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RESEARCH ARTICLE

Upper echelons theory: Research at the nexus of CEO psychological profiles, gender, and firm diversity

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Abstract
Upper echelons theory suggests that CEO values and personalities impact their actions, driving organizational performance. However, accessing the black box of a CEO's values and personality is difficult. Numerous studies of senior leaders have informed research on discrete psychological characteristics such as drivers, risk, temporal focus, and emotionality. This study builds on this work by holistically sourcing these psychological characteristics through a LIWC (Linguistic Inquiry & Word Count) text analysis of top-ranked CEO Twitter (X) postings. These data were transformed via a principal component analysis into four distinct psychological profiles, termed by the authors 'grey flannel suits', 'self-actualizers', 'empaths', and 'greyhounds'. Binary logistic regressions suggested divergence in CEO psychological profile occurrences based on firm size. The profile analysis failed to detect significant top CEO gender differences; however, some gender distinctions were discerned from follow-on *t*-tests of the profile's underlying psychological characteristics. The paper concludes with a call for further top management team psychological profile-informed research.

Keywords: upper echelons theory; CEO; top management teams; gender; firm size; psychological profile

Introduction

Top-ranked CEOs are a rare breed. By definition, only 500 CEOs run the Fortune 500 firms, and 1,200 CEOs run S&P 1200 firms. Focusing on even more highly rarefied CEOs for this study, we analyzed CEOs honored in the *Harvard Business Review* top 100 global CEOs, *Forbes Next Billion-Dollar Startups*, and *Fortune Most Powerful Women* listings. Upper echelons theory research notes the importance of CEOs to firm success, driving strategy (Hambrick, 2007), and impacting corporate policies and performance (Graham, Harvey & Manju, 2013).

CEOs have an oversized impact on firm outcomes relative to other TMT members. Bolinger, Brookman and Thistle (2023) utilized variance decomposition techniques to ascribe outcome variances to CEOs and their TMT members. CEO effects were found to be significantly higher than those for TMT members.

A central premise of upper echelons theory was that values and personality influenced CEO's interpretation of and response to firm needs (Hambrick, 2007), and thus firm outcomes, with a call for more nuanced linkages between CEO characteristics and firm behavior and performance (Melis & Nawaz, 2024). Through a Linguistic Inquiry & Word Count, LIWC, text analysis of 49 top-ranked CEO Twitter (X) postings, multiple psychological characteristics were identified for each CEO, allowing for a unique and holistic analysis of the data. Given the impact of CEOs on firm outcomes, this

paper considers the following research question: Do top-performing CEO psychological characteristics load onto a limited number of psychological profiles that manifest to different degrees based on gender and firm-stage differences? The following theory section considers prior research on CEO psychological characteristics and profiling to inform the paper's hypotheses.

Theoretical framework and hypotheses

CEOs were shown to be influenced by their psychological characteristics, with cognitive biases and personal values directly impacting behavior and indirectly informing perceptual screening (Finkelstein, Hambrick & Cannella, 2009; Hambrick & Brandon, 1988). Watton, Lichtenstein and Aitken (2019) noted a relationship between personal values and a leader's firm-level purpose, behavior, and decisions. Personal values were observed to influence perceptions, affect solutions considered, impact interpersonal relationships, guide perceptions of success, and provide a basis for ethical decision-making. Mumford, Marks, Connelly, Zaccaro and Reiter-Palmo (2000) suggested leaders are promoted and effective in their roles because of how they approach solving problems. Other studies show that a leader's attributes, such as career background and age, influence performance (Datta, Rajagopalan & Zhang 2003; Wiersema & Bantel, 1992).

CEO psychological characteristics

Psychological characteristics shape an individual's attention, selection, and interpretation of stimuli, directly impacting CEO decision-making (Hambrick & Mason, 1984). Petrenko, Aime, Ridge and Hill (2016) noted that CEO psychological characteristics, such as narcissism, could negatively impact firm financial performance due to agency issues, while CEO values could drive firm-level corporate social responsibility decisions. Additional research studies noted correlations between leadership effectiveness and personality attributes (Judge, Bono, Ilies & Gerhardt, 2002; Peterson, Smith, Martorana & Owens, 2003). Bray, Campbell and Grant (1974) observed that interpersonal skills and achievement motivation in leaders assisted in their future promotions. Studies also noted correlations between leadership effectiveness and personality attributes (Judge et al., 2002; Peterson et al., 2003).

Drivers

Leadership is represented through behavior patterns influenced by personal attributes and values (Zaccaro, 2004). Personal values function as motivational guides for individuals (Higgins, 2007). These motivational guides focus on personal goals and goal-oriented actions, influencing a leader's behavior. McClelland and Boyatzis (1982) illustrated linkages between motivational traits, executive advancement, and effectiveness. Previously, McClelland (1961) proposed that a high-achievement driver would not be effective for executives, given the cooperative nature of organizational environments. Other drivers, such as affiliation and power, were posited and evaluated in the research literature (Brown, 1965; Conte & Plutchik, 1981). For example, power was correlated with garnering formal social power and impulsive actions such as risk-taking (Winter, 1973; Winter & Stewart, 1978).

Risk

As upper echelons theory suggests (Hambrick & Mason, 1984), the effect of a CEO's personality on strategic risk-taking has been well examined. Some researchers have focused on outcome probabilities (Hambrick, 2007), while others have focused on the cognitive limitations that may affect rational risk perceptions (Weber & Milliman, 1997) and ultimately influence risk assessment when making decisions on behalf of the firm (Sitkin & Pablo, 1992). Through such subjective judgments, CEOs perceive firm outcomes and their associated risks as correlated with personal losses and gains (Wiseman

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& Gomez-Mejia, 1998). However, the more unpredictable the outcome given firm context, the more conscientious the CEO may be about the risks and the effort involved (Miller & Toulouse, 1986).

Emotions

A CEO's emotional state reflects their ability to adapt to the demands of various situations, even when stressful (McCrae & Costa, 1997). Positive emotions are experienced more frequently by emotionally stable individuals, which benefits the CEO. For instance, Fredrickson (2001) noted that positive emotions, such as love and joy, expand an individual's range of attention, cognition, Kocsis (2003) and action. Further research has shown that this enhancement of attention and cognition correlates with complex problem-solving (Judge, Erez & Bono, 1998). On the contrary, negative emotions (e.g., fear, anxiety, and stress) correlate with reduced receptivity and acceptance of change (Huy, 2011; Teece, 2007). CEOs who maintain emotional stability promote both cooperation within the firm and a more substantial commitment to firm goals (Peterson et al., 2003).

Temporal focus

Prior research has shown that a CEO's temporal focus impacts critical firm operational and strategic approaches and outcomes. Impacts analyzed included the firm's strategic novelty, dynamism and distinctiveness (Agnihotri, Bhattacharya & Prasad, 2025), rate of new product development (Nadkarni & Chen, 2014), and strategic focus (causation vs. effectuation) (Kozachenko, Shirokova & Bodolica, 2024).

