strengthened when CEOs are younger in age and weakened when CEOs are older in age.

Ongoing Sibling Rivalry

While the tendency to use risky behaviors associated with birth order develops during childhood, we theorize that the underlying mechanism of sibling rivalry may be amplified in situations in adulthood that facilitate ongoing sibling competition. Scholars have suggested that birth order effects are dependent on "whether or not certain attitudes and sentiments

about the family"—specifically sibling rivalry—"are tapped in ways that make them salient" (Sulloway, 2007: 162). Indeed, Sulloway and Zweigenhaft (2010) suggested that birth order differences may be more context sensitive than previously believed. Building on this logic, we theorize that the intensity of an ongoing rivalry with siblings amplifies the relationship between birth order and risk taking.

A factor that may be indicative of an individual's ongoing sibling rivalry in adulthood is whether they have a sibling in the same career and position. Sibling rivalry can become salient in adulthood when siblings have the same job because "habits of mutual monitoring and social comparison formed in the course of competition for parental recognition during the early childhood period" can "influence adult sibling relationships and rivalry" (Ko & Park, 2017: 3). This is especially relevant as it relates to siblings having the same career and position. Scholars have noted that "achievement is the dimension of rivalry *par excellence,*" and that adulthood achievement takes the form of professional success (Ross & Milgram, 1982: 238). In terms of having the same career and position, Bexley (2017: 1) noted, "when you choose to take the same career path as your sibling, you are almost asking for comparisons to be made all through your life. There's no doubt that [. . .] will make you more competitive." Sulloway and Zweigenhaft (2010) similarly suggested that adult behaviors continue to be sensitive to sibling rivalry when two siblings are in the same career and position.

Research across contexts has supported the idea that sibling rivalry intensifies when siblings have the same career and position. McNerney and Usner (2001), for example, found that sibling rivalry peaked when siblings were each focused on similar tasks. Further, in a study of MLB players, having a sibling who also played professional baseball amplified sibling rivalry (Sulloway & Zweigenhaft, 2010). Specifically, playing in a similar athletic position tended to increase competition among siblings (Sulloway & Zweigenhaft, 2010). Justin Upton, a player in MLB whose sibling, Melvin, is a professional baseball player who plays the same position, said, "having an older brother to try to catch up to just added a little more fire under my butt. That's what drove me" (Jones, 2007)—we theorize similar effects for CEOs.

For a CEO, having a sibling who also works as a CEO should promote greater sibling rivalry and thus amplify birth order's relationship with risk taking. Research has found rivalry between siblings in the business context. For example, Levinson (1971: 382) described the influence of sibling rivalry in firms, stating that, "the rivalry [. . .] which began in childhood, continues into adult life" and "can reach such an intensity that it colors every management decision." A few studies on family businesses, where having a sibling who is also a CEO is somewhat common,[4] have also corroborated this idea. Research, for example, has suggested that sibling relationships drive rivalry as sibling managers compete for power and status in family firms' leadership (Kaye, 1991; Sorenson, 1999). More relevant to our theorizing, Ko and Park (2017: 1) suggested an "intense rivalry between sibling CEOs," that influences CEOs' strategic actions. In further support of our theorizing, one of the two aforementioned sibling CEOs we interviewed noted that he and his brother were "competitors in most activities that we both did," and that his brother "was in big business and made a lot more money than I. . .so, possibly there was competition there."

Given the heightened sibling rivalry experienced when a CEO has a sibling who is also a CEO, we theorize that the relationship between CEO birth order and strategic risk taking will be stronger compared to instances when a CEO does not have a sibling CEO. We thus theorize:

Hypothesis 4. The positive relationship between CEO birth order and strategic risk taking is moderated by the presence of a sibling CEO, such that the relationship is strengthened when a CEO has a sibling who is a CEO and weakened when a CEO does not have a sibling who is a CEO.

METHODS

Context

We tested our theory in the context of family-controlled business groups in South Korea known as Chaebols,[5] and specifically the publicly traded firms

[4] While having a sibling CEO is common in family firms, especially business groups, it also occurs in nonfamily firms. Indeed, we found seven recent instances where siblings simultaneously served as CEO of large U.S. public firms (FBCG, 2017). For example, Denise Morrison was the CEO of Campbell Soup and Maggie Wilderrotter (her sister) was the CEO of Frontier Communications.

[5] Chaebols are South Korean business groups that consist of multiple private or publicly traded companies, typically owned and managed by a family dynasty. In 2015, the largest Chaebols consisted of an average of approximately 28 affiliated companies. Some prominent examples of Chaebols are Hyundai, Samsung, and the LG Group. These Chaebol-affiliated companies have many similarities to U.S. public companies that are family controlled.

within such groups. There were three main reasons for this choice. First, family firms, and more specifically business groups, are ubiquitous around the world. Research has shown that the Western conception of organizations (i.e., nonfamily firms with dispersed shareholders), on which management research has largely focused, is less common than believed (Feldman, Amit, & Villalonga, 2016; Patel & Cooper, 2014). Family firms comprise the majority of publicly traded firms in the world, even in the United States, where widely held corporations are thought to pervade (Feldman et al., 2016; La Porta et al., 1999; Villalonga & Amit, 2009, 2010). Indeed, research has noted that family firms make up at least two thirds of all businesses around the world and generate approximately 70–90% of global GDP (FFI, 2018).

A large portion of family-controlled firms are business groups, or collections of legally independent firms operating across multiple industries bonded together by formal (e.g., equity) and informal (e.g., family) ties (Khanna & Yafeh, 2007). Indeed, business groups are a prevalent organizational form across much of Asia, Europe, Latin America, and the Middle East (Colpan et al., 2010). In fact, as illustrated by Table 1, business groups are common in many of the top global economies in the world, and in South Korea in particular the top five business groups alone account for 51% of the country's market capitalization (Bloomberg, 2018). Our context thus captures much of South Korea's economy—the 11th largest economy in the world—and allows our findings to generalize to a substantial portion of global businesses.

Second, our setting is suitable for our proposed theory since it allows observation of ongoing sibling rivalry, a mechanism relevant to our theorizing (Sulloway, 2001). In family business groups, multiple siblings tend to be involved (Carney, 2008), with some serving as CEOs of independent firms at the same time—a condition we argue contributes to ongoing sibling rivalry. Our context is thus well suited for tests of CEO birth order that not only examine its impact on strategic decisions, but also elucidate the underlying sibling rivalry mechanism.

Finally, this context allows us to overcome significant data collection challenges. To test our hypotheses, we required detailed family background information, such as birth order, family size, and age and gender of each sibling, for a large number of CEOs for whom we could also collect matching data on strategic risk taking and other control variables. It was infeasible to collect this data through surveys because of generally low response rates by executives (Cycyota & Harrison, 2002) and the sensitive nature and amount of data we needed. In South Korea, however, it is possible to obtain detailed personal information about the families behind business groups because of the level of scrutiny they are subject to by the public. In particular, media and research organizations have traced these families' histories across several decades and made this information publicly available through news articles and books (Han, Shipilov, & Greve, 2017). At the same time, however, we were able to largely replicate our results in a small sample of United States–based CEOs, which we discuss in our supplementary analyses.

While the use of data on South Korean business groups enables the advantages mentioned above, prior studies have recommended that research using international samples should consider how the context may influence the theories being tested (Nadkarni & Herrmann, 2010). We acknowledge the need for such consideration, as the ideas we drew from to develop our theory may be impacted by our context. Therefore, we next discuss how our context may influence (1) the effects of birth order and (2) the effects of CEOs on firm strategy.

Study context and the effects of birth order. A potential concern is whether birth order–related predictions can be applied to the South Korean context. In this regard, we note again that our arguments about CEO birth order are rooted in evolutionary theory. Notions of niche partitioning (Sulloway, 2001) are universal, are not thought to be driven by unique cultural nuances, and can even be applied to the behaviors of nonhuman species, such as sharks or birds (Buss, 2007). We thus agree with Denny's (2004: 17) view that as it relates to birth order, "the underlying psychological mechanisms [. . .] are not culture specific." To examine this assertion further, we sought studies of birth order differences in the top 15 economies in the world. As reported in Table 2, we found studies in each of these countries that support birth order differences across a broad range of outcomes. This review suggests that birth order differences are ubiquitous and not necessarily bound by cultural or national borders.

Nevertheless, some specific aspects of the South Korean context are worth highlighting for their potential influence on birth order differences and sibling rivalry. One aspect is the Confucian culture of deference toward one's elders (primarily parents, but also older siblings) within the family (Kim, Atkinson, & Yang, 1999; Pyke, 2005). This tendency could potentially serve to mitigate overt sibling rivalry and reduce the likelihood of observing significant CEO birth order effects based on sibling rivalry. Counter to this argument, however, is the fact that in family firm

settings, there is a tendency for siblings to compete vigorously with each other, often for the rights to succession of the company or the broader business group (Kets de Vries, 1993; Peng & Jiang, 2010). South Korean media also closely scrutinizes and dedicates a great deal of attention to business groups and the sibling rivalry occurring within family firms, so it is also possible that this unique cultural aspect might further intensify sibling rivalry (Han et al., 2017). With arguments that would support the case for both a subdued and amplified sibling rivalry effect based on contextual nuances, it is difficult to proclaim *a priori* whether our context makes it more or less likely to find significant birth order effects. However, as we point out above, prior research has suggested that birth order effects are not culturally specific.

Study context and CEO effects. Another point to consider is the extent to which CEOs in South Korea can affect firm outcomes. It has been well established in the upper echelons literature that managerial discretion, or the latitude of action given to executives (Hambrick & Finkelstein, 1987), varies across cultural contexts. Crossland and Hambrick's (2007, 2011) framework predicts variance in CEO effects across countries. For instance, South Korean CEOs' discretion may be limited as the strong cultural norms of collectivism restrict the individual initiative that CEOs can exercise (Gelfand, Bhawuk, Nishii, & Bechtold, 2004), and a tendency toward uncertainty avoidance also typically restricts CEOs' leeway (Schwartz, 1994). Further, South Korea's legal system inhibits CEOs' influence over stakeholders (Johnson, La Porta, Lopez-de-Silanes, & Shleifer, 2000), and the relatively low labor flexibility reduces the latitude of action CEOs have over their employees (Estevez-Abe, Iversen, & Soskice, 2001). Bearing out these arguments, industry experts and academics have rated South Korean CEOs as having low levels of managerial discretion compared to CEOs in other countries (Crossland & Hambrick, 2011).

