

Examining the Influence of CEOs' Narcissism on Environmental, Social, and Governance Performance¹

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Abstract

This study develops and presents a novel neural network-based model for identifying narcissistic sentences in the ESG (environmental, social, and governance) reports of Japanese companies. By analysing 1,535 top management messages in non-financial disclosures spanning five years, the research finds an inclination towards narcissism. Distinct from previous methodologies that have focused on first- and second-person word-based narcissism indicators, our model innovatively evaluates narcissistic tendencies at the sentence level. Moreover, we examine the impact of managers' narcissism on ESG performance using discretionary ESG information disclosures, evaluated via narcissistic sentences. Our results corroborate the findings of earlier research indicating that managers' narcissism similarly influences ESG performance. The research highlights the profound role that top management psychology plays in the propagation of ESG activities in Japanese companies. A major contribution of our study is revealing the substantial effect of managerial psychology on ESG operations in Japanese firms. Further, our research introduces an original method for assessing managers' narcissism that focuses on the subjective and boastful evaluations of their companies.

Keywords: neural network, narcissism, supervised learning, psychological characteristics

1. INTRODUCTION

Many environmental, social, and governance (ESG) activities are motivated by external institutional pressure. However, recent studies have found that the psychological characteristics of managers can also stimulate the performance of ESG activities, showing that narcissistic CEOs engage in ESG activities owing to the self-interested motivation that allows them to receive praise. For example, Petrenko et al. (2016) focused on narcissistic CEOs and found that they have a high incentive to perform ESG activities to strengthen their managerial image. Al-Shammari et al. (2019) divided ESG activities into internal and external and demonstrated that narcissistic CEOs positively influence external ESG activities related to the environment and community compared with internal ESG activities related to human rights and workers. It has also been suggested that the more narcissistic a top manager that identifies with the organisation, the more they will see the organisation as an extension of themselves (Fuller et al., 2017; Galvin et al., 2015). However, while previous studies on the relationship between the psychological characteristics of top management and ESG activities have recently been attracting research attention, they remain scarce.

In the above studies, the size of the CEO's photo in the annual report, difference in remuneration from other directors, and difference in personal titles such as 'I' or 'We' were used as indicators to measure CEOs' narcissism

¹ Some of the analysis in this paper is based on the following book: Nakao, Y., Ishino, A., & Kokubu, K. (2023). "ESG Assessment by AI". *Dobunkan Publishing*, Tokyo.

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and study their relationship with ESG performance. However, while those studies assessed the narcissism of top management, they did not show how CEOs narcissistically assess the ESG activities of their organisations. As some CEOs identify closely with their organisations (Fuller et al., 2017; Galvin et al., 2015), research on CEOs' narcissistic evaluations of those organisations is important. Therefore, this study focuses on how CEOs' narcissism is reflected in how they evaluate their organisations.

Managers' assessments of a company's ESG activities can be judged based on the top management messages published in companies' ESG reports.² Unlike the narcissism indicators employed in previous studies, this study constructed a model using machine learning to assess the narcissism of the company's ESG activities within those sentences of the ESG reports. Specifically, it employed a neural network—a machine learning method—to judge whether a company evaluates its ESG activities narcissistically. In particular, whether the company's ESG activities are evaluated subjectively were assessed by targeting a single sentence in a message from top management rather than all the words within that message. To examine the ability of the constructed model to automatically judge narcissistic sentences, it was applied to the top management messages published in the ESG reports of 1,535 Japanese companies.

2. BACKGROUND AND FRAMEWORK

This section explains how narcissism indicators have been constructed in previous psychological and management studies to guide the construction of our model for judging narcissistic sentences. In psychological research, objective measures of narcissism based on its multifaceted nature have been adopted.

2.1 Research on Narcissism Indicators

Raskin and Terry (1988) developed the Narcissistic Personality Inventory (NPI) based on 220 items. From the NPI, Emmons (1987), a psychologist, identified the following four characteristics of narcissists:

1. Asserting their rights.
2. Liking attention.
3. Considering themselves as better than others.
4. Being fascinated by how extraordinary and special they are.