Psychological profiling and screening

Historically, upper echelons theory research had to proxy psychological characteristics with demographic indicators, termed the 'black box problem' for such studies, given the difficulty of CEO data collection (Lawrence, 1997). A better understanding of the psychological characteristics of TMTs was theorized to provide deeper insight into explanations of firm outcomes (Hambrick, 2007), a need enabled in this study by a unique data set for each top-ranked CEO subject with measures for emotions, drivers, risk, and temporal focus, each individually noted as impactful psychological characteristics informing CEO performance as noted earlier.

Combining psychological characteristics for profiling, assessment, and screening is a widely used technique in psychological research and practice. As an example, the California Psychological Inventory (CPI) assessment, available from the Myers-Briggs Company, has been used to 'find and develop leaders and high-potential employees' (The Myers-Briggs Company, 2025). A Web of Science search for the 'CPI' returned 587 publications. CPI and other profiling vehicles are used to both prescreen candidates and assess existing employees (Kelley, Jacobs & Farr, 1994; Roberts, Tarescavage, Ben-Porath & Roberts, 2019). Psychological profiling, also known as personality profiling, has been applied to assess individuals for optimal 'fit' with specific environments or roles; one such example is the Entrepreneurial Mindset Profile (Davis, Hall, & Mayers, 2016). Psychological profiling of criminals (Kocsis, 2003), athletes (Ruiz-Esteban, Olmedilla, Méndez & Tobal, 2020), patients (Lykouras, 2007), and doctors (Foster, Neidert, Brubaker-Rimmer, Artalejo & Caruso, 2010) provides examples of the span of existing psychological profiling research.

The prior research on the impact of CEO psychological characteristics on firm performance and the research literature on psychological profiling and screening suggest the following hypothesis:

Hypothesis 1: Top-ranked CEOs will cluster into a small number of psychological profiles.

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Firm context

CEO characteristics, such as drive, risk, and entrepreneurial orientation, impact firm outcomes differently based on firm context (Zhao, Seibert & Lumpkin, 2009; Busenitz & Barney, 1997). For example, Najar and Dhaouadi (2020) note the importance of a CEO's entrepreneurial orientation to promoting a firm's climate of innovation and pursuing open innovation strategies. In a study focused on the impact of CEO personality characteristics on small and medium enterprises' entrepreneurial orientation, Verdú-Jover, Estrada-Cruz, Rodríguez-Hernández and Gómez-Gras (2013) found strong correlations with CEO extraversion (40.68% of variance explained), openness to experience (18.64% of variance explained), conscientiousness, agreeableness, and neuroticism (latter three each at 13.56% of variance explained). A study of large publicly traded Indian software firms observed that entrepreneurial orientation had an inverted U-shaped relation to firm performance, with greater CEO power exacerbating negative outcomes (Saiyed, Tatoglu, Ali & Dutta, 2023). These studies suggest that differing firm contexts require CEOs with distinctive psychological profiles to maximize their respective outcomes, as noted in the following hypothesis:

Hypothesis 2: Dominant CEO psychological profiles will vary across differing firm contexts.

Gender

To better understand the impact of increased female leadership on companies, researchers have examined psychological differences between women and men (Croson & Gneezy, 2009). For example, studies have shown that women are more risk-averse than males (Faccio, Marchica & Mura, 2016; Sapienza, Zingales & Maestripieri, 2009). Within the psychology literature, males and females exhibit differences in core values, for example, self-transcendent values versus self-enhancement values (Schwartz & Rubel, 2005). Consistent with Schwartz and Rubel's findings, when examining the differences between female and male leaders, Graham et al. (2013) found significant gender differences regarding attitudes toward risks and values.

Despite these differences, other studies that have examined female leaders have indicated that female leaders will adopt behaviors that allow access or acceptance in male-dominated groups with the intent to benefit career advancement and pursue top management positions (Davies-Netzley, 1998; Ferree & Purkayastha, 2000). However, although studies such as these have focused on differences between female and male leaders, as well as on the differences in their psychological characteristics, it is unclear if top-performing female CEOs will exhibit psychological profiles distinctive from their male counterparts. Given this prior research, we posit the following hypothesis:

Hypothesis 3: CEO psychological profiles will vary with gender.

Methodology

Scholars have called for a more holistic perspective when analyzing CEO values and personality (Wowak, Gomez-Mejia & Steinbach, 2017); however, gathering such information has historically been difficult. Responding to this call, this study sought to identify a set of psychological profiles of top-ranked CEOs by analyzing a corpus of top-ranked CEO Twitter postings and studying them utilizing linguistic analysis software (LIWC), principal component analysis (PCA), binary logistic regressions, and *t*-tests.

Top CEO subject identification and data collection

This study analyzed top-ranked CEOs as recognized by business trade press rankings (Harvard Business Review, 2018; Forbes, 2018; Fortune, 2018). By definition, top-ranked CEOs are a rare breed. For instance, the S&P Global 1200 index of global equities accounts for approximately 70% of

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total global stock capitalizations. This index, by definition, represents 1,200 CEOs and is the original source for the Harvard Business Review (HBR) top 100 CEO listing, one of the sources for this study (Harvard Business Review, 2018).

Numerous business trade publications provide top CEO rankings with criteria varying from personal earnings, employee feedback, reputation, and firm performance (Barron's, 2018; Bastone, 2018; Glassdoor, 2019; Melin & Sam, 2020; Valet, 2018). The publications highlight CEOs in top 10 to top 200 rankings, with CEOs overlapping between different listings. Top-ranked CEO analyses are thus highly focused studies, which, in our case, are further reduced based on the CEO's personal Twitter use.

Starting with the initial top-ranked CEOs identified in the business trade publication listings, a search was conducted to identify the CEO's personal Twitter account, versus a corporate account that mentioned the CEO. If a personal Twitter account was not identified, the CEO was dropped from the analysis. CEO tweets were downloaded from the Twitter website. Given software constraints, only the latest 3,200 tweets could be downloaded per CEO. All words containing '@' (indicating proper name references), all words containing 'HTTP' (links), and all retweets were removed from the resulting data set prior to the textual analysis to ensure only CEO generated text was analyzed. If the CEO's cumulative personal tweet content did not exceed 250 words, the CEO record was dropped from the analysis given LIWC guidance on minimal corpus size for an effective linguistic analysis. Accounts were also dropped if tweets were not in English. The accounts studied are personal CEO Twitter accounts, which are more likely to be directly managed by the CEO or, at a minimum, receive their direct oversight and approval of content given the personal nature of the channel. However, to further judge personal versus for-hire tweeting activity, the data were checked to ensure the CEO was the only member listed, analyzed for the use of replies, and reviewed for personal content, all useful indicators of authentic CEO engagement. If this screening suggested the CEO had outsourced their postings, the CEO was dropped from the data set.