Our choice of empirical context can thus be justified on the basis of generalizability, observation of theoretical mechanisms, and data availability. This setting also allows for a fairly conservative test of our hypotheses given South Korean CEOs' limited discretion, which may make it more difficult to find a relationship between a CEO characteristic and strategic outcome.

Sample and Data Sources

For data on birth order and characteristics of CEOs' families, we relied primarily on *The Chaebol of Korea: The management structure and personal network of Korean Chaebols* (Kim, Kim, Paik, Jeong, Paik, & Yoo, 2005), which details major business families in South Korea based on extensive research, including information on the names and birthdates of the founders, their descendants, and their relatives. To supplement this source and keep the family trees up to date, we searched news articles, obituaries, and other sources as needed. We obtained other firm- and CEO-level data from databases of the Korea Information Service (KIS), the largest credit rating agency in the country, and the Korea Listed Companies Association (KLCA) (e.g., Han et al., 2017; Lee & Song, 2012; Siegel, 2007). Acquisition data were obtained from SDC platinum.

To construct our dataset, we sampled firms affiliated with the largest Chaebols as identified by the Korea Fair Trade Commission. We then identified cases in which members of the Chaebol families served as CEOs of these publicly traded firms during 1999–2015. After accounting for missing data, we arrived at a sample of 71 CEOs across 67 firms, and a final sample size of 503 CEO-years. It is noteworthy that all CEOs in our sample are males, but this is not surprising given that South Korea ranks low in global studies of gender equality (e.g., it was recently ranked 116th in the world) (World Economic Forum, 2016). While we observe no female CEOs in our sample, unfortunately the underrepresentation of female CEOs is consistent with many settings across the world, including the United States (Favaro, Karlsson, & Neilson, 2014).

Dependent Variable: Strategic Risk Taking

Consistent with prior research, we measured strategic risk taking by aggregating three major outlays typically associated with uncertain and potentially negative returns: capital expenditures, research and development (R&D) spending, and acquisitions (Chatterjee & Hambrick, 2011; Sanders & Hambrick, 2007). Capital expenditures and R&D spending were obtained from the KLCA database, and acquisitions were measured as the transaction value of all completed acquisitions as reported in SDC platinum. We aggregated these risk-taking indicators instead of treating them as separate dependent variables because these spending categories often substitute for each other. For example, a firm may expand its product portfolio through an acquisition instead of through R&D investments. We formed a risk-taking index by logging the sum of the three different types of risky spending to create an aggregate indicator (Chatterjee & Hambrick, 2011).

Independent Variables

CEO birth order. To obtain our sample of CEOs, we used the KISLINE database, which lists executives according to their rank within the company. The CEO was identified as the person ranked number 1 within each company (Chang & Shin, 2006). This treatment of the most senior executive of a business group–affiliated firm as CEO is consistent with prior research (Crossland & Hambrick, 2011). It is important to note that the head of the entire business group (i.e., the group chairman) is typically distinct from the CEO at the publicly traded firm level. For example, the current group chairman of the Samsung Group is Lee Kun-hee, but the CEO of Samsung Electronics, a publicly traded firm in the Samsung Group, is Kwon Oh-hyun. Similar to CEOs in other contexts, our CEOs have broad influence over the entire firm, so they are also distinct from division heads, whose influence typically is more limited within the organization.

The CEO birth order variable was coded as the order in which CEOs were born to their parents. It took the value of 1 for a first-born, 2 for a second-born, 3 for a third-born, etc. Following prior studies (e.g., Booth & Kee, 2009; De Haan, 2010), we treated birth order as a continuous variable in our regression models predicting strategic risk taking. This approach allows interpretation of the linear effects of increases or decreases in birth order and avoids the loss of information caused by forcing birth order to be a categorical or discrete variable. This approach, however, hinges on the assumption that there is a generally linear relationship between birth order and the outcome (strategic risk taking), and that deviations from linearity in the relationship between birth order and strategic risk taking are not significant. We therefore conducted Wald tests to assess this assumption statistically (Pasta, 2009). Two different ways of operationalizing birth order were tested. The first was to treat all the observed birth orders as different discrete categories. In our case this lead to seven categories given that the birth orders of CEOs in our sample ranged from first to seventh. The second method was to treat birth order as comprising of three categories: first-born, middle-born, and last-born.

In both cases, the test of deviation from linearity entailed entering the continuous birth order variable simultaneously with the categorical variables in a generalized estimating equations (GEE) model predicting strategic risk taking (Long & Freese, 2006). The number of dummy variables entered should be two less than the number of categories (i.e., five dummies for the seven-category measure of birth order and one dummy in the case of the three-category measure). According to these tests, neither the seven-category measure nor the three-category measure of birth order was statistically significant. This led us to conclude that the continuous treatment of birth order is preferred, as its deviations from linearity were not statistically significant (Pasta, 2009; Williams, 2016).

Closest sibling age gap. This variable was measured as the number of years between the focal CEOs and their closest sibling (e.g., Buckles & Munnich, 2012). When the focal CEO was a first-born, the closest sibling was the immediate younger sibling. In cases where an individual had a younger and older sibling, we determined the closest sibling based on their birthdates.

Presence of sibling CEO. We measured presence of sibling CEO as a binary indicator that takes the value of 1 when a sibling of the focal CEO was simultaneously a CEO of another independently traded firm (this occurred for 37% of our CEO-year observations). This determination was made based on the executives list provided in the KIS database. All of the sibling CEOs in our sample are males.

CEO age. We captured CEO age by subtracting the focal year from the CEO's birth year.

Controls

We included several CEO-level control variables in our models. As birth order studies have noted, it is critical to control for the number of siblings (Belmont & Marolla, 1973; Booth & Kee, 2009). Family size is inevitably correlated with birth order, so it is not possible to isolate the effects of one without accounting for the other. We thus controlled for CEOs' *number of siblings* (logarithm was taken) in our regression models. Because the extent of sibling rivalry may depend on the gender composition of the siblings one grew up with, we controlled for CEOs' *number of female siblings* (logarithm was taken). *CEO ownership*,[6] measured as the proportion of total outstanding shares held by a CEO, was included as it may be related to a CEOs' decision-making power within a firm, as well as the

[6] While, ideally, we would have also controlled for CEO compensation more broadly, these data are not available in our empirical context. Compensation data for individual executives in South Korea were undisclosed traditionally, and were made partially available in 2013 (due to changes in regulation). Even these newly disclosed data, however, were incomplete and unsuitable for our analyses, since compensation disclosure is required only for executives paid in excess of 500 million won (approximately 500,000 U.S. dollars) (Kim, Lee, & Shin, 2017).

incentive to engage in risk taking. We accounted for economic conditions during CEOs' upbringing, as it may influence their level of narcissism and in turn their risk tendencies (e.g., Bianchi, 2014). In contrast to the mostly stagnant economy prior to the 1960s, South Korea experienced an extremely rapid "rags-to-riches" transformation of the economy from the 1960s until the 1980s that has been called the "Korean Miracle" (Kim, 1995). Therefore, we included a dummy variable that indicates whether the CEO was *born during an economic upswing* (i.e., 1960s-1970s).[7] To account for potential sibling competition within the same firm, *presence of sibling executive* was controlled for as a binary variable that takes the value of 1 if there is at least one executive in the firm who is a sibling of the CEO.

Several firm-level controls were also included in our empirical models. We included *firm size*, measured as logged total assets. We also controlled for two different forms of firm performance: *return on assets* (net income over total assets) and *Tobin's Q* (the ratio of market to book value). To account for governance mechanisms known to influence firm risk taking (Lim & McCann, 2014), we accounted for *board size* (logged number of board members) and *proportion of outside board members* (number of outside members divided by total number of board members). We also controlled for *presence of female director* (binary indicator that takes the value of 1 if at least one woman sits on the board), as it has a known influence on strategic risk taking (e.g., Post & Byron, 2015). Because of their relatedness to firm-level risk, we also included *financial leverage* (measured as a ratio of total liabilities to total sales) and *stock market β* (e.g., Bromiley, Rau, & Zhang, 2017). All models also included *year fixed effects* and *industry fixed effects* (industry classification is based on two-digit industry codes) to account for unobserved heterogeneity across different time periods and business domains.

Estimation Techniques

As we noted, we sampled family CEOs of public firms associated with Chaebols. This choice may have introduced a potential sample selection bias, because even within Chaebol-affiliated firms there are many instances in which nonfamily professionals serve as CEOs. Although a random sample that included both family and nonfamily (professional) CEOs would have been ideal, this was infeasible because comprehensive family background data (e.g., birth order, number of siblings) were not available for nonfamily CEOs. We therefore adopted a Heckman two-stage model to account for potential bias due to our nonrandom CEO sampling.

Our first-stage probit model (i.e., selection model) predicted the presence of a family CEO in our full collection of 1,170 CEO-year observations, which includes family and nonfamily CEOs of our Chaebol-affiliated firm sample. One challenge in properly specifying our first-stage model was identifying exclusion restrictions that are correlated with the likelihood of presence of a family CEO but not with strategic risk taking (Heckman, 1979). We included two exclusion restrictions.

Our first exclusion restriction is the business group chairman's number of children. This exclusion restriction is suitable for our purposes because it should be related to the selection bias we are seeking to correct (i.e., the selection of only family CEOs), as more children means that there should theoretically be a higher likelihood of a family CEO, while it should be uncorrelated with our outcome variable (i.e., strategic risk taking). Consistent with these expectations, we find in our data that the business group chairman's number of children is not significantly correlated with firm-level strategic risk taking ($r = -.03$; $p = -.31$).

Following Bennedsen, Nielsen, Pérez-González, and Wolfenzon (2007), we also used the gender of the Chaebol chairman's first child (binary variable coded as 1 for sons) as an exclusion restriction. Prior research has suggested that there may be a relationship between the gender of top executives and strategic risk taking, although the effects are typically small (Jeong & Harrison, 2017). In this study, however, we are measuring the gender of the group chairman's first child. While chairmen's first children (especially those who are males) have a higher likelihood of reaching the upper echelons based on norms of primogeniture, this is not always the case. As such, we do not expect this variable to be associated with a firm's strategic risk taking, making it a suitable exclusion restriction. Consistent with this logic, our data indicate that there is a nonsignificant correlation between the first child of the business group chairman being a son and firm-level strategic risk taking ($r = -.05$; $p = .16$).

[7] In addition to these controls, we examined the impact of step siblings from another marriage. We identified three CEOs in our sample that grew up with half siblings due to their father having more than one spouse. Our findings are unchanged regardless of whether we include a dummy variable to control for these CEOs or drop these CEOs from our analyses.