Similarly, in a psychological study, Ames et al. (2006) extracted 16 of 40 items from the NPI to judge narcissism:

1. I know I am superior because people keep telling me so.
2. I like being the centre of attention.
3. I consider myself as a special person.
4. I like to have authority over people.
5. I find it easy to manipulate people.
6. I claim that I deserve respect.
7. Given a chance, I stand out.
8. I always know what I am doing.
9. Everyone likes to hear what I have to say.
10. I expect a lot from others.
11. I really like being the centre of attention.
12. People always seem to recognise my authority.
13. I intend to be great.
14. I can make anyone believe anything if I want to.
15. I am more capable than others.
16. I am an extraordinary person.

Ames et al. (2006) selected items that mainly represent narcissism to test their surface validity. Both scales were confirmed to have similar correlations with self-esteem as well as the Big Five personality traits, which represent the five dimensions of human personality in psychology. Furthermore, convergent and discriminant validity were examined, the retest data were validated, and predictive validity was tested. While these indicators in psychological research are narcissistic elements that adequately capture the multifaceted nature of narcissism, they do not indicate how one would interpret a narcissistic person. Furthermore, assessing whether a person is narcissistic is based on self-reporting and it is difficult to obtain data to conduct a third-party measurement of the narcissism of the top management team in a firm (Cragun et al., 2020). Therefore, management research has

² This study targeted reports that disclose ESG information: ESG reports that focus on ESG disclosure, integrated reports that disclose both financial and ESG information, and annual reports containing non-financial information focusing on financial reporting.

recently begun to analyse companies' published documents to examine the psychological aspects of their CEOs (Craig & Amernic, 2011).

Machine learning approaches can capture and develop the psychological aspects of language characteristics (Kern et al., 2016). For example, Bleidorn and Hopwood (2019) highlighted that despite machine learning's predictive power, it does not measure the 'relatively stable patterns of thoughts, feelings, and behavior (i.e. personality traits) and associated psychological traits such as preferences, interests, attitudes, and associated psychological characteristics such as preferences, interests, attitudes, motivations, or beliefs' (p. 195). The extent to which machine learning measures these characteristics is unclear (Bleidorn & Hopwood, 2019). In other words, determining the degree to which individual linguistic characteristics can be captured by machine learning in the specific context of published top management language, such as that in a company's ESG reports, is considered to be a challenge.

2.2 Assessing Narcissistic Writing

Considering the multifaceted aspects of the aforementioned narcissism indicators, this study attempted to judge narcissism, a psychological characteristic of CEOs, from the third-party perspective. Instead of using self-report indicators, published data in the form of firms' information disclosures were used to determine narcissistic sentences. We defined narcissistic sentences as follows:

Subjectively or boastfully claiming that the company's characteristics such as its history, technology, and activities are better or more special than those of other companies.

This definition is not based on whether such content is included word by word, but rather on whether a company's characteristics are subjectively or boastfully claimed to be better or more special than those of other companies based on the content of a single sentence. Based on the aforementioned definition, sentences that do not pertain to current achievements but speak subjectively about the future were also considered to be narcissistic sentences. Moreover, if narcissistic characteristics were found in some of the statements in a compound sentence, the entire compound sentence was considered as narcissistic. By contrast, sentences in which the characteristics were described objectively, and not subjectively or boastfully asserted, were not judged as narcissistic sentences.

A company can be subjectively rated highly in narcissistic sentences. However, its activities may also be rated more highly or relatively poorly than those of other companies, but the narcissistic text expresses this conveniently through written rhetoric. In this respect, this study judged narcissism solely based on the written expressions in the text. Furthermore, the model of narcissistic sentences constructed did not consider the nature of the ESG activity mentioned in the top management message. In this respect, this study did not consider the type of ESG activity mentioned in the message, but rather judged narcissism solely based on the written expressions in the text. It also did not consider whether narcissistic sentences were expressed rhetorically or depended on managerial qualities. The following narcissistic sentences were employed in this study as the supervised data:

This corporate culture has been built up through our aim to be the world's best at manufacturing since the company was founded, our challenging spirit of 'don't say it can't be done, try it', the venture spirit we have inherited through our divisional independent account system, and above all our pursuit of optical technology. As a result, we have created optical devices that are second to none and have improved the performance of the products of our customers that incorporate these products.