These filters significantly reduced the data set available for analysis. For example, the CEOs sourced from the *Harvard Business Review*'s top 100 global CEOs were reduced to 16 available for analysis in the final CEO data set. These cumulative screening steps resulted in a final data set of 49 CEOs. Ten of the 49 CEOs were female, and 21 of the firms were classified as small and medium enterprises (SMEs) based on source (Forbes Next Billion-Dollar Startups listing) and a review of available revenue and funding data. Demographic data on the CEOs and their companies were also collected. This included CEO age, years at the firm, and years as CEO.

Text analysis to identify psychological characteristics by subject

The LIWC software extracted features from the CEO's Twitter postings (all pre-July 2020), similar to analyses in other studies leveraging linguistic analysis software (Akstinaite, Robinson & Sadler-Smith, 2020; Pennebaker, Boyd, Jordan & Blackburn, 2015; Schultheiss, 2013). LIWC-extracted features include summary language variables, linguistic dimensions (including grammar), and psychological characteristics (Pennebaker et al., 2015). The psychological characteristics considered in this analysis are measures available from the LIWC software and noted as impactful in prior upper echelons theory research. They include emotionality (positive and negative), temporal focus (present and future), risk tolerance, and drivers (affiliation, achievement, power, and reward). LIWC analytics have been utilized in recent research literature, with more than 802 LIWC references found on the Web of Science with 92 of those including a Twitter reference. Several LIWC studies have focused on top leaders by analyzing political leaders (Kangas, 2014) and Chief Marketing Officers' communications to extract psychological characteristics and evaluate performance impacts (Winkler, Rieger & Engelen, 2020), serving as exemplars for this paper's CEO focus.

Combining the psychological characteristics identified into CEO psychological profiles via a factor analysis (PCA) provides a path to address the endogeneity problem inherent in upper echelons theory studies and an opportunity to utilize CEO psychological profiles to '… turn upper echelons theory

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on its head. … By [being able to treat] … executive characteristics as dependent variables, we will not only open up new avenues for thinking about organizational adaptation and intra-organizational power struggles but will almost certainly gain insights that will … sharpen our predictions of how and why executives' characteristics become manifested in organizational outcomes' (Hambrick, 2007: 338). The CEO psychological profiles identified are a result of board or investor selection criteria and CEO appointment.

PCA to identify psychological profiles

The LIWC-derived psychological characteristics were next analyzed via a PCA extraction method to combine, and thus reduce, the variables, identifying unique components, termed here as CEO psychological profiles. The unique psychological profiles (components) were required to have eigenvalues greater than 1, indicating that the component explained more variance than any single variable in the data set. The components were rotated using a Varimax with Kaiser normalization that identified and reduced the number of critical variables per component, facilitating interpretation of results and cross-component comparisons.

Measures for the psychological characteristics included in the PCA were relative measures to the study's overall top-ranked CEO sample (Z-values). These Z-values were used to normalize measures across variables.

Binary logistic regressions and t-tests to consider gender and firm size differences

The rotated and extracted variables (psychological characteristics) for each component (psychological profile) were included as independent variables in binary logistic regression models where gender and firm size served as dependent variables. The binary logistic regressions were conducted for each psychological profile derived from the PCA analysis, with the psychological characteristics included in the profile serving as the model's independent variables. Overall model fit (Cox & Snell R^2 values) and classification results were considered to determine if psychological profile differences were supported. Box and whisker plots were next used to visualize and compare the overlap of the binary subject (male–female and large firm–SME) psychological characteristics data included in the profiles. Psychological characteristics were next analyzed using t-tests to confirm statistical differences in the data.

Results

Table 1 provides a list of the final CEOs in the data set, company information, and details on the CEO Twitter data used in this analysis. The LIWC text analysis was used to derive values for the nine psychological characteristics analyzed in this study: drivers (affiliation, achievement, power, and reward), risk tolerance, temporal focus (present and future), and emotionality (positive and negative) via an analysis of text corpora from the Twitter (X) postings of the CEO subjects. The average corpus had 3,916 words with a word range per subject of 296–9,000 words (minimum word count needed for an LIWC analysis is 250).

The LIWC text corpora analysis identified subject values for the nine different psychological characteristics with the resulting data converted to Z-values as noted in Table 2.

A Kaiser–Meyer–Olkin measure of 0.503 found the data set to be acceptable for factor analysis (a minimum value of 0.5 or above required). A Bartlett's test of sphericity was found to be significant at <0.001 (a maximum value of 0.05 acceptable), indicating no significant correlation between variables, a requirement when conducting a factor analysis. The PCA reduced the nine initial psychological characteristics into four psychological profiles (all with eigenvalues > 1.0) that collectively explained 78.11% of total sample variance. The results of the unrotated and rotated factor solutions based on eigenvalues greater than 1 and a maximum iteration of 25 (rotation converged in five iterations) are presented in Tables 3 and 4. Table 4 also lists the % variance explained by each psychological profile

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Table 1. CEO subject data

CEO	Company	SM_Ent	SIC-code	Gender	Age	CEO (years)	Fortune[a]	HBR[a]	Forbes[a]	Twitter ID	Tweet start	Tweet end	Total number of words
Mary Barra	General Motors	0	5511	0	58	6	1	0	0	@mtbarra	Apr-13	Jun-20	5,154
Margaret M. Keane	Synchrony Financial	0	6282	0	61	6	1	0	0	@SYFMKeane	Jul-15	Jun-20	1,656
Beth Ford	Land O'Lakes	0	5159	0	57	2	1	0	0	@BethFordLOL	Apr-17	Jun-20	3,341
Kathryn V. Marinello	Hertz Global Holdings	0	6411	0	64	3	1	0	0	@KathyMarinello	Oct-17	Jun-20	995
Patti Poppe	CMS Energy	0	4931	0	51	4	1	0	0	@poppepk	Feb-11	Jun-20	3,458
Lisa Su	Advanced Micro Devices	0	7371	0	50	6	1	0	0	@LisaSu	Mar-17	Jun-20	1,250
Bernadette Nixon	Algolia	1	7373	0	53	2	0	0	1	@bvnixon	Nov-11	Jul-20	5,001
Brynn Putnam	Mirror	1	8600	0	36	3	0	0	1	@BrynnPutnam	Sep-18	Jul-20	505
Lidia Yan	Next Trucking	1	4731	0	38	5	0	0	1	@lidi-ayan2012	Aug-12	Apr-20	901
Julie Sweet	Accenture	0	8748	0	52	1	1	0	0	@JulieSweet	Sep-15	Jun-20	5,081
Marc Benioff	Salesforce.com	0	7374	1	55	21	0	1	0	@Benioff	Nov-19	Jun-20	5,255
Bernard Charlès	Dassault Systèmes	0	7371	1	63	25	0	1	0	@BernardCharles	Dec-12	Jun-20	1,599
Brad Smith	Intuit	0	7374	1	61	11	0	1	0	@IntuitBrad	Dec-13	Jun-20	5,243
Robert Iger	Disney	0	7812	1	69	15	0	1	0	@Robertiger	Feb-17	Jun-20	5,296
Mark Bertolini	Aetna	0	6411	1	64	10	0	1	0	@mtbert	Sep-09	Jun-20	5,357
Satya Nadella	Microsoft	0	7389	1	52	6	0	1	0	@satyanadella	Feb-09	Jun-20	5,133
Douglas Baker Jr.	Ecolab	0	5169	1	61	16	0	1	0	@CEOEcolab	Jul-17	Jun-20	3,658