This first-stage model also included firm performance, firm size, firm age, industry dummies, and year dummies as predictors, and robust standard errors were used. As expected, the business group chairman's number of children had a positive and significant influence on the presence of a family CEO ($p < .01$), as did whether the business group chairman's first child was a son ($p < .01$). The coefficient for firm performance ($p < .01$) was also positive and significant. Since the business group chairman's number of children and gender of first child each predict the presence of family CEO, and are not significantly correlated with our dependent variable (i.e., strategic risk taking), the exclusion restriction criteria are satisfied (e.g., Feldman, Gilson, & Villalonga, 2013). The inverse Mills ratio generated from the predicted values of this model was included in the second-stage GEE models, which we discuss below.

In our second-stage models, we tested our hypotheses using GEEs given the nonindependent nature of the observations in our panel data. This technique is well suited for our purposes because it accounts for unobserved heterogeneity across firms and CEOs, as well as autocorrelation due to repeated measurements of these subjects over time (Liang & Zeger, 1986). Unlike random effects models, which require that unobserved heterogeneity across firms and CEOs is uncorrelated with the predictor variables, GEE does not rely on these strong assumptions (Liang & Zeger, 1986). Fixed effects models were infeasible because they do not estimate parameters for time-invariant variables, which in our case included our key independent variable, CEO birth order. Given these differences, GEE is often used in longitudinal research on time invariant CEO characteristics (Chatterjee & Hambrick, 2007, 2011; Petrenko, Aime, Ridge, & Hill, 2016). We specified an identity link function, Gaussian family, and first-order autoregressive correlation structure for all of our GEE models. Furthermore, we used robust standard errors to account for potential misspecification of the correlation structure and heteroskedasticity (Hardin & Hilbe, 2003).

To mitigate concerns of reverse causality, we lagged all predictor variables by one year. We also mean-centered the continuous variables included in the interaction terms (i.e., CEO age and closest sibling age gap) to mitigate multicollinearity problems.

RESULTS

The descriptive statistics and correlations for the key variables are reported in Table 3. CEO birth order is significantly correlated with number of siblings ($r = .37$), which is expected since a later birth order is possible only to the extent that family size increases. Research has shown that because these two variables inevitably share variance, it is important to account for both at the same time to understand the independent effects of each (Behrman & Taubman, 1986; Belmont & Marolla, 1973). The number of siblings variable is logged, so it is worth noting that CEOs in our sample, on average, have about five siblings. This average family size is much higher than what has typically been observed in recent years. It is not surprising, however, given that the CEOs in our sample were typically born in the 1940s–1950s in South Korea; this large family size is in line with what is expected based on global and local trends during that period (Kwon, Lee, Chang, & Yu, 1975; World Bank, 2017a). Further, all of the sampled CEOs had at least one sibling, and we were thus able to analyze relative birth order without having to account for only-child effects.

To investigate potential multicollinearity affecting our results, we calculated a variance inflation factor (VIF) for each model. Average VIFs were less than 3.2 in all models, and the maximum value for any variable was 6.6, which is well below the typical threshold of 10 (Cohen, Cohen, West, & Aiken, 2013). The zero-order correlation between CEO birth order and strategic risk taking is insignificant. However, there are correlates of both the independent and dependent variable that should be controlled for to fully understand the relationship; therefore, looking at bivariate correlations may not provide great insight into birth order's impact on risk taking. Indeed, this is consistent with prior birth order research, as well as prior CEO characteristics research, that have found small or nonsignificant bivariate correlations, but significant, practical effects in multivariate models (e.g., Black, Devereux, & Salvanes, 2005; Chen, Crossland, & Huang, 2016; Gamache, McNamara, Mannor, & Johnson, 2015). We now turn to the results of the GEE models.

Table 4 reports the GEE models predicting strategic risk taking with our predictors. In Hypothesis 1, we predicted that CEO birth order would positively influence risk taking. According to Model 1 of Table 4, CEO birth order has a positive and statistically significant influence on strategic risk taking ($b = .17$; $p < .05$), and this holds across Models 2–4, which include our interaction terms, and Model 5, which includes all interaction terms. Because our outcome variable (strategic risk taking) is

TABLE 3
Descriptive Statistics and Correlations

		Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Strategic risk taking[a]	19.27	1.78																	
2	CEO birth order	2.97	1.80	−0.04																
3	Closest sibling age gap	2.65	1.41	−0.03	0.30															
4	CEO age	59.81	9.69	0.06	−0.14	0.01														
5	Sibling CEO	0.37	0.48	0.00	0.08	−0.02	0.04													
6	Number of siblings[a]	1.47	0.52	0.06	0.37	−0.05	0.42	0.21												
7	Number of female siblings[a]	0.99	0.52	−0.05	0.43	0.06	0.18	−0.09	0.62											
8	CEO ownership	0.08	0.13	−0.12	−0.16	−0.04	−0.03	−0.12	−0.01	0.08										
9	Sibling executive presence	0.12	0.33	0.08	−0.03	0.00	−0.15	0.15	−0.11	−0.07	−0.05									
10	Born during economic upswing	0.15	0.35	−0.05	0.11	0.12	−0.60	−0.12	−0.37	−0.16	0.07	0.11								
11	Firm size[a]	14.48	1.33	0.78	−0.14	−0.09	0.10	0.07	0.06	−0.10	−0.13	0.06	0.00							
12	Tobin's *Q*	0.56	0.64	0.11	0.23	0.14	−0.11	0.03	0.05	0.07	−0.11	0.01	0.28	0.16						
13	Return on assets	0.05	0.06	0.19	0.21	0.08	0.00	0.05	0.16	0.02	−0.13	0.02	−0.02	0.12	0.40					
14	Female director presence	0.01	0.09	0.04	−0.04	−0.03	0.06	−0.07	0.00	0.00	0.00	−0.03	0.09	0.04	0.14	0.02				
15	Board size[a]	2.12	0.33	0.41	−0.05	0.11	0.09	−0.10	0.03	−0.04	−0.01	0.13	−0.09	0.34	−0.06	0.12	−0.02			
16	Outside director proportion	0.38	0.18	0.39	−0.10	−0.05	0.03	0.12	0.00	−0.09	−0.07	0.05	0.13	0.59	0.19	0.01	0.12	0.02		
17	Stock market β	0.91	0.40	0.38	−0.17	−0.03	0.02	−0.03	−0.01	−0.02	−0.05	0.05	−0.06	0.51	0.09	0.09	0.06	0.22	0.35	
18	Financial leverage	0.89	1.26	−0.07	−0.11	−0.03	−0.07	−0.03	−0.04	−0.04	0.13	−0.02	0.05	0.00	−0.10	−0.24	0.10	−0.08	0.04	0.13

Note: Correlations greater than |.08| are significant at $p < .05$.

[a] Natural logarithm.

TABLE 4
GEE Models Predicting Strategic Risk Taking ($t + 1$)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	4.46**	4.56**	4.79**	4.48**	4.88**
	(0.99)	(1.05)	(0.99)	(0.96)	(1.00)
Closest sibling age gap[a]	−0.11*	0.25†	−0.12*	−0.11*	0.18
	(0.06)	(0.15)	(0.06)	(0.05)	(0.13)
Sibling executive presence	0.31	0.34	0.37	0.30	0.38†
	(0.22)	(0.23)	(0.22)	(0.21)	(0.22)
Sibling CEO	0.01	−0.05	0.01	−0.55*	−0.47†
	(0.14)	(0.14)	(0.14)	(0.26)	(0.26)
Number of siblings	−1.00**	−1.06**	−1.05**	−0.94**	−1.05**
	(0.34)	(0.34)	(0.32)	(0.33)	(0.31)
Number of female siblings	0.52	0.47	0.46	0.43	0.36
	(0.40)	(0.40)	(0.41)	(0.39)	(0.40)
CEO stock ownership	0.58†	0.56	0.61*	0.45	0.49
	(0.31)	(0.36)	(0.30)	(0.35)	(0.38)
CEO age[a]	−0.00	0.00	0.01	−0.00	0.02
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Born during economic upswing	−0.93**	−0.84**	−1.04**	−0.82**	−0.87**
	(0.26)	(0.25)	(0.30)	(0.23)	(0.26)
Firm size	0.94**	0.92**	0.93**	0.97**	0.95**
	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)
Tobin's Q	0.20*	0.23*	0.20*	0.28**	0.28**
	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
Return on assets	0.26	0.81	−0.01	−0.12	0.14
	(1.74)	(1.74)	(1.77)	(1.69)	(1.75)
Presence of female director	0.23	0.41	0.12	0.15	0.21
	(0.33)	(0.41)	(0.32)	(0.29)	(0.35)
Board size	0.68*	0.64**	0.69**	0.65**	0.62**
	(0.27)	(0.24)	(0.27)	(0.24)	(0.22)
Outside director proportion	0.40	0.45	0.47	0.36	0.47
	(0.42)	(0.42)	(0.43)	(0.40)	(0.41)
Stock market β	−0.04	−0.06	−0.03	−0.04	−0.05
	(0.18)	(0.19)	(0.18)	(0.19)	(0.19)
Financial leverage	0.02	0.02	0.02	0.02	0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Inverse Mills ratio	0.27	0.88	0.10	0.09	0.47
	(0.52)	(0.62)	(0.51)	(0.50)	(0.57)
CEO birth order	0.17*	0.20**	0.17**	0.08†	0.12**
	(0.07)	(0.06)	(0.06)	(0.04)	(0.05)
CEO birth order × Closest sibling age gap[a]		−0.09*			−0.07*
		(0.03)			(0.03)
CEO birth order × CEO age[a]			−0.01		−0.00
			(0.00)		(0.00)
CEO birth order × Sibling CEO				0.19*	0.15*
				(0.08)	(0.07)
Industry fixed effects?	Yes	Yes	Yes	Yes	Yes
Year fixed effects?	Yes	Yes	Yes	Yes	Yes
Observations	503	503	503	503	503
Wald χ^2	82998.2**	43627.4**	151859.9**	24984.1**	27106.3**

[a] Mean-centered prior to inclusion in the models. Robust standard errors in parentheses.
† $p < 0.1$
* $p < 0.05$
** $p < 0.01$

log-transformed, the magnitude of effects can be best understood by exponentiating the regression coefficients to obtain values that can be used to infer the percentage change in the outcome. We can infer that for each increase in birth order, risky spending increases by 19%. Hypothesis 1 is thus supported by our data.