(Source: Integrated Report – 2019 – Hamamatsu Photonics)

3. MODEL CONSTRUCTION

3.1 Creating the Supervised Data

To construct the model, the first stage was to create the supervised data to train the neural network used in this study. First, three of the researchers (Kana Okada, Sai Okada, and Yuriko Nakao) evaluated the narcissism in approximately 400 sentences of top management messages in the ESG reports of 30 companies from 2017 to 2019. During this process, the three raters did not always initially agree on some of the sentences; however, after discussion, agreement was finally reached for all the sampled narcissism sentences. From these processes, we established the definition of narcissistic sentences used in this study, from which we expanded the supervised data. Next, the narcissistic sentences in the top management messages of 300 companies were rated by each of the three raters. The sentences evaluated as narcissistic had to be rated so by at least one of the three raters.

Accordingly, the final supervised dataset consisted of 11,754 sentences, of which 5,963 were positive examples and 5,791 were negative examples.

3.2 Building the Model

Deep averaging networks (DAN) (Iyyer et al., 2015), a neural network method, was employed as the machine learning approach (Figure 1). The horizontal rectangles in Figure 1 schematically represent the feature vectors that are the inputs and outputs of the DAN.

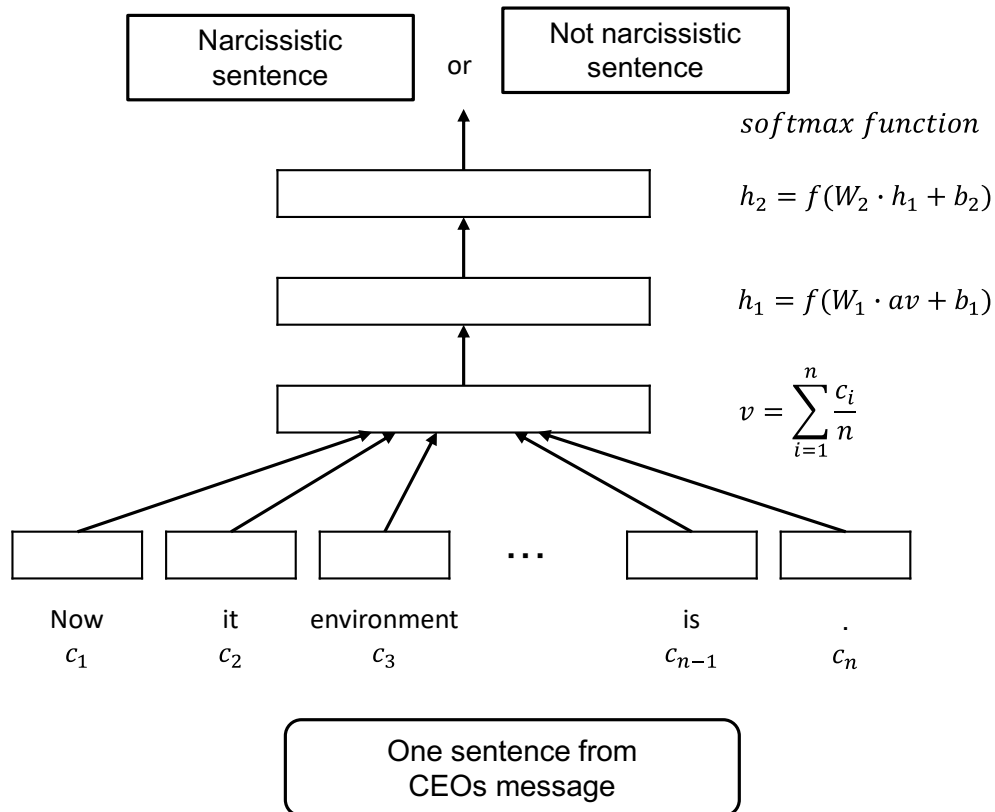


Fig. 1. The DAN method for automatically determining narcissistic sentences

As illustrated in Figure 1, the input to the DAN was a single sentence from the top management message divided into words. Each word was then converted into a 300-dimensional distributed representation vector c_i , which was created from the Japanese Wikipedia as textual information (Suzuki et al., 2016). c_i was averaged into vector v . The linear and activation functions were applied to the 300-dimensional feature vector h_1 . Furthermore, a linear function was applied to h_1 and transformed into a two-dimensional vector h_2 . The softmax function was applied in the final output and the dimension with the highest value was taken as the predicted label.