(*Continued*)

Table 1. (*Continued.*)

CEO	Company	SM_Ent	SIC-code	Gender	Age	CEO (years)	Fortune[a]	HBR[a]	Forbes[a]	Twitter ID	Tweet start	Tweet end	Total number of words
Masayoshi Son	Softbank	0	8741	1	62	39	0	1	0	@masason	Nov-10	Jun-20	475
Bruce Broussard	Humana	0	6324	1	57	7	0	1	0	@BruceDBroussard	Jan-13	Jun-20	2,528
Jeffrey Bezos	Amazon	0	5942	1	56	26	0	1	0	@JeffBezos	Nov-15	Jun-20	1,820
Bobby Kotick	Activision Blizzard	0	7374	1	57	29	0	1	0	@BobbyKotick	May-12	Jun-20	995
Reed Hastings	Netflix	0	7374	1	59	22	0	1	0	@reed-hastings	Jun-14	Jun-20	253
Ola Rollén	Hexagon	0	3823	1	55	20	0	1	0	@OlaRollen	Apr-12	Jun-20	3,952
Corie Barry	Best Buy	0	5731	1	44	1	1	0	0	@Corie_Barry	Nov-16	Jun-20	1,820
Eric Kinariwala	Capsule	1	2711	1	37	5	0	0	1	@ekinariwala	Jan-10	Jul-20	3,559
Joshua Motta	Coalition	1	8742	1	36	3	0	0	1	@joshuamotta	Nov-11	Jul-20	3,598
Amit Bendov	Gong	1	7372	1	55	5	0	0	1	@ban-ditmove	Dec-08	Jul-18	5,147
Jason Boehmig	Ironclad	1	7372	1	38	6	0	0	1	@jboehmig	Sep-16	Jul-20	2,558
Bhavin Shah	Moveworks	1	7361	1	42	4	0	0	1	@bhavinator	Dec-10	Jul-20	5,616
Parker Conrad	Rippling	1	5045	1	40	4	0	0	1	@park-erconrad	Nov-12	Jul-20	1,734
Andrew Peterson	Signal Sciences	1	7372	1	36	7	0	0	1	@AMPeters06	Jun-09	Jul-20	5,774
Gaurab Chakrabarti	Solugen	1	2879	1	31	3	0	0	1	@GaurabC	Dec-08	Jul-20	5,284
Richard Waldron	tray.io	1	7372	1	35	8	0	0	1	@rich-waldron	Apr-17	Jul-20	1,330
Lennie Sliwinski	Trusted health	1	8099	1	33	3	0	0	1	@Lennie_S	Oct-12	May-19	4,977
Brandon Rodman	Weave	1	2211	1	39	8	0	0	1	@brandon-rodman	Sep-09	Jan-20	551

(*Continued*)

Table 1. (*Continued.*)

CEO	Company	SM_Ent	SIC-code	Gender	Age	CEO (years)	Fortune[a]	HBR[a]	Forbes[a]	Twitter ID	Tweet start	Tweet end	Total number of words
Michael Gronager	CHAINALYSIS	1	7372	1	49	5	0	0	1	@gronager	Apr-09	Jul-20	1,413
Lior Div	CYBEREASON	1	7371	1	41	8	0	0	1	@liordiv	Jan-14	May-20	4,034
Jason Wilk	Dave	1	7378	1	34	4	0	0	1	@Jasonwilk	Jun-08	Jul-20	5,655
Blake Murray	Divvy	1	5812	1	35	4	0	0	1	@blakemur	May-19	Jun-20	792
Luis von Ahn	Duolingo	1	7372	1	39	9	0	0	1	@LuisvonAhn	Mar-10	Jul-20	5,444
Dylan Field	Figma	1	7371	1	27	8	0	0	1	@zoink	Nov-17	Jul-20	5,549
Matt Elenjickal	FOURKITES	1	7373	1	37	6	0	0	1	@Matt_Elenjickal			4,609
Stuart Landesberg	GROVE COLLABORATIVE	1	5122	1	34	7	0	0	1	@Stu_Land	May-12	Jul-20	1,279
Jack Altman	Lattice	1	3674	1	30	4	0	0	1	@jaltma	Sep-12	Jul-20	5,624
Jack Conte	Patreon	1	7371	1	35	7	0	0	1	@jackconte	Apr-13	Jul-20	5,553
Denis Mars	Proxy	1	7311	1	42	4	0	0	1	@denismars	Apr-08	Jul-20	4,619
Matt Oppenheimer	Remitly	1	7372	1	37	9	0	0	1	@matt_oppy	Aug-13	Jul-20	5,006
Karthik Rau	Signalfx	1	7372	1	41	5	0	0	1	@krrau	Nov-12	Oct-19	540
Umar Afridi	TRUEPILL	1	2828	1	37	4	0	0	1	@UAfridi	Jun-11	Jul-20	1,242

[a]Listings: Fortune Most Powerful Women (CEOs), HBR Top Global CEOs, and Forbes Next Billion-Dollar Startups.

Table 2. LIWC psychological characteristic output *Z*-values (all subject data)

	Z_ posemo	Z_ negemo	Z_ affiliation	Z_ achievement	Z_ power	Z_ reward	Z_ risk	Z_ present	Z_ future
Max	3.490	2.349	3.306	1.554	3.519	1.653	5.151	1.844	4.861
Mean	−0.045	−0.051	0.000	−0.163	−0.102	−0.044	0.081	0.114	0.022
Min	−1.677	−1.033	−1.461	−2.326	−1.943	−1.208	−1.299	−1.681	−1.063
SD	1.155	0.790	1.103	0.959	1.136	0.743	1.240	0.857	1.213

Table 3. PCA component (psychological characteristics) matrix

	1	2	3	4
Z_posemo	0.787		0.396	
Z_affiliation	0.764			
Z_achievement	0.741	0.413		−0.381
Z_negemo	−0.733	0.304	0.412	
Z_risk	−0.681	0.385		
Z_reward	0.579	0.53		0.348
Z_power		0.763		−0.397
Z_present		0.328	0.732	0.336
Z_future		0.371	−0.593	0.648

Table 4. PCA-rotated psychological characteristics matrix with % variance explained

	Grey flannel suits	Self-actualizers	Empaths	Greyhounds
% variance explained	35.056	17.578	14.140	11.338
Z_negemo	−0.807		0.353	
Z_risk	−0.804			
Z_affiliation	0.744			
Z_posemo	0.752		0.481	
Z_power		0.889		
Z_achievement	0.435	0.805		
Z_reward	0.366	0.482	0.409	0.451
Z_present			0.862	
Z_future				0.953

derived from this analysis. Figure 1 provides a scree plot mapping the psychological profiles to their eigenvalues.