Hypothesis 2 theorized that closest sibling age gap would negatively moderate the relationship between CEO birth order and strategic risk taking. The results of this test are reported in Model 2 of Table 4, which indicates that the moderating effect of closest sibling age gap is negative and significant ($b = -0.09$; $p < 0.05$). This result also holds in Model 5, where all the interaction terms are included. A graph of this moderating effect, shown in Figure 1, allows further investigation of this finding. Note that the *Y*-axis, strategic risk taking, is depicted on a logarithmic scale, and needs to be exponentiated for proper inference of magnitude of effects. Specifically, a one-unit increase in CEO birth order is associated with a 33% increase in strategic risk taking when the age gap is small (one standard deviation below the mean), whereas the increase is 9% when the age gap is large (one standard deviation above the mean). Hypothesis 2 is thus statistically supported.

In Hypothesis 3, we predicted that the effects of CEO birth order on risk taking would be negatively moderated by CEO age. To test that idea, we entered the relevant interaction term in Model 3 of Table 4. The results of this model show that CEO age is not a statistically significant moderator ($b = -.01$; n.s.), and this nonsignificance is repeated in Model 5. As such, our data do not statistically support Hypothesis 3.

We predicted in Hypothesis 4 that the CEO birth order effect would be moderated by the presence of a sibling CEO. Model 4 of Table 4, which reports the findings of this, shows that the presence of a sibling CEO is indeed a positive and significant moderator ($b = .19$; $p < .05$). This significant finding holds in Model 5 as well. A graph of this moderating effect, shown in Figure 2, confirms this pattern (again, note that strategic risk taking is depicted on a logarithmic scale). We find that a one-unit increase in CEO birth order is associated with a 33% increase in strategic risk taking when there is a sibling who is a CEO in another firm, whereas there is a 15% increase when there is no such sibling who is a CEO. Our findings thus support Hypothesis 4.

FIGURE 1
Moderating Effect of Sibling Age Gap

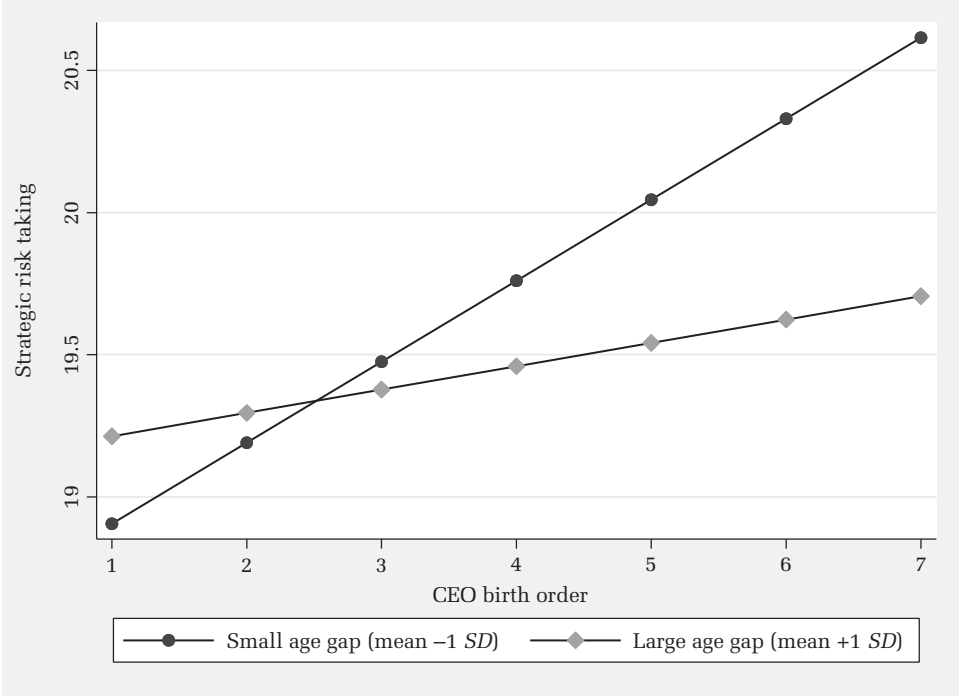
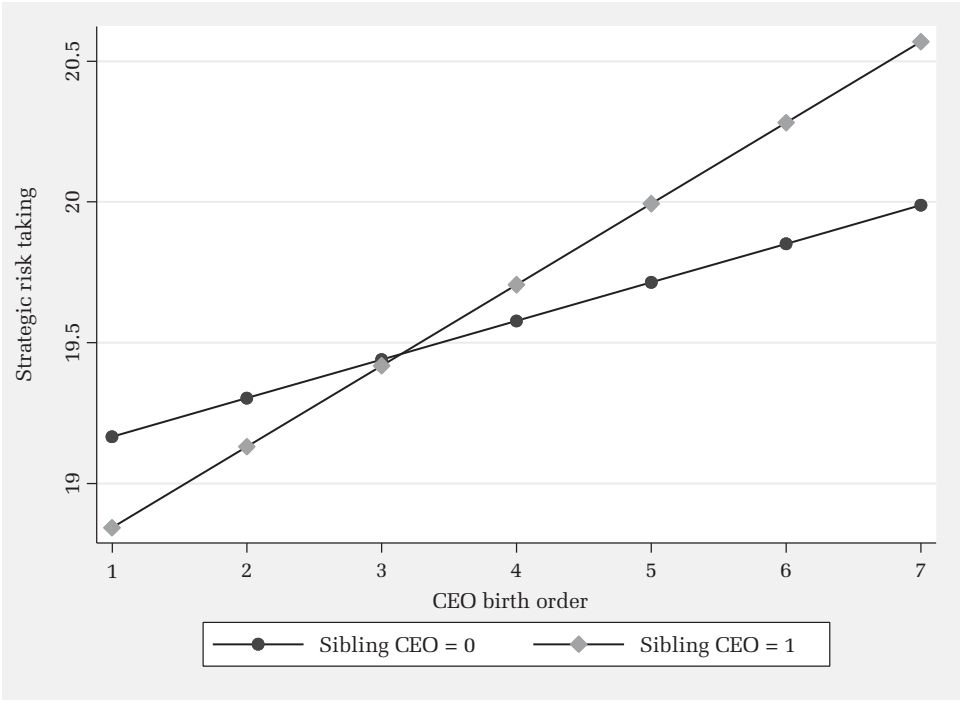


FIGURE 2
Moderating Effect of Sibling CEO



SUPPLEMENTAL ANALYSES

As our sample for this study was composed of 503 CEO-year observations in family business groups in South Korea, there is a possibility that our findings might be a false positive or attributable to aspects of our context. With this in mind, we conducted a number of supplemental analyses to enhance the generalizability of our theory and findings.

Ruling Out False Positive Results

As adequately powering a study is crucial for maximizing the value of the findings for reasons related to both Type I and Type II errors (Button et al., 2013; Ledgerwood, Soderberg, & Sparks, 2017), we wanted to ensure that the sample in our primary analyses was adequately powered. To do so, we used the G*Power program to calculate the power of our statistical tests (Faul, Erdfelder, Lang, & Buchner, 2007). To be conservative, we assumed a small effect size (*f*-squared = .02 using the widely cited Cohen criteria), we set our α to .05 and power was set at 80%, and we input that we had 45 predictors in the model. According to the power analysis via G*Power, we need a total sample size of 395 to achieve 80% power. Given that our sample is 503, this suggests that our statistical power is well in excess of 80%, helping to alleviate concerns related to power driving false positives. In addition to this program suggesting that our study is adequately powered, scholars have noted that, when considering power in longitudinal data, there are a number of rules of thumb, including six to 10 observations per predictor (Neter, Kutner, Nachtsheim, & Wasserman, 1996) and 10 observations per predictor (Howell, 1992). Given that our sample is in excess of 500 observations and we have 45 predictors, we once again meet the generally accepted criteria.

In addition to power being a concern as it relates to false positives, there is a possibility that the sample drawn is an outlier among the sampling distribution. One means by which to reduce this possibility is to make certain the results within a given sample are not driven by outliers. To assess this possibility, we winsorized our dependent variable at the 1% and 99% levels, and our results were substantively unchanged. Finally, regarding concerns about our findings being driven by false positives, we are using robust standard errors for a more conservative test of our hypotheses.

U.S. Sample of CEOs

To establish the generalizability of our sample outside of CEOs of Korean business groups, we conducted a supplemental analysis examining a sample of U.S. public firm CEOs. Specifically, we examined data available in Ancestry.com and discovered that this website's most detailed records end with the 1940 U.S. census. Based on this constraint, we began gathering data for individuals who were: (1) a CEO in Execucomp in 1992, which is the first year it existed (this increased the odds these CEOs would appear in the 1940 census) and, (2) born before 1940 (so they would be included in the 1940 census).

With these constraints in place, we performed Internet searches on this subsample of CEOs from Execucomp in 1992. The goal of these searches was to gather enough information so that we could be certain the census record in Ancestry.com was the proper record for each CEO. To do so, we needed to find each CEO's (1) birthdate, (2) hometown at birth, and (3) parents' names. When we were able to collect of this information for a given CEO, we entered it into Ancestry.com. Even in those cases where we had all of this information, however, there was still often uncertainty about whether we definitely had the correct record—such as when the one parent's name was close to, but did not exactly match, the name we found from other sources. If there was any uncertainty about the match, that CEO was excluded from our analyses. After performing these multiple searches, we generated a sample of 36 CEOs for whom we could gather their birth order as well as their sibling information from the 1940 U.S. census or from the 1930 U.S. census (for older CEOs). We were also able to gather most of the same controls, except for some of our board controls, for which data were not available.

Using the same estimation technique as for our main analyses, we were able to replicate our main effect of birth order on CEO risk taking ($p < .05$) found in our Korean sample. We were also able to replicate our moderating effect of closest-sibling age gap ($p < .05$), and the moderating effect of age was nonsignificant, as in our main analyses. We were not able to gather data on whether siblings were simultaneously employed as CEOs, due lack of data availability in regards to this variable. Thus, the results of the three hypotheses we retested in our U.S.-based sample are substantively similar to our Korea-based test in terms of direction and statistical significance, which helps to provide additional support for the generalizability of our theory.

