

*Investors reaction to acquisition announcements by  
narcissistic CEOs in times of high environmental uncertainty*



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I present to you my Master Thesis. I hope you will enjoy reading it.

Mai Le

Nijmegen, July 2021

## Summary

In general, CEOs with a more narcissistic personality tend to manage firms very differently compared to CEOs who are less narcissistic. This research measures the effect of an acquisition announcement, made by a narcissistic CEO on the stock market reaction, by using a novel media-based measurement technique and utilizing the outcomes of third-party ratings of video samples of 99 S&P500 CEOs. Using signaling theory as a theoretical lens, three hypotheses were formulated. It has been researched (1) if a narcissistic CEO influences the stock market reaction negatively when announcing an acquisition, (2) if environmental uncertainty has a direct effect on stock market reaction and (3) if environmental uncertainty moderates the relationship between CEO narcissism and stock market reaction. A significant result has been found for the second hypothesis. A new measurement method has also been applied in this research by implementing attention check questions combined with the NPI-16 questionnaire. However, further research and validation should be conducted to refine this method in order to implement it in future research.

*Keywords: CEO narcissism, environmental uncertainty, signaling theory, stock market reaction, acquisitions*

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## Chapter 1 | Introduction

Individual characteristics of a chief executive officer (CEO) have an impact on their decision-making (Hambrick and Mason, 1984). Prior research points out that CEOs tend to have a relatively high degree of narcissism in general, as this component of orientation might be a driving force behind the desire to obtain a leadership position (Campbell, Hoffman, Campbell and Marchisio, 2011; de Vries, and Miller, 1985). Narcissism is a personality trait and an attribute of many powerful leaders (Rosenthal and Pittinsky, 2006). There seem to be differences in the intensity of the characteristic (Chatterjee and Hambrick, 2007). Extreme narcissism is a serious psychological disorder (American Psychiatric Association, 2000) but subclinical narcissism, often in the form of grandiose narcissism, is recognized as a normal personality trait (Emmons, 1987). In this study, the focus will be limited to the grandiose form of narcissism in which individuals have inflated self-views and crave affirming recognition (Chatterjee and Hambrick, 2007; Zhu and Chen, 2015).

The interesting part of narcissistic CEOs in strategic management is that CEOs with a more narcissistic personality tend to manage firms very differently compared to CEOs who are less narcissistic (Chatterjee and Hambrick, 2007). Research has found that narcissistic CEOs tend to take bold and risky actions to gain attention and admiration and also deliver extreme performance outcomes. In order to gain attention, narcissists will for example favor acquisitions, because they are highly confident in their ability to perform better than the incumbent managers and because acquisitions are grandiose attention-getters (Chatterjee and Hambrick, 2007). In contrast, CEOs with a relatively low narcissistic tendency are inclined to emphasize stability and incremental improvements to operations. Therefore, CEO narcissism clearly has an impact on the strategic decision making, the firm outcome (Zhu and Chen, 2015) and the investors reaction (Marquez-Illescas, Zebedee, & Zhou, 2019).

However, there seem to be a gap since the circumstance in which the CEOs lead is also an important factor besides their personalities (Glad and Whitmore, 1991; Robins and Paulhus, 2001; Rosenthal and Pittinsky, 2006) when investigating investors reaction. Narcissists are apt to emerge and often flourish in times that call for a new order to be established (Rosenthal and Pittinsky, 2006). The Corona virus has caused the world to transform into a new order (Tahir and Batool, 2020) and causes environmental uncertainty (Barrero, & Bloom, 2020). It has impact across different countries and markets across the world. Therefore, the pandemic makes it difficult to predict and control any single business as it has affected the entire international business within and across nations (Sharma, Leung,