Based on the differences noted in the underlying psychological characteristics, the authors assigned names to the psychological profile to represent them and to assist in distinguishing between them. This naming was arbitrary; however, they were selected to represent the underlying psychological characteristics, noted in Table 4, most strongly associated with each profile. These naming choices utilized a literary technique, termed aptronym, to capture each psychological profile's distinctiveness.

The 'grey flannel suits' profile represented 35.06% of variance explained, the most popular profile identified. These CEOs exhibited higher positive emotionality, lower negative emotionality, a lower risk tolerance, and a high affiliation driver. The 'self-actualizers' profile represented 17.58% of variance explained. These CEOs exhibited high power and achievement drivers. The 'empaths'

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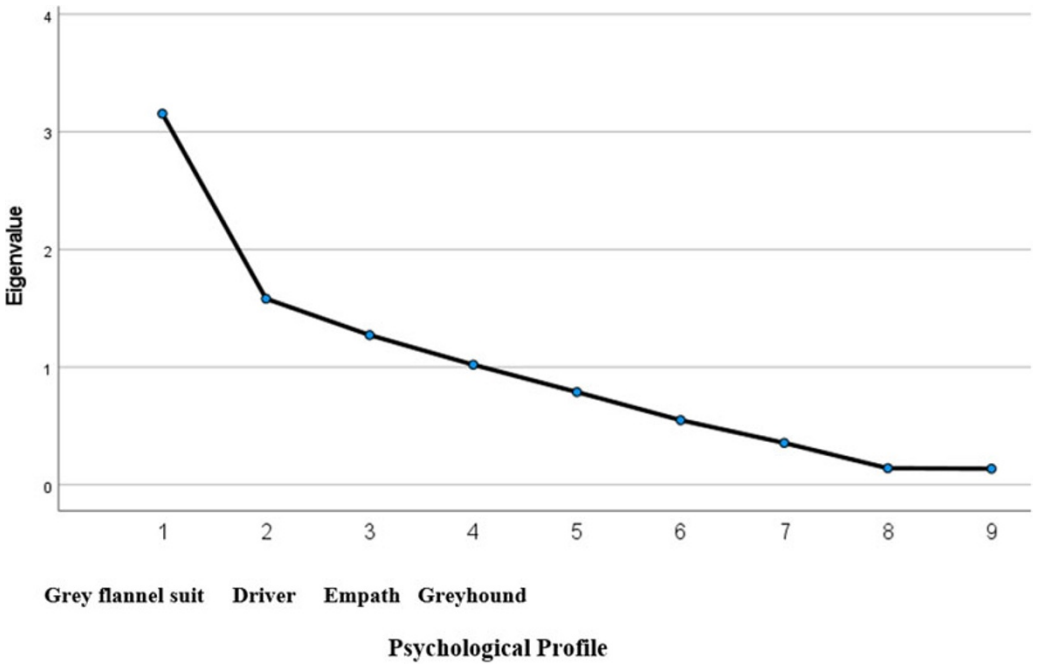

Figure 1. Scree plot.

Table 5. Binary logistic regression firm size Dependent Variables (DVs) and psychological profile characteristic Independent Variabless (IVs)

	Grey flannel suits	Self-actualizers	Empaths	Greyhounds
Cox & Snell R^2	0.463	0.218	0.438	0.044
Nagelkerke R^2	0.621	0.293	0.589	0.059
Classification % correct SME	81%	57.1%	71.4%	14.3%
Classification % correct large firm	89.3%	85.7%	89.3%	82.1%
Significant variable(s)	1 (negemo)	1 (achievement)	1 (negemo)	0

profile represented 14.14% of variance explained. These CEOs exhibited high emotions (both positive and negative) and a strong present focus. The 'greyhound' profile represented 11.34% of variance explained. These CEOs exhibited a high future focus. Note that a high reward driver was found across all four profiles.

Next, binary logistic regression analyses were conducted to evaluate the psychological profile's relationship to firm size (large and SME) and CEO gender (male and female) differences, the dependent variables in the respective analyses. For firm size, the model fit R^2 values were strong (Cox & Snell R^2 ranging from 0.438 to 0.463) for the 'grey flannel suits' and 'empaths' profiles, moderate for the self-actualizers profile (Cox & Snell R^2 of 0.218), and low for the 'greyhounds' profile (Cox & Snell R^2 of 0.044). High levels of classification accuracy for SME CEOs were observed for the 'gray flannel suit' and 'empaths' profiles (81% and 71.4% accuracy, respectively). 'Self-actualizers' classification accuracy of 57.1% was a bit better than a coin toss, while 'greyhounds' classification accuracy was a poor 14.3%. The strong model fits and classification accuracy noted were suggestive of discernible differences in CEO profiles sorted on firm size. Table 5 provides the results of the firm size's binary logistic regression analysis.

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Table 6. Binary logistic regression gender DVs & psychological profile characteristic IVs

	Grey flannel suits	Self-actualizers	Empaths	Greyhounds
Cox & Snell R^2	0.220	0.170	0.177	0.073
Nagelkerke R^2	0.345	0.226	0.277	0.114
Classification % correct female	50%	40%	30%	0%
Classification % correct male	97.4%	97.4%	97.4%	97.4%
Significant variable(s)	0	1 (achievement)	0	0

The model fit and classification accuracy for the gender analysis demonstrated poorer model fit and limited classification discernment, with the best classification accuracy for female CEOs at 50% for the 'grey flannel suits' profile. Table 6 provides the results of the gender differences' binary logistic regression analysis.

To further investigate the strong firm size distinctness suggested across three of the profiles and potential gender differences for the 'grey flannel suits' profile, the individual psychological characteristic data contributing to the psychological profile models were visualized using box and whisker plots to discern differences, followed by *t*-test analyses to confirm statistical significance. Figure 2 provides the box plots for firm size differences, and Fig. 3 provides the box plots for gender differences with the respective input data noted in Tables 7 and 8.

The visual analysis of the box plots suggested likely differences in the emotionality and affiliation driver psychological characteristics for both the gender- and firm size-differentiated samples; however, the *t*-test results did not find these characteristic differences to be statistically distinct. The *t*-test results did however find statistically significant differences in the temporal focus and reward drivers for both the gender and firm size analyses. In addition, risk tolerance and power driver differences were identified for the gender delineated data. The *t*-test results are noted in Tables 9 and 10.