Other Analyses

While we tested Hypothesis 2 using a linear measure of age gap with closest sibling, we further examined whether the results hold when using a discrete measure of age gap. Based on prior literature that has suggested sibling rivalry is intensified when the gap with siblings is less than five years (e.g., Sulloway, 1996), we created a dichotomous variable coded as 1 when that condition is met. We find statistically significant support for our Hypothesis 2 in a model predicting strategic risk taking, when interacting CEO birth order with the small age gap with closet sibling (less than five years) variable ($b = .27$; $p < .05$). The results also hold when using a moderator variable that captures age gap with closest sibling that is less than three years (e.g., Baer, Oldham, Hollingshead, & Costa Jacobsohn, 2005).

Prior research has noted that any credible study on birth order effects should control for number of siblings, as we do in our study, since large sibships are biased for later-borns (Ernst & Angst, 1983). In a meta-analysis, Sulloway and Zweigenhaft (2010) found that studies controlling for number of siblings produced larger effect sizes than did studies lacking this control. That is, number of siblings acts as a suppressor variable: "a variable which increases the predictive validity of another variable (or set of variables) by its inclusion in a regression equation" (Tzelgov & Henik, 1991). Consistent with this notion, we found that in both our South Korean and U.S. sample, the effect of CEO birth order on strategic risk taking was not statistically significant when number of siblings was dropped, and became significant when it was included in the regression models. This underscores the importance of accounting for key confounds and potential suppressors, such as number of siblings, to understand the true effects of birth order.

DISCUSSION

Birth order, which captures early-life family domain experiences, is a fundamental determinant of individual behavior (Damian & Roberts, 2015; Jaskiewicz et al., 2017) and has captured the attention of the general public and researchers alike. Within the upper echelons literature, and the broader management literature, however, "this truth has not had much impact" (Jaskiewicz et al., 2017: 309). We thus attempt to shift the theoretical conversation surrounding CEO experiences to the family domain—a domain that scholars have suggested may

have a great impact, even on top executives (Smith, 2009). Drawing on evolutionary theory arguments related to sibling rivalry, we develop theory suggesting that CEO birth order is positively associated with strategic risk taking. To provide further evidence for our proposed sibling rivalry mechanism, we propose three moderators to assess sibling rivalry. The results of our primary analyses using a South Korea-based sample, a supplementary analysis of a U.S.-based sample, and other robustness checks largely support our theorizing.

Implications

Our theorizing and results have a number of implications. First, we contribute to the upper echelons literature by shifting the conversation around executives' experiences to the family domain, specifically birth order. Studies within this paradigm have primarily examined how work-related experiences shape CEOs' decisions (Finkelstein et al., 2009). This primary focus on work-related experiences suggests that researchers have little understanding of the impact of family domain experiences on CEOs, which is problematic given that the family is arguably the "most important and enduring of all human social groupings" (Smith, 2009: 5). Through the construct of birth order, we are able to shift the theoretical conversation to a construct that captures some of the most personal and earliest possible types of experiences. This construct may be of great importance to our understanding of CEO characteristics, as birth order is one of the most fundamental life experiences and is an engrained determinant of behaviors (Damian & Roberts, 2015; Plomin & Daniels, 1987), regardless of cultural context (Denny, 2004).

As illustrated through our theorizing and results, birth order in our sample does appear to influence CEOs' behavior. In line with evolutionary theory arguments suggesting that the later an individual is born in the sibling hierarchy, the more they will engage in risk taking to gain parental favor (Grable & Joo, 2004; Sulloway & Zweigenhaft, 2010), we find that risk-taking tendencies established in childhood continue into the executive suite. In our sample, we found that CEO birth order was positively related to strategic risk taking. Specifically, we found that for each one-unit increase in birth order, CEOs took 19% more risk in our sample. Given the pervasive nature of birth order, future research might also investigate other strategic decisions that CEO birth order influences. Further, given that this research implies that a characteristic that we classify with experiences, birth order, potentially influences a psychological property, risk-taking propensity, we suggest, consistent with Finkelstein et al. (2009), that future research might more directly address this mutual causality, and examine the association between the two categories of characteristics.

Second, our study responds to recent calls to leverage "family science" theories to advance management research (Jaskiewicz et al., 2017) given the important impact family experiences have on individuals (Smith, 2009: 5). Despite the fact that in the upper echelons of organizations the demands of work and family domains certainly interact, very little is understood. In response, we drew on evolutionary theory arguments to illustrate the firm-level implications of birth order and sibling rivalry on CEO risk taking. Our findings suggest that the family environment in which a CEO grew up influences their strategic decisions. Our findings also suggest that when the family life is present in the workplace there are implications. Indeed, we found that having a sibling CEO amplifies strategic risk taken by the CEO. Future research may investigate additional implications of CEOs having sibling CEOs, especially given that in family business groups, multiple siblings tend to be involved (Carney, 2008). Future research might investigate the impact of other nonwork experiences, such as other experiences in the family domain or even activities that CEOs might do for leisure.

Third, we contribute to the multidisciplinary birth order literature by developing new theory regarding moderators of birth order. While scholars have suggested that birth order effects are contingent on moderating factors (e.g., Sulloway, 1999), little is understood in this regard. We address this oversight by building on evolutionary theory arguments suggesting that birth order effects are driven by sibling rivalry, and theorizing that the extent to which sibling rivalry was present during childhood, the extent to which childhood sibling rivalry is recalled, and the extent to which sibling rivalry is ongoing will moderate the CEO birth order–strategic risk taking relationship. Our results provide support for these ideas as the closest sibling age gap and the presence of a sibling CEO each moderate the proposed direct relationship. Further, even our unsupported hypothesis regarding the moderating effect of age contributes to the understanding of birth order effects. The fact that birth order effects are not diluted over time is itself notable. That is, whether the CEO is 35 or 93 years old (the range of CEO ages in our Korean sample), we found no evidence that birth order effects diminished over time.

Finally, we contribute to the literature by advancing understanding surrounding an important firm outcome—strategic risk taking. As risk taking is a core decision CEOs undertake and is the focus of many corporate governance mechanisms (e.g., Eisenhardt, 1989; Wiseman & Gomez-Mejia, 1998), better understanding CEOs' risk preferences has implications for scholars and practitioners. Indeed, while scholars have focused on how a number of factors shape risk-taking behaviors, including the way in which a decision is framed, societal factors (e.g., Hofstede, 2001), and confidence (e.g., Chatterjee & Hambrick, 2007), our paper shifts the focus of this literature toward a different factor entirely—birth order. Indeed, birth order may be considered an observable *ex ante* indicator of CEOs' attitude toward risk, and thus may influence how they frame risk taking.

Limitations and Future Research

This study is not without limitations. First, like many studies on CEOs, we were concerned with endogeneity, especially sample-selection bias (i.e., sample-induced endogeneity) given that we sampled family CEOs associated with Chaebols due to data availability. While these issues can never be ruled out completely, we took a number of steps to mitigate these concerns. First, we tested our hypotheses using a Heckman two-stage model: in the first stage we estimated a model that predicts the likelihood of family CEO presence with a set of predictors that includes exclusion restrictions, and those results were used to calculate an inverse Mills ratio included in the second-stage GEE (AR1) models. Our data are also uniquely suited to deal with endogeneity concerns, given that the key predictors in both stages of the estimation—i.e., gender of first-born child in the first stage and birth order in the second stage—were clearly determined exogenously, at the time of individuals' birth. Thus, our approach allowed a stringent and conservative test of our proposed hypotheses.

Second, while evolutionary theory suggests that sibling rivalry drives birth order effects, like most archival research on CEOs we were not able to directly test the sibling rivalry mechanism. That said, in testing our theoretical arguments for our moderators we were able to empirically examine factors that may be indicative of past and present sibling rivalry, specifically age spacing and the presence of a sibling CEO, as well as the extent to which CEOs may recall childhood sibling rivalry based on age. Scholars have suggested that moderators can help provide further evidence for a theorized mechanism (Baron & Kenny, 1986; Shi et al., 2017); thus, while we were not able to directly test our mechanism, these moderators provide additional evidence for our proposed sibling rivalry mechanism.

Third, we used CEOs of business groups, or Chaebols, in South Korea to test our theory. Scholars have made calls to conduct empirical research in international contexts, including in those that have different sociocultural contexts from Western countries. As such, our context may be considered a strength of our study given that family firms comprise the majority of publicly traded firms in the world (La Porta et al., 1999), even in the United States where widely held corporations are thought to pervade (Feldman et al., 2016; Villalonga & Amit, 2009, 2010), and that business groups make up a large percentage of family firms (Masulis, Pham, & Zein, 2011). It is possible, however, that the South Korean context influenced the relationship between CEO birth order and strategic risk taking, and thus this relationship could be different in other countries or in other business forms. The fact that we were largely able to replicate our results in a U.S.-based sample of public firms, however, helps alleviate these concerns. These data, however, have some limitations, including that they comprise a relatively small sample and that there are truncation issues as it is possible that the families in our sample continued to have more children after 1940. While this would not change any of our CEOs' birth rank, it does mean that two of our control variables—number of siblings and number of female siblings—may not be entirely accurate. Future research may thus explore the impact of executive birth order in other countries to help understand its generalizability. Using Ancestry.com coupled with census data, future research may be able to build a more expansive dataset of CEOs with which to examine the effects of CEO birth order. Alternatively, scholars may find success gathering birth order data in other countries where family business groups are common and are closely scrutinized, such as those countries listed in Table 1.

Fourth, a limitation of our study is that that all the CEOs in our primary and supplementary analyses were males. As we noted, this is not surprising given that South Korea ranks low in global studies of gender equality (World Economic Forum, 2016), and that, unfortunately, the underrepresentation of female CEOs is consistent with many settings across the world, including the United States (Favaro et al., 2014). That said, scholars have found that CEO gender may alter important relationships in the upper echelons (e.g., Jeong & Harrison, forthcoming); thus,

future research might examine how birth order impacts male versus female CEOs in samples where there are enough female CEOs to have adequate power. Given that many scholars have examined birth order in samples that included both male and females, we expect scholars to find that birth order effects persist for female CEOs, albeit with potentially weaker effects suggested by prior work (e.g., Argys et al., 2006; Gilliam & Chatterjee, 2011)

Finally, we did our best to control for as many relevant factors as possible; however, we were not able to control for some factors that might serve as potential confounds. For example, we were not able to examine other TMT members' birth order given that these individuals were typically not family members and thus their birth order and sibling data were not publicly available. We also were not able to control for potentially important personality factors of CEOs, such as the Big Five, given the noted reluctance of CEOs "to submit to batteries of psychological tests" (Finkelstein et al., 2009: 50; see also Cycyota & Harrison, 2006; Nadkarni & Chen, 2014). That said, our supplementary analysis of U.S. CEOs helps to combat a potential omitted variable problem. Still, future research might examine whether these findings hold while controlling for some of these aforementioned factors.