3.3 Evaluating the Model

To test the usefulness of the constructed model, we used three evaluation measures, namely, accuracy, reproducibility, and F-value, as illustrated in Equations (1), (2), and (3):

$$\text{Accuracy} = \frac{\text{proportion of correct answers labelled correctly by the computer}}{\text{number of labels given by the computer}} \quad (1)$$

$$\text{Reproducibility} = \frac{\text{proportion of correct answers labelled correctly by the computer}}{\text{Number of labels assigned manually}} \quad (2)$$

$$\text{F-value} = \frac{2 \times \text{Accuracy} \times \text{Reproducibility}}{\text{Accuracy} + \text{Reproducibility}} \quad (3)$$

Accuracy is the proportion of correct answers out of the number of labels given by the computer. Reproducibility indicates the proportion of correct answers labelled correctly by the computer. The F-value is the harmonic mean

of the accuracy and reproducibility. This serves as the overall indicator: a higher F-value generally indicates better performance. The evaluation was also carried out using a five-part cross-validation test.

Among the 11,754 sentences of the 300 companies examined to which the correct labels were manually assigned (see Section 2.3), accuracy was 0.688, reproducibility was 0.750, and the F-value was 0.707.³ The constructed model was thus suitable to be used to examine the top management messages in the non-financial disclosures of Japanese companies.⁴

4. ANALYSIS AND RESULTS

The analysis employs an ordinary least squares approach, with the logarithm of the number of narcissistic sentences (narcissism log) as the explanatory variable and ESG performance as the explained variable. Following Petrenko et al. (2016), who found that the CEOs of companies with high ESG performance tend to have high narcissism, we adopted the scores of four indicators (human resource management, environment, corporate governance, and society) of Toyo Keizai Inc.'s CSR Ranking for 2017–2021 that influence ESG performance.

Since several factors may be associated with a company's ESG performance, the following control variables were employed. First, agency theory (Gómez-Mejía et al., 2007) states that the top management teams in founding family firms have a higher shareholding than those in non-family firms, which reduces the separation of ownership and management. Given this and the fact that managers display firm value-maximising behaviours, we adopted the top management shareholding ratio as a control variable. Second, following Borghesi et al. (2014) and Jiraporn and Chintrakarn (2013), control variables for company characteristics that may affect ESG performance were also employed. Larger companies are considered to be more active in ESG activities due to their size and exposure to public scrutiny (Luethge & Guohong Han, 2012; Xu & Zeng, 2016). Hence, firm size (log sales) was adopted as a control variable.

Third, previous studies on ESG and financial performance have argued that ESG investment can improve a company's image and competitiveness (Branco & Rodrigues, 2006; Flammer, 2013). Yield, as a proxy of a firm's financial performance, is considered to influence ESG performance; hence, return on assets (ROA) was adopted as a proxy indicator of profitability. Fourth, creditors such as banks are important stakeholders that can influence firms' activities, including their ESG activities (Mitchell et al., 1997; Roberts, 1992); therefore, the debt ratio (debt/total assets) was used as the variable to understand the influence of creditors.

Finally, owing to differences in the relevant regulations at the industry level and need to control for differences in the magnitude of environmental impacts, industry and year fixed effects were also included. Using these variables, ordinary least squares regression was employed to test whether CEOs' narcissism affects ESG performance. No multicollinearity was evident.

Table 1. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Human resource management	1,535	77.36	13.69	20	100
Environment	1,535	79.86	15.52	24.3	100
Corporate governance	1,535	88.75	9.18	20	100
Society	1,535	76.97	16.75	20	275.2
Narcissism log	1,535	1.18	0.40	0	1.987
Top management shareholding ratio	1,535	0.13	0.34	0	1
Log sales	1,535	5.64	0.61	3.89	7.48
ROA	1,535	6.52	4.49	-19.63	35.11
Debt ratio	1,535	48.16	16.63	8.3	106

³ The results of the textual analysis of 'environment' and 'society' conducted by Nakao et al. (2019) showed F-values of 0.713 and 0.706, respectively, which are similar to the F-values in this study.