Discussion

Although the psychological profile embodying the 'man' in the grey flannel suit profile appears alive and well among top-ranked CEOs, there was significant diversity between the four psychological profiles observed. The binary logistic regression analysis noted variation in profile occurrences across firm sizes, supporting previous studies indicating CEO variations related to firm differences (Zhao & Seibert, 2006; Busenitz & Barney, 1997). These findings support Hypotheses 1 and 2 with the existence of several distinct CEO psychological profiles and their varying prevalence in CEOs leading large versus SME firms.

This study suggests that CEO psychological profiles are not gender distinct, failing to provide support for Hypothesis 3. However, the box plot and *t*-test evaluations provided support for gender distinctions at the psychological characteristic level of analysis. The psychological characteristic gender differences noted in the *t*-tests included temporal focus, risk tolerance, and power/reward drivers; however, Cohen's *d* effect size measures suggested small to medium impacts from these differences that were apparently 'lost' at the aggregated psychological profile level.

Contributions

This study identifies the presence of a diverse but limited set of psychological profiles represented within the rarefied world of top-ranked CEOs. The research suggests that while there is no single, winner-take-all CEO psychological profile, there is a limited repertoire. The variations noted based on firm size suggest that certain psychological profiles may have a 'Darwinian' advantage in varying firm contexts. The lack of support for gender-based psychological profile differences noted suggests that, after climbing to the summit of top-ranked CEO leaders, psychological profile conformity may

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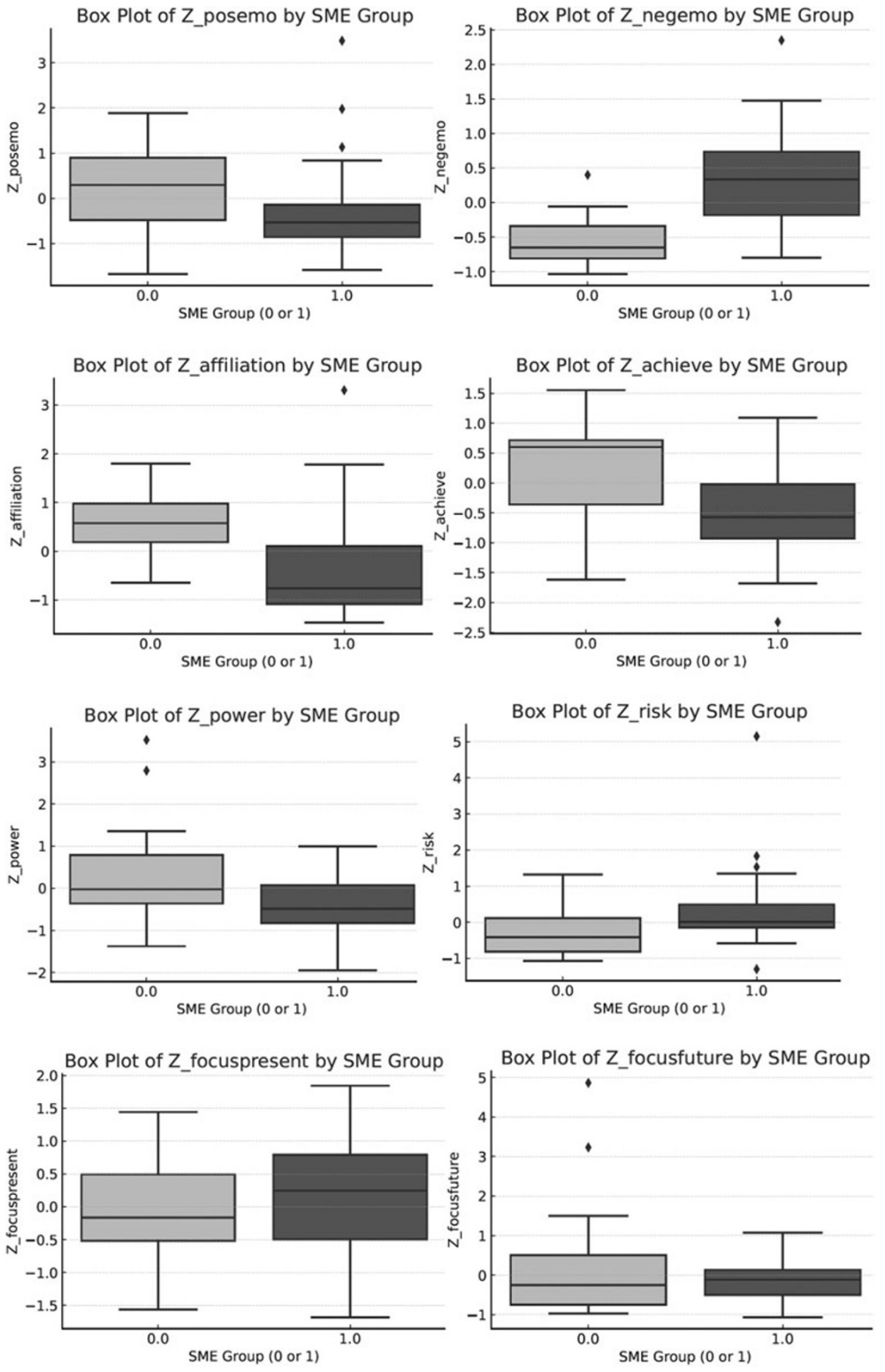

Figure 2. Firm size psychological characteristic box and whisker comparisons (SME = 1).