Kingshott, Davcik, Cardinali, 2020). Environmental uncertainty is defined as ‘*the degree to which future states of the world can not be anticipated and accurately predicted*’ (Salancik and Pfeffer, 1978; p.67). Strategy literature generally states that strategy selection is conditional on how closely a business is aligned with its environment (Hofer and Schendel, 1978; Porter, 1980). Environmental uncertainty may require a firm to be able to respond more rapidly to unforeseen change in order to survive (Lawrence and Lorsch, 1967; Covin and Slevin, 1989). In addition, environmental uncertainty includes unpredictability of external forces acting on the company such as the actions of suppliers, customer behavior, labour market changes, economic development and technological developments (Daft, 2002; Dess and Beard, 1984; Hartmann, 2005). As environmental uncertainty increases, it becomes more difficult for organizational leaders to formulate and implement proper strategies and structures (Lester, Certo, Dalton, Dalton, & Cannella, 2006). Therefore, it is promising to investigate how narcissistic CEOs behave and deal with environmental uncertainty and how this influence firm performance and the reaction of investors. Firm performance after an acquisition announcement by a narcissistic CEO has been investigated by measuring stock performance (King, Wang, Samimi, & Cortes, 2020). Researchers have found that the market reacts less favourably to acquisitions announced by narcissistic CEOs (Aabo, Als, Thomsen, and Wulff, 2020; Aktas, de Bodt, Bollaert, H, and Roll, 2016).

Research has stressed the importance of the circumstances in which the CEOs lead. (Glad and Whitmore, 1991; Robins and Paulhus, 2001; Rosenthal and Pittinsky, 2006). Therefore, the aim of this research is to investigate this gap by finding out to what extent the current circumstances, expressed in terms of environmental uncertainty, has an influence on the stock market reaction when narcissistic CEOs announce an acquisition. This is illustrated in Figure 1: Conceptual model. Therefore, the main research question is:

*How do investors react to acquisition announcements by narcissistic CEOs in times of high environmental uncertainty?*

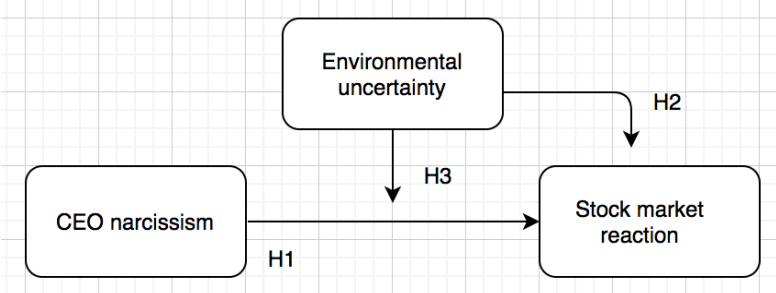


Figure 1: Conceptual model

The remainder of this research is organized as follows. The next section contains a literature review and hypothesis development. Following this, the variables and method will be explained. The results will be presented and explained in the next section followed by results of a robustness analysis. Finally, this research ends with the main implications of the study, conclusion and recommendations for further research.

## **Chapter 2 | Literature review and hypotheses development**

### **2.1 Signaling theory and narcissistic CEOs**

Signaling theory posits that a signaler and receiver signal unobservable qualities to reduce information asymmetries (Spence, 1978). This theory is useful for describing behavior when two parties have access to different information. A typical scenario consists of one party, the sender, that must choose whether and how to communicate or signal that information. The other party, the receiver, must choose how to interpret the signal. Although the firms do know their own true quality, outsiders such as investors or customers, do not know the true quality of the sender. Therefore, information asymmetry is present (Connelly, Certo, Ireland, & Reutzel, 2011). Information asymmetries occur when ‘different people know different things’ (Stiglitz, 2002; p.469) since some information is private, information asymmetries arise between those who hold that information and those who could potentially make better decisions if they had it (Connelly et al., 2011).

Research has used signaling theory to examine how director and top management team characteristics influence investor valuation of the firm (Certo, 2003; Certo, Daily, and Dalton, 2001; Higgins and Gulati, 2003; Podolny and Baron, 1997). Attributes of the CEO communicate important information to investors and therefore, serve as important signals to investors which in turn impacts the stock market (Zhang and Wiersema, 2009). Narcissistic CEOs desire risky strategies (Oesterle, Elosge, & Elosge, 2016). Those risky strategies represent a risk indicator to investors. Therefore, signaling theory as a theoretical lens