CONCLUSION

The order in which we are born shapes us in profound ways, and we find that CEOs are no exception. The later the order of birth, the more strategic risk CEOs undertake, and this tendency is more pronounced when the conditions for sibling rivalry (a key mechanism explaining birth order effects) are salient due to small age gaps with their siblings and the presence of a sibling CEO. Contrary to our theorizing, the impact of CEO birth order on strategic risk taking does not diminish as CEOs age. This unexpected finding reinforces the idea that birth order effects have a strong lasting effect on individuals, including CEOs. We believe this study helps advance management research, the broader multidisciplinary "family science" literature, and the much needed cross-pollination of ideas between the two.

REFERENCES

Adler, A. 1928. Characteristics of the first, second, and third child. ***Children***, 3: 14–52.

Adli, R., Louichi, A., & Tamouh, N. 2010. The sibling size impact on the educational achievement in France. ***Education Economics***, 18: 331–348.

Alberts, C. L., & Landers, D. M. 1977. Birth order, motor performance, and maternal influence. ***Research Quarterly. American Alliance for Health. Physical Education and Recreation***, 48: 661–670.

Argys, L. M., Rees, D. I., Averett, S. L., & Witoonchart, B. 2006. Birth order and risky adolescent behavior. ***Economic Inquiry***, 44: 215–233.

Bacci, S., Bartolucci, F., Chiavarini, M., Minelli, L., & Pieroni, L. 2014. Differences in birthweight outcomes: A longitudinal study based on siblings. ***International Journal of Environmental Research and Public Health***, 11: 6472–6484.

Badger, J., & Reddy, P. 2009. The effects of birth order on personality traits and feelings of academic sibling rivalry. ***Psychology Teaching Review***, 15: 45–54.

Baer, M., Oldham, G. R., Hollingshead, A. B., & Costa Jacobsohn, G. 2005. Revisiting the birth order–creativity connection: The role of sibling constellation. ***Creativity Research Journal***, 17: 67–77.

Baron, R. M., & Kenny, D. A. 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. ***Journal of Personality and Social Psychology***, 51: 1173–1182.

Beck, E., Burnet, K. L., & Vosper, J. 2006. Birth-order effects on facets of extraversion. ***Personality and Individual Differences***, 40: 953–959.

Bedford, V. H. 1998. Sibling relationship troubles and well-being in middle and old age. ***Family Relations***, 47: 369–376.

Behrman, J. R., & Taubman, P. 1986. Birth order, schooling, and earnings. ***Journal of Labor Economics***, 4: S121–S145.

Belmont, L., & Marolla, F. A. 1973. Birth order, family size, and intelligence. ***Science***, 182: 1096–1101.

Bennedsen, M., Nielsen, K. M., Pérez-González, F., & Wolfenzon, D. 2007. Inside the family firm: The role of families in succession decisions and performance. ***The Quarterly Journal of Economics***, 122: 647–691.

Bertoni, M., & Brunello, G. 2016. Later-borns don't give up: The temporary effects of birth order on european earnings. ***Demography***, 53: 449–470.

Bexley, S. 2017. Sibling rivalry: who is happier? ***Daily Mail***. Retrieved from https://www.dailymail.co.uk/femail/article-172538/Sibling-rivalry-happier.html. Accessed January 7, 2018.

Bianchi, E. C. 2014. Entering adulthood in a recession tempers later narcissism. ***Psychological Science***, 25: 1429–1437.

Black, S. E., Devereux, P. J., & Salvanes, K. G. 2005. The more the merrier? The effect of family size and birth

order on children's education. ***The Quarterly Journal of Economics***, 120: 669–700.

Bloomberg. 2018. Bloomberg quick take: South Korea's Chaebol. Retrieved from https://www.bloomberg.com/quicktake/republic-samsung. Accessed October 12th, 2018.

Booth, A. L., & Kee, H. J. 2009. Birth order matters: The effect of family size and birth order on educational attainment. ***Journal of Population Economics***, 22: 367–397.

Bromiley, P., Rau, D., & Zhang, Y. 2017. Is R&D risky? ***Strategic Management Journal***, 38: 876–891.

Buchholtz, A. K., & Ribbens, B. A. 1994. Role of chief executive officers in takeover resistance: Effects of CEO incentives and individual characteristics. ***Academy of Management Journal***, 37: 554–579.

Buckles, K. S., & Munnich, E. L. 2012. Birth spacing and sibling outcomes. ***The Journal of Human Resources***, 47: 613–642.

Buckley, N. J. 2005. Not so happy families. ***Trends in Ecology & Evolution***, 20: 295.

Buss, D. 2007. ***Evolutionary psychology: The new science of the mind*** (3rd ed.). New York, NY: Psychology Press.

Button, K. S., Ioannidis, J. P. A, Mokrysz, C., Nosek B. A., Flint, J., Robinson, E. S. J., & Munafò, M. R. 2013. Power failure: why small sample size undermines the reliability of neuroscience. ***Nature Reviews Neuroscience***, 14: 365–376.

Carney, M. 2008. ***Asian business groups: Context, governance and performance***. Oxford, U.K.: Chandos Publishing.

Chang, J., & Shin, H. 2006. Governance system effectiveness following the crisis: The case of Korean business group headquarters. ***Corporate Governance***, 14: 85–97.

Chatterjee, A., & Hambrick, D. C. 2007. It's all about me: Narcissistic chief executive officers and their effects on company strategy and performance. ***Administrative Science Quarterly***, 52: 351–386.

Chatterjee, A., & Hambrick, D. C. 2011. Executive personality, capability cues, and risk taking: How narcissistic CEOs react to their successes and stumbles. ***Administrative Science Quarterly***, 56: 202–237.

Chen, G. L., Crossland, C., & Huang, S. 2016. Female board representation and corporate acquisition intensity. ***Strategic Management Journal***, 37: 303–313.

Chen, G. L., Crossland, C., & Luo, S. Q. 2015. Making the same mistake all over again: CEO overconfidence and corporate resistance to corrective feedback. ***Strategic Management Journal***, 36: 1513–1535.

Chen, J., & Nadkarni, S. 2017. It's about time! CEOs' temporal dispositions, temporal leadership, and corporate entrepreneurship. ***Administrative Science Quarterly***, 62: 31–66.

Christensen, D. M., Dhaliwal, D. S., Boivie, S., & Graffin, S. D. 2015. Top management conservatism and corporate risk strategies: Evidence from managers' personal political orientation and corporate tax avoidance. ***Strategic Management Journal***, 36: 1918–1938.

Cicirelli, V. G. 1982. Sibling influence throughout the lifespan. In M. E Lamb & B. Sutton-Smith (Eds.), ***Sibling relationships: Their nature and significance across the lifespan***: 267–284. New York, NY: Psychology Press.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. 2003. ***Applied multiple regression/correlation analysis for the behavioral sciences***. Mahwah, NJ: Lawrence Erlbaum Associates.

Colpan, A. M., Hikino, T., & Lincoln, J. R. 2010. ***The Oxford handbook of business groups***. Oxford, U.K.: Oxford University Press.

Crossland, C., & Hambrick, D. C. 2007. How national systems differ in their constraints on corporate executives: a study of CEO effects in three countries. ***Strategic Management Journal***, 28: 767–789.

Crossland, C., & Hambrick, D. C. 2011. Differences in managerial discretion across countries: How nation-level institutions affect the degree to which CEOs matter. ***Strategic Management Journal***, 32: 797–819.

Crossland, C., Zyung, J. Y., Hiller, N. J., & Hambrick, D. C. 2014. CEO career variety: Effects on firm-level strategic and social novelty. ***Academy of Management Journal***, 57: 652–674.

Cycyota, C. S., & Harrison, D. A. 2002. Enhancing survey response rates at the executive level: Are employee- or consumer-level techniques effective? ***Journal of Management***, 28: 151–176.

Cycyota, C. S., & Harrison, D. A. 2006. What (not) to expect when surveying executives: A meta-analysis of top manager response rates and techniques over time. ***Organizational Research Methods***, 9: 133–160.

Cyert, R. M., & March, J. G. 1963. ***A behavioral theory of the firm***. Engledwood Cliffs, NJ: Prentice Hall.

Daily, C. M., Certo, S. T., & Dalton, D. R. 2000. International experience in the executive suite: The path to prosperity? ***Strategic Management Journal***, 21: 515–523.

Daly, M., & Wilson, M. 1990. Is parent–offspring conflict sex-linked—Freudian and Darwinian models. ***Journal of Personality***, 58: 163–189.

Damian, R. I., & Roberts, B. W. 2015. The associations of birth order with personality and intelligence in a

representative sample of US high school students. ***Journal of Research in Personality***, 58: 96–105.

Darwin, C. 1968. ***On the origin of species by means of natural selection. 1859***. London, U.K.: Murray.

Davis, J. N. 1997. Birth order, sibship size, and status in modern Canada. ***Human Nature***, 8: 205–230.

De Haan, M. 2010. Birth order, family size and educational attainment. ***Economics of Education Review***, 29: 576–588.

Denny, K. 2004. Born to be wild? The effect of birth order, families and schools on truancy: Working Paper Series, UCD Centre for Economic Research.

Eisenhardt, K. M. 1989. Agency theory—An assessment and review. ***Academy of Management Review***, 14: 57–74.

Emerson, P. M., & Souza, A. P. 2008. Birth order, child labor, and school attendance in Brazil. ***World Development***, 36: 1647–1664.

Ernst, C., & Angst, J. 1983. ***Birth order: Its influence on personality***. Berlin: Springer-Verlag.

Estevez-Abe, M., Iversen, T., & Soskice, D. 2001. Social protection and the formation of skills: A reinterpretation of the welfare state. In P. Hall & D. Soskice (Eds.), ***Varieties of capitalism: The institutional foundations of comparative advantage***: 145–183. New York, NY: Oxford University Press.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. 2007. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. ***Behavior Research Methods***, 39: 175–191.

Favaro, K., Karlsson, P., & Neilson, G. 2014. The 2013 chief executive study. Women CEOs of the last 10 years. ***PWC***. Retrieved from https://www.strategyand.pwc.com/reports/2013-chief-executive-study. Accessed June 7, 2017.

FBCG. 2017. Sibling CEOs of different companies: The family business consulting group. Retrieved from https://www.thefbcg.com/Sibling-CEOs-of-Different-Companies/. Accessed July 2, 2018.