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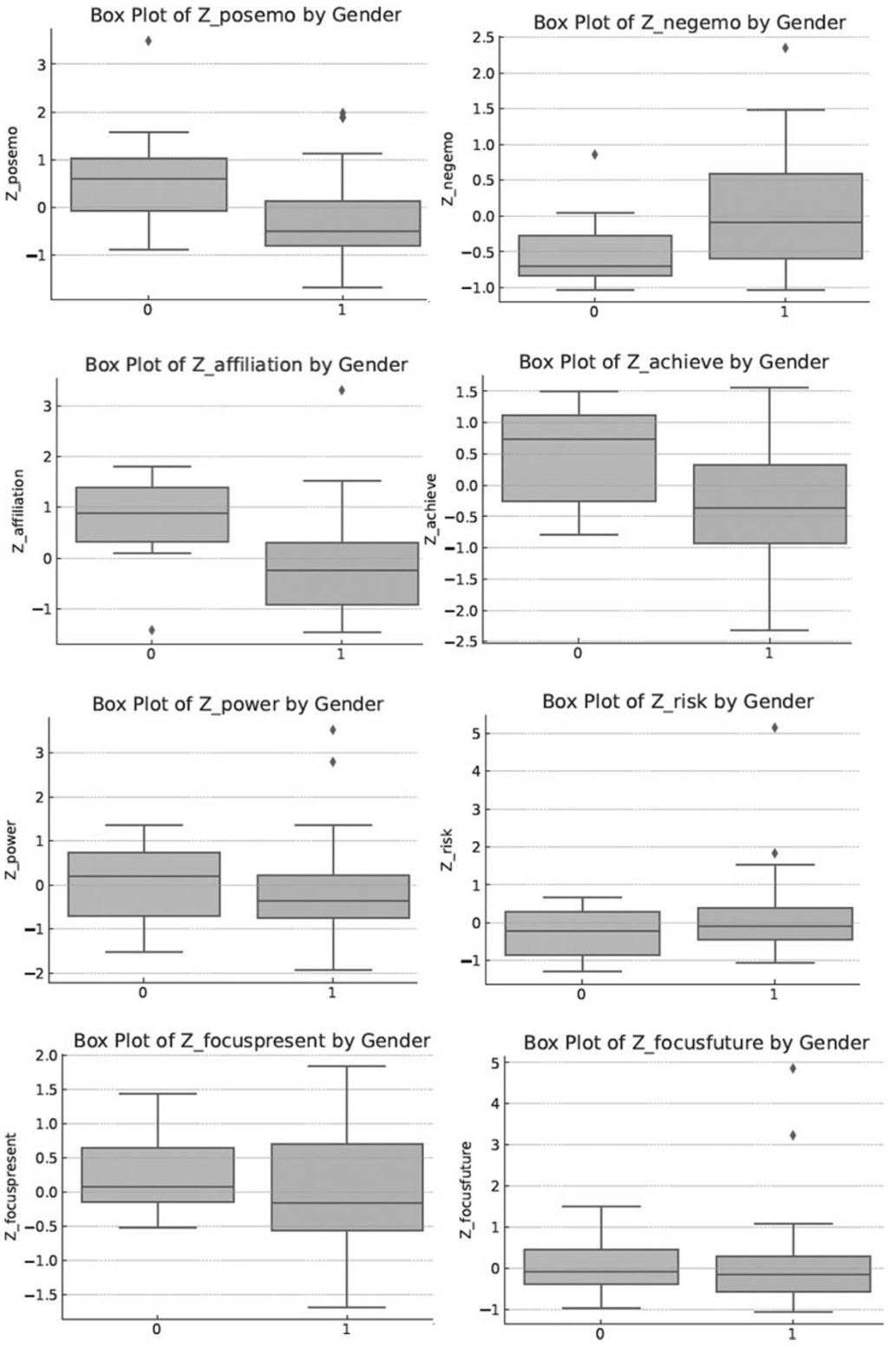

Figure 3. Gender psychological characteristic box and whisker comparisons (female = 0).

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Table 7. LIWC psychological characteristics by firm size with quartiles for box plots

Variable	SME = 1	Mean	SD	Min	Q1 (25%)	Median	Q3 (75%)	Max
Z_posemo	0	0.295	0.953	−1.676	−0.488	0.294	0.897	1.866
Z_posemo	1	−0.301	1.064	−1.585	−0.862	−0.534	−0.141	3.490
Z_negemo	0	−0.582	0.364	−1.033	−0.809	−0.652	−0.339	0.400
Z_negemo	1	0.348	0.687	−0.798	−0.182	0.333	0.736	2.349
Z_affiliation	0	0.548	0.651	−0.643	0.186	0.577	0.978	1.802
Z_affiliation	1	−0.411	1.045	−1.461	−1.082	−0.757	0.107	3.306
Z_achievement	0	0.282	0.904	−1.616	−0.359	0.601	0.718	1.554
Z_achievement	1	−0.498	0.760	−2.326	−0.925	−0.574	−0.021	1.093
Z_power	0	0.315	1.222	−1.373	−0.361	−0.024	0.788	3.519
Z_power	1	−0.415	0.697	−.1943	−0.828	−0.482	0.076	0.999
Z_risk	0	−0.264	0.697	−1.067	−0.811	−0.417	0.117	1.323
Z_risk	1	0.339	1.170	−1.299	−0.144	0.008	0.494	5.151
Z_focuspresent	0	−0.007	0.718	−1.566	−0.517	− 0.162	0.494	1.444
Z_focuspresent	1	0.205	0.869	−1.681	−0.496	0.246	0.792	1.844
Z_focusfuture	0	0.220	1.449	−0.973	−0.750	−0.253	0.502	4.861
Z_focusfuture	1	−0.127	0.519	−1.063	−0.501	−0.115	0.133	1.069

Table 8. LIWC psychological characteristics by gender with quartiles for box plots

Variable	Female = 0	Mean	SD	Min	Q1 (25%)	Median	Q3 (75%)	Max
Z_posemo	0	0.68	1.236	−0.895	−0.071	0.589	1.029	3.49
Z_posemo	1	−0.231	0.927	−1.676	−0.815	−0.504	0.135	1.978
Z_negemo	0	−0.485	0.578	−1.033	−0.84	−0.703	−0.277	0.86
Z_negemo	1	0.061	0.733	−1.033	−0.591	−0.092	0.585	2.349
Z_affiliation	0	0.747	0.963	−1.42	0.322	0.874	1.398	1.802
Z_affiliation	1	−0.191	0.941	−1.461	−0.914	−0.246	0.297	3.306
Z_achievement	0	0.523	0.86	−0.788	−0.265	0.734	1.116	1.499
Z_achievement	1	−0.339	0.838	−2.326	−0.929	−0.367	0.324	1.554
Z_power	0	0.056	0.951	−1.521	−0.712	0.198	0.733	1.357
Z_power	1	−0.143	1.038	−1.943	−0.757	−0.361	0.213	3.519
Z_risk	0	−0.257	0.712	−1.299	−0.852	−0.22	0.291	0.673
Z_risk	1	0.167	1.089	−1.067	−0.44	−0.092	0.395	5.151
Z_focuspresent	0	0.258	0.6	−0.517	−0.143	0.073	0.655	1.444
Z_focuspresent	1	0.077	0.854	−1.681	−0.559	−0.158	0.709	1.844
Z_focusfuture	0	0.01	0.741	−0.973	−0.381	−0.09	0.442	1.497
Z_focusfuture	1	0.025	1.098	−1.063	−0.587	−0.15	0.279	4.861

Table 9. Firm size (large and SME) psychological characteristic *t*-test comparisons

	Equality of means significance (two-sided *p*)	Cohen's *d* effect size point estimate	Cohen's *d* effect size benchmarks
Z_posemo	.048**	−0.585	Medium
Z_affiliation	<.001**	−1.067	Large
Z_achievement	<.001**	−0.946	Large
Z_negemo	<.001**	1.626	Large
Z_risk	.041**	0.606	Medium
Z_reward	.269	−0.323	Small
Z_power*	.020**	−0.764	Medium
Z_present	.248	−0.338	Small
Z_future	.368	0.263	Small

*Equal variances not assumed.
**Significance at the 0.05 level.