⁴ The non-financial information includes ESG reports as well as financial-centred annual reports.

Table 2. ESG performance and scores

Variable	ESG Performance (Human Resource Management Score)		
	Coefficient		P-value
Narcissism log	3.729	***	0.000
Top management shareholding ratio	-3.837	***	0.000
Log sales	11.915	***	0.000
ROA	0.020		0.828
Debt ratio	0.001		0.948
Constant term	6.345	*	0.071
Coefficient of determination	0.391		

***p < 0.01, **p < 0.05, *p < 0.1

Note: All the regressions include industry and year effects.

Variable	ESG Performance (Environment Score)		
	Coefficient		P-value
Narcissism log	3.112	***	0.000
Top management shareholding ratio	-6.656	***	0.000
Log sales	12.778	***	0.000
ROA	-0.395	***	0.000
Debt ratio	-0.040		0.132
Constant term	11.491	***	0.003
Coefficient of determination	0.435		

***p < 0.01, **p < 0.05, *p < 0.1

Note: All the regressions include industry and year effects.

Variable	ESG Performance (Corporate Governance Score)		
	Coefficient		P-value
Narcissism log	2.534	***	0.000
Top management shareholding ratio	-1.594	**	0.035
Log sales	5.386	***	0.000
ROA	-0.106		0.138
Debt ratio	0.020		0.306
Constant term	53.774	***	0.000
Coefficient of determination	0.226		

***p < 0.01, **p < 0.05, *p < 0.1

Note: All regressions include industry and year effects.

Variable	ESG Performance (Society Score)		
	Coefficient		P-value
Narcissism log	4.082	***	0.000
Top management shareholding ratio	-1.250		0.455
Log sales	18.516	***	0.000
ROA	-0.289	***	0.001
Debt ratio	-0.097	***	0.000
Constant term	-27.233	***	0.000
Coefficient of determination	0.471		

***p < 0.01, **p < 0.05, *p < 0.1

Note: All the regressions include industry and year effects.

The results in Tables 1 and 2 show that CEOs' narcissism affected all four indicators of ESG performance (human resource management, environment, corporate governance, and society). Narcissism at the top management level can thus promote ESG activities. These factors related to CEOs' narcissism significantly affected larger firms more than smaller ones. However, narcissism was lower in firms with high profitability.

5. CONCLUSION

Our research designed and presented a model capable of identifying narcissistic sentences in the ESG reports of Japanese companies. This novel neural network-based model automates the process of determining top management narcissism, as demonstrated by the boastful and subjective evaluations of company activities in these reports. The analysis, which covered 1,535 top management messages found in the non-financial disclosures of Japanese companies spanning five years, therefore uncovered a strong tendency towards narcissism by managers. Unlike prior approaches focusing on first- and second-person word-based narcissism indicators, our model innovatively evaluated narcissistic tendencies at the sentence level. Additionally, we scrutinised the influence of managers' narcissism on ESG performance using discretionary data such as ESG information disclosures, evaluated via narcissistic sentences. Our findings confirmed those of previous research, suggesting that managers' narcissism impacts ESG performance. As top management is critical for driving ESG initiatives, the study underscored the significant influence of their psychological characteristics on ESG activities in Japanese companies. This impact reconfirmed the significance of CEOs' psychological traits on ESG initiatives in Japanese companies, confirming their pivotal role in driving sustainability.

One of the key contributions of our research is shedding light on the substantial impact of managerial psychology on ESG operations in Japanese firms. Furthermore, this study pioneers a novel method of appraising managers' narcissism based on the subjective and boastful evaluations of their organisations. The broader implications of our research highlight the crucial link between managerial psychology and corporate sustainability, providing stakeholders with a new lens through which to assess ESG performance. Our findings also open avenues for better governance, encouraging policies that consider psychological factors when planning and implementing ESG initiatives. However, our study is limited to the evaluation of narcissism at the sentence level in the ESG reports of Japanese companies and the presented findings may not be directly generalisable to other contexts or cultures. Future research could extend this model to different types of corporate communications, cultures, or languages, thereby enhancing its overall utility and generalisability.

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