Feldman, E. R., Amit, R. R., & Villalonga, B. 2016. Corporate divestitures and family control. ***Strategic Management Journal***, 37: 429–446.

Feldman, E. R., Gilson, S. C., & Villalonga, B. 2013. Do analysts add value when they most can? Evidence from corporate spin-offs. ***Strategic Management Journal***, 35: 1446–1463.

FFI. 2018. Global data points. Retrieved from https://www.ffi.org/page/globaldatapoints. Accessed June 28, 2018.

Finkelstein, S., Hambrick, D. C., & Cannella, A. A. 2009. ***Strategic leadership: Theory and research on executives, top management teams, and boards***. New York, NY: Oxford University Press.

Foster, J. D., Campbell, W. K., & Twenge, J. M. 2003. Individual differences in narcissism: Inflated self-views across the lifespan and around the world. ***Journal of Research in Personality***, 37: 469–486.

Freese, J., Powell, B., & Steelman, L. C. 1999. Rebel without a cause or effect: Birth order and social attitudes. ***American Sociological Review***, 64: 207–231.

Frey, R., Pedroni, A., Mata, R., Rieskamp, J., & Hertwig, R. 2017. Risk preference shares the psychometric structure of major psychological traits. ***Science Advances***, 3: 1–13.

Galton, F. 1874. ***English men of science***. London, U.K.: Macmillan.

Gamache, D. L., McNamara, G., Mannor, M. J., & Johnson, R. E. 2015. Motivated to acquire? The impact of CEO regulatory focus on firm acquisitions. ***Academy of Management Journal***, 58: 1261–1282.

Gelfand, M. J., Bhawuk, D. P., Nishii, L. H., & Bechtold, D. J. 2004. Individualism and collectivism. In R. House, P. Hanges, M. Javidan, P. Dorfman, & V. Gupta (Eds.), ***Culture, leadership, and organizations: The GLOBE study of 62 societies***: 437–512. Thousand Oaks, CA: Sage.

Gilliam, J., & Chatterjee, S. 2011. The Influence of birth order on financial risk tolerance. ***Journal of Business & Economics Research***, 9: 43–50.

Goetting, A. 1986. The developmental tasks of siblingship over the life cycle. ***Journal of Marriage and the Family***, 48: 703–714.

Grable, J. E., & Joo, S.-H. 2004. Environmental and biophysical factors associated with financial risk tolerance. ***Journal of Financial Counseling and Planning***, 15: 73–82.

Green, B., & Griffiths, E. C. 2014. Birth order and posttraumatic stress disorder. ***Psychology Health and Medicine***, 19: 24–32.

Greif, G., & Woolley, M. 2016. ***Adult sibling relationships***. New York, NY: Columbia University Press.

Hambrick, D. C. 2007. Upper echelons theory: An update. ***Academy of Management Review***, 32: 334–343.

Hambrick, D. C., & Finkelstein, S. 1987. Managerial discretion: A bridge between polar views of organizational outcomes. ***Research in Organizational Behavior***, 9: 369–406.

Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. ***Academy of Management Review***, 9: 193–206.

Hamilton, W. D. 1964. The genetical evolution of socia lbehavior. ***Journal of Theoretical Biology***, 7: 1–52.

Han, J., Shipilov, A. V., & Greve, H. R. 2017. Unequal bedfellows: Gender role-based deference in multiplex ties between Korean business groups. ***Academy of Management Journal***, 60: 1531–1553.

Hardin, J., & Hilbe, J. 2003. ***Generalized estimating equations***. Boca Raton, FL: CRC Press.

Härkönen, J. 2013. Birth order effects on educational attainment and educational transitions in West Germany. ***European Sociological Review***, 30: 166–179.

Harris, J. R. 2000. Context-specific learning, personality, and birth order. ***Current Directions in Psychological Science***, 9: 174–177.

Healey, M. D., & Ellis, B. J. 2007. Birth order, conscientiousness, and openness to experience—Tests of the family-niche model of personality using a within-family methodology. ***Evolution and Human Behavior***, 28: 55–59.

Heckman, J. J. 1979. Sample selection bias as a specification error. ***Econometrica***, 47: 153–161.

Herrmann, P., & Nadkarni, S. 2014. Managing strategic change: The duality of CEO personality. ***Strategic Management Journal***, 35: 1318–1342.

Hertwig, R., Davis, J. N., & Sulloway, F. J. 2002. Parental investment: How an equity motive can produce inequality. ***Psychological Bulletin***, 128: 728–745.

Hitt, M. A., & Tyler, B. B. 1991. Strategic decision models: Integrating different perspectives. ***Strategic Management Journal***, 12: 327–351.

Hofstede, G., & McCrae, R. R. 2004. Personality and culture revisited: Linking traits and dimensions of culture. ***Cross-Cultural Research***, 38: 52–88.

Hofstede, G. H. 2001. ***Culture's consequences: Comparing values, behaviors, institutions and organizations across nations***. Thousand Oaks, CA: Sage Publications.

Hotz, V. J., & Pantano, J. 2015. Strategic parenting, birth order, and school performance. ***Journal of Population Economics***, 28: 911–936.

Howell, D. C. 1992. ***Statistical methods for psychology***. Boston, MA: Cengage Learning.

Isaacson, C. E., & Radish, K. 2002. ***The birth order effect: How to better understand yourself and others***. Avon, MA: Adams Media Corporation.

Jaskiewicz, P., Combs, J., Shanine, K., & Kacmar, M. 2017. Introducing the family: A review of family science with implications for management research. ***Academy of Management Annals***, 11: 309–341.

Jayachandran, S., & Pande, R. 2017. Why are Indian children so short? The role of birth order and son preference. ***The American Economic Review***, 107: 2600–2629.

Jefferson, T., Herbst, J. H., & McCrae, R. R. 1998. Associations between birth order and personality traits: Evidence from self-reports and observer ratings. ***Journal of Research in Personality***, 32: 498–509.

Jeong, S.-H., & Harrison, D. 2017. Glass breaking, strategy making, and value creating: Meta-analytic outcomes of females as CEOs and TMT members. ***Academy of Management Journal,*** 60: 1219–1252.

Jobe, J. B., Holgate, S. H., & Scrapansky, T. A. 1983. Risk taking as motivation for volunteering for a hazardous experiment. ***Journal of Personality***, 51: 95–107.

Johnson, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. 2000. Tunneling. ***The American Economic Review***, 90: 22–27.

Jones, B. 2007. Upton brothers look to reverse trend. ***ESPN***. Retrieved from http://sports.espn.go.com/espn/page2/story?pagejones/070412. Accessed January 10, 2018.

Juon, H.-S., Shin, Y., & Nam, J. J. 1995. Cigarette smoking among Korean adolescents: Prevalence and correlates. ***Adolescence***, 30: 631–643.

Kaye, K. 1991. Penetrating the cycle of sustained conflict. ***Family Business Review***, 4: 21–44.

Kets de Vries, M. F. R. 1993. The dynamics of family controlled firms: The good and the bad news. ***Organizational Dynamics***, 21: 59–71.

Khanna, T., & Yafeh, Y. 2007. Business groups in emerging markets: Paragons or parasites? ***Journal of Economic Literature***, 45: 331–372.

Kidwell, J. S. 1981. Number of siblings, sibling spacing, sex, and birth order: Their effects on perceived parent-adolescent relationships. ***Journal of Marriage and the Family***, 43: 315–332.

Kim, B. S., Atkinson, D. R., & Yang, P. H. 1999. The Asian values scale: Development, factor analysis, validation, and reliability. ***Journal of Counseling Psychology***, 46: 342–352.

Kim, D.-W., Kim, D.-M., Paik, W.-G., Jeong, J.-H., Paik, Y.-H., & Yoo, T.-H. 2005. ***The Chaebol of Korea: The management structure and personal network of Korean Chaebols.*** Paju: Nanam.

Kim, K. S. 1995. The Korean miracle (1962–80) revisited: Myths and realities in strategies and development. In H. Stein (Ed.), ***Asian industrialization and Africa***: 87–143. London, U.K.: Palgrave Macmillan.

Kim, S. Y., Lee, K. R., & Shin, H.-H. 2017. The enhanced disclosure of executive compensation in Korea. ***Pacific-Basin Finance Journal***, 43: 72–83.

Kish-Gephart, J. J., & Campbell, J. T. 2015. You don't forget your roots: The influence of CEO social class background on strategic risk taking. ***Academy of Management Journal***, 58: 1614–1636.

Ko, S. J., & Park, S. H. 2017. Is blood thicker than water? Sibling rivalry and strategic change in family business

groups. ***Academy of Management Proceedings***. doi: 10.5465/ambpp.2017.205.

Kusunoki, T., Mukaida, K., Morimoto, T., Sakuma, M., Yasumi, T., Nishikomori, R., & Heike, T. 2012. Birth order effect on childhood food allergy. ***Pediatric Allergy and Immunology***, 23: 250–254.

Kwon, T. H., Lee, H. Y., Chang, Y., & Yu, E. 1975. ***The population of Korea***. Seoul: Seoul National University Press.

Lafortune, J., & Lee, S. 2014. All for one? Family size and children's educational distribution under credit constraints. ***The American Economic Review***, 104: 365–369.

Lamarck, J. 1809. ***Zoological philosophy***. New York, NY: McMillan & Co.

La Porta, R., López de Silanes, F., & Shleifer, A. 1999. Corporate ownership around the world. ***The Journal of Finance***, 54: 471–517.

Lasko, J. K. 1954. Parent behavior toward first and second children. ***Genetic Psychology Monographs***, 49: 97–137.

Ledgerwood, A., Soderberg, C. K., & Sparks, J. 2017. Designing a study to maximize informational value. In M. C. Makel & J. A. Plucker (Eds.), ***Toward a more perfect psychology: Improving trust, accuracy, and transparency in research***: 33–58. Washington, D.C.: American Psychological Association.

Lee, S. H., & Song, S. 2012. Host country uncertainty, intra-MNC production shifts, and subsidiary performance. ***Strategic Management Journal***, 33: 1331–1340.

Levinson, H. 1971. Conflicts that plague family businesses. ***Harvard Business Review***, 49: 378–387.

Li, J., & Tang, Y. 2010. CEO hubris and firm risk taking in China: The moderating role of managerial discretion. ***Academy of Management Journal***, 53: 45–68.

Liang, K. Y., & Zeger, S. L. 1986. Longitudinal data analysis using generalized linear models. ***Biometrika***, 73: 13.

Lim, E. N. K., & McCann, B. T. 2014. Performance feedback and firm risk taking: The moderating effects of CEO and outside director stock options. ***Organization Science***, 25: 262–282.