Table 10. Gender (female and male) psychological characteristic *t*-test comparisons

	Equality of means significance (2-sided *p*)	Cohen's *d* effect size point estimate	Cohen's *d* effect size benchmarks
Z_posemo	.012**	−0.918	Large
Z_affiliation	.007**	−0.992	Large
Z_achievement	.006**	−1.024	Large
Z_negemo*	.022**	0.774	Medium
Z_risk	.250	0.413	Small
Z_reward	.062	−0.679	Medium
Z_power	.585	−0.195	Small
Z_present	.968	0.014	Small
Z_future*	.447	−0.224	Small

*Equal variances not assumed.
**Significance at the 0.05 level.

be the norm (within the limits of the repertoires noted). Gender differences were detected for certain psychological characteristics underlying the profiles; however, this distinctiveness was lost in the aggregated measure results.

The confluence of automated linguistic analysis tools, such as LIWC, with the ability to source large corpora of CEO data from social media and other electronic platforms enabled this study and its ability to conduct a more holistic analysis of top-ranked CEO psychological characteristics and profiles, providing a unique contribution to upper echelon theory research.

Limitations

While social media, subject postings, and linguistic analysis tools enabled this research, collecting the data and conducting data 'hygiene' tasks remains a non-trivial task, explaining the modest sample size of this study and the need to enlarge the sample in further research. In addition, the efficacy of the psychological characteristics available via the LIWC textual analysis approach may be questioned. Even highly studied psychological characteristics, such as CEO narcissism, remain in a state of further ongoing validation (Koch-Bayram & Biemann, 2020).

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As linguistic analysis methods become more applied, subjects such as CEOs may increasingly manage their publicly accessible content to manipulate perceptions and outcomes through such analytic methods. Data accessibility from software platforms such as Twitter (X) can also be easily limited based on social media company objectives or regulatory pressures.

When it comes to CEO decision-making and performance, psychological characteristics and profiles are just one 'piece of the puzzle'. For instance, studies have indicated that a new CEO's lack of technological expertise was linked to a significant decline in firm innovation (Cummings & Knott, 2017). Moreover, there are other psychological characteristics beyond those accessible through LIWC that are important. For example, a substantial body of literature exists on CEO narcissism and its influence on decision-making (O'Reilly and Hall, 2021)

Our top-rated CEO data sourcing presents the potential for selection bias. Business trade press listings were utilized to highlight the top-rated CEOs analyzed in this study. The goal of using these lists to source the CEOs was to identify independently recognized exceptional performers in the already exclusive world of CEOs, perhaps increasing the signal from our subject data. However, the press listings had different selection criteria, and firm size was bifurcated between the trade press listings. On the small/medium company side, the listings were primarily sourced from the Forbes Next Billion-Dollar Startup list. For these companies, many of the CEOs are firm founders and are active in the technology space. This presents potentially confounding industry and start-up experience moderating variables not controlled for in this analysis.

Research agenda

This paper concludes with a broad call for continued CEO and TMT research leveraging linguistic analysis software and C-suite corpora to further inform upper echelons theory. Suggestions for ongoing research include studies of TMT homophily, global differences, and more diverse leadership contexts.

Relevant to TMT homophily, Rivera (2012) observed the importance of cultural matching in hiring decisions from a corporate case study informed by 120 employee interviews and hiring committee observations. Cultural matching of candidates and reviewers was signaled by a candidate's leisure pursuits, career, social experiences, and presentation style. While overall job competence was 'table stakes' for consideration, cultural matching versus productivity optimization was the next most important selection criterion. Greenberg and Mollick (2017) observed three distinctive homophily forms impacting funding decisions in a study of crowdfunding campaigns: 'induced homophily' (social category affiliation), 'interpersonal choice homophily' (similarity of individuals), and 'activist choice homophily' (shared social barrier experiences). In combination, these studies suggest that homophily is important in selection decisions and that homophily considerations are stratified across various dimensions. Homophily across psychological characteristics and profiles as a consideration in CEO and TMT selection would not be unexpected given these findings. Control variables would be needed, such as firm size, industry, CEO tenure, CEO gender, CEO as founder, TMT members hired by the CEO, and firm financial performance, for such analyses to consider the following question for consideration: Do TMT members hired by the CEO reflect the CEO's psychological profile?

Do CEO psychological profiles vary by industry?

Enabling the study of global CEO psychological profiles, linguistic analysis tools, such as LIWC, have expanded their global coverage with dictionaries in German and French, as examples (LIWC, 2024). This study can be replicated using multi-language corpora allowing for cross-country analyses. Varying global contexts can be quite distinct requiring different skills to navigate. Mersland and Strom (2009) found microfinance institution performance improved with local versus international directors. US versus U.K. CEOs are paid differently, with US CEOs receiving significantly larger 'at risk' compensation (Conyon, Core & Guay, 2011). Even the instantiation of capitalism varies across Western countries as noted in a study by Schmidt (2003) comparing the market capitalism of

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the United Kingdom to the managed and state capitalism of Germany and France. These observations suggest the following question for consideration: Do variations in CEO psychological profiles correlate with variations in firm geographic headquarters for otherwise similarly situated firms?

Moving beyond the traditional corporate C-suite, leaders work in numerous alternative contexts such as academia, non-profits, and politics. Leaders in these diverse contexts can be similarly analyzed and compared to those highlighted in this corporate-focused study. For example, LIWC has been used to investigate US Presidential and Vice-Presidential candidates (Kangas, 2014), suggesting the following research question: Do top leader psychological profiles vary across leadership contexts?

The methodological approach taken in this paper informs critiques levied against upper echelons theory research (Brett, Neely, Lovelace, Cowen & Hiller, 2020). For this study, the 'black box' that this approach sought to unpack was visibility to individual top-ranked CEO's multi-faceted psychological characteristics, transformed into more holistic leadership psychological profiles. The black box problem for upper echelons theory in general has historically been a data collection and access problem. As Hambrick (2007) noted, access to upper echelon individuals is difficult; however, new technologies and analytic tools reduce these barriers for future research. Brett et al. (2020) categorized the black box issues noted in prior studies as cognitive and relational in nature. While relational considerations are not addressed in this paper, electronic records and social network analysis tools and techniques may similarly provide novel paths to advance this relational-focused research and further inform upper echelons theory in a TMT context.

This paper responds to Brett et al.'s (2020) metacritiques of upper echelons theory beyond the black box issues already discussed. A second metacritique raised was the incongruence of constructs and measures with a recommendation to 'shift focus toward better understanding how distal a proxy/unobtrusive variable is from the focal variable' (Brett et al., 2020: 1034). By focusing on CEO psychological profiles, this paper suggests a path forward to address this 'focal variables' concern in future research.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/jmo.2025.10041.

Conflicts of interest. The authors declare that they have no competing interests.

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