Long, J., & Freese, J. 2006. ***Regression models for categorical dependent variables using Stata*** (2nd ed.). College Station, TX: Stata Press.

Luo, X., Kanuri, V. K., & Andrews, M. 2014. How does CEO tenure matter? The mediating role of firm-employee and firm-customer relationships. ***Strategic Management Journal***, 35: 492–511.

Malthus, T. R. 1798. An essay on the principle of population, as it affects the future imporvement of society, with remarks on the speculations of Mr. Godwin, M. Condorcet, and Other Writers. London, U.K.: The Lawbook Exchange.

Masulis, R. W., Pham, P. K., & Zein, J. 2011. Family business groups around the world: Financing advantages, control motivations, and organizational choices. ***Review of Financial Studies***, 24: 3556–3600.

McNerney, A., & Usner, J. 2001. Sibling rivalry in degree and dimensions across the lifespan. ***The nature of human nature: Student research feedback and peer review.*** Retrieved from http://jrscience.wcp.muohio.edu/Research/humannautre01/FinalArticles/SiblingRivalryinDegreeandDimensionsAcrosstheLifespan.html. Accessed December 12, 2017.

Milne, F., & Judge, D. 2009. Birth order influences reproductive measures in Australians. ***Human Nature***, 20: 294–316.

Morgan, E. M. 2009. ***The heir and the spare: Impact of birth order on risk attitudes, discount rates, and behaviors***. Ann Arbor, MI: ProQuest.

Myers, S. A., & Goodboy, A. K. 2006. Perceived sibling use of verbally aggressive messages across the lifespan. ***Communication Research Reports***, 23: 1–11.

Nadkarni, S., & Chen, J. 2014. Bridging yesterday, today, and tomorrow: CEO temporal focus, environmental dynamism, and rate of new product introduction. ***Academy of Management Journal***, 57: 1810–1833.

Nadkarni, S., & Herrmann, P. 2010. CEO personality, strategic flexibility, and firm performance: The case of the Indian business process outsourcing industry. ***Academy of Management Journal***, 53: 1050–1073.

Neter, J., Kutner, M. H., Nachtsheim, C. J., & Wasserman, W. 1996. ***Applied linear statistical models***. Chicago, IL: Irwin.

Nicholson, N., Soane, E., Fenton-O'Creevy, M., & Willman, P. 2005. Personality and domain-specific risk taking. ***Journal of Risk Research***, 8: 157–176.

Nisbett, R. E. 1968. Birth order and participation in dangerous sports. ***Journal of Personality and Social Psychology***, 8: 351–353.

Pasta, D. J. 2009. ***Learning when to be discrete: Continuous vs. categorical predictors***. Paper presented at the SAS Global Forum, Washington, D.C.

Patel, P. C., & Cooper, D. 2014. Structural power equality between family and non-family TMT members and the performance of family firms. ***Academy of Management Journal***, 57: 1624–1649.

Peng, M. W., & Jiang, Y. 2010. Institutions behind family ownership and control in large firms. ***Journal of Management Studies***, 47: 253–273.

Petrenko, O. V., Aime, F., Ridge, J., & Hill, A. 2016. Corporate social responsibility or CEO narcissism? CSR motivations and organizational performance. ***Strategic Management Journal***, 37: 262–279.

Plomin, R., & Daniels, D. 1987. Why are children in the same family so different from one another. ***Behavioral and Brain Sciences***, 10: 1–16.

Post, C., & Byron, K. 2015. Women on boards and firm financial performance: A meta-analysis. ***Academy of Management Journal***, 58: 1546–1571.

Prendergast, C., & Stole, L. 1996. Impetuous youngsters and jaded old-timers: Acquiring a reputation for learning. ***Journal of Political Economy***, 104: 1105–1134.

Puffer, R., & Serrano, C. V. 1973. Patterns of mortality in childhood: Report of the Inter-American Investigation of Mortality in Childhood. ***PAHO Scientific Pub.***, vol. 262. Washington D.C.: Pan American Health Organization.

Pyke, K. 2005. "Generational deserters" and "black sheep": Acculturative differences among siblings in Asian immigrant families. ***Journal of Family Issues***, 26: 491–517.

Radovanovic, D. L. S., & Lebowitz, S. 2016. How your birth order predicts the rest of your life, ***Business Insider***. Retrieved from https://www.businessinsider.com/what-your-birth-order-says-about-you-2016-9. Accessed November 7, 2017.

Rohde, P. A., Atzwanger, K., Butovskaya, M., Lampert, A., Mysterud, I., Sanchez-Andres, A., & Sulloway, F. J. 2003. Perceived parental favoritism, closeness to kin, and the rebel of the family: The effects of birth order and sex. ***Evolution and Human Behavior***, 24: 261–276.

Ross, H. G., & Milgram, J. I. 1982. Important variables in adult sibling relationships: A qualitative study. ***Sibling relationships: Their nature and significance across the lifespan***: 225–249.

Royle, N. J., Hartley, I. R., Owens, I. P., & Parker, G. A. 1999. Sibling competition and the evolution of growth rates in birds. ***Proceedings of the Royal Society of London. Series B, Biological Sciences***, 266: 923–932.

Sanders, W. M. G., & Hambrick, D. C. 2007. Swinging for the fences: The effects of CEO stock options on company risk taking and performance. ***Academy of Management Journal***, 50: 1055–1078.

Scharf, M., Shulman, S., & Avigad-Spitz, L. 2005. Sibling relationships in emerging adulthood and in adolescence. ***Journal of Adolescent Research***, 20: 64–90.

Schwartz, S. H. 1994. Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim, H. Triandis, C. Kagitcibasi, S.-C. Choi, & G. Yoon (Eds.), ***Individualism and collectivism: Theory, method, and applications***: 85–119. Thousand Oaks, CA: Sage.

Serfling, M. A. 2014. CEO age and the riskiness of corporate policies. ***Journal of Corporate Finance***, 25: 251–273.

Shi, W., Zhang, Y., & Hoskisson, R. E. 2017. Ripple effects of CEO awards: Investigating the acquisition activities of superstar CEOs' competitors. ***Strategic Management Journal***, 38: 2080–2102.

Siegel, J. 2007. Contingent political capital and international alliances: Evidence from South Korea. ***Administrative Science Quarterly***, 52: 621–666.

Smith, S. R. 2009. ***Exploring family theories.*** New York, NY: Oxford University Press.

Sorenson, R. L. 1999. Conflict management strategies used by successful family businesses. ***Family Business Review***, 12: 325–340.

Steelman, L. C. 1985. A tale of two variables: A review of the intellectual consequences of sibship size and birth order. ***Review of Educational Research***, 55: 353–386.

Stocker, C. M., Lanthier, R. P., & Furman, W. 1997. Sibling relationships in early adulthood. ***Journal of Family Psychology***, 11: 210.

Suitor, J. J., & Pillemer, K. 2007. Mothers' favoritism in later life: The role of children's birth order. ***Research on Aging***, 29: 32–55.

Sulloway, F. J. 1995. Birth order and evolutionary psychology: A meta-analytic overview. ***Psychological Inquiry***, 6: 75–80.

Sulloway, F. J. 1996. ***Born to rebel: Birth order, family dynamics, and creative lives***. New York, NY: Pantheon Books.

Sulloway, F. J. 1999. Birth order. In S. R. Pritzker & M. A. Runco (Eds.), ***Encyclopedia of Creativity***: 189–202. San Diego, CA: Academic Press.

Sulloway, F. J. 2001. Birth order, sibling competition, and human behavior. In H. R. Holcomb (Ed.), ***Conceptual Challenges in Evolutionary Psychology. Studies in Cognitive Systems***, vol 27: 39–83. Norwell, MA: Springer.

Sulloway, F. J. 2007. Birth order. In C. A. Salmon & T. K. Shackelford (Eds.), ***Family relationships: An evolutionary perspective***: 162–182. New York, NY: Oxford University Press.

Sulloway, F. J., & Zweigenhaft, R. L. 2010. Birth order and risk taking in athletics: A meta-analysis and study of major league baseball. ***Personality and Social Psychology Review***, 14: 402–416.

Tooby, J., & Cosmides, L. 1992. The psychological foundations of culture. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), ***The adapted mind: Evolutionary psychology and the generation of culture***: 19–136. New York, NY: Oxford University Press.

Trivers, R. L. 1974. Parent–offspring conflict. ***Integrative and Comparative Biology***, 14: 249–264.

Tzelgov, J., & Henik, A. 1991. Suppression situations in psychological research: Definitions, implications, and applications. ***Psychological Bulletin***, 109: 524–536.

Villalonga, B., & Amit, R. 2009. How are U.S. family firms controlled? ***Review of Financial Studies***, 22: 3047–3091.

Villalonga, B., & Amit, R. 2010. Family control of firms and industries. ***Financial Management***, 39: 863–904.

Wang, G., Holmes, R. M., Oh, I. S., & Zhu, W. 2016. Do CEOs matter to firm strategic actions and firm performance? A Meta-analytic investigation based on upper echelons theory. ***Personnel Psychology***, 69: 775–862.

Wang, X.-T., Kruger, D. J., & Wilke, A. 2009. Life history variables and risk-taking propensity. ***Evolution and Human Behavior***, 30: 77–84.

White, L. 2001. Sibling relationships over the life course: A panel analysis. ***Journal of Marriage and the Family***, 63: 555–568.

Williams, R. 2016. Ordinal independent variables. Retrieved from https://www3.nd.edu/~rwilliam/xsoc73994/OrdinalIndependent.pdf. Accessed June 7, 2017.

Wiseman, R. M., & Gomez-Mejia, L. R. 1998. A behavioral agency model of managerial risk taking. ***Academy of Management Review***, 23: 133–153.

World Bank. 2017a. Fertility rate, total (births per woman). Retrieved from https://data.worldbank.org/indicator/sp.dyn.tfrt.in. Accessed June 1, 2018.

World Bank. 2017b. GDP (current US$). Retrieved from https://data.worldbank.org/indicator/ny.gdp.mktp.cd. Accessed July 10, 2018.

World Economic Forum 2016. Global Gender Gap Index 2016. Retrieved from http://www3.weforum.org/docs/GGGR16/WEF_Global_Gender_Gap_Report_2016.pdf. Accessed September 15, 2017.

Xu, Y., & Zheng, Y. 2014. Birth order and sibling sex ratio in relation to sexual orientation in China. ***Social Behavior and Personality***, 42: 995–1001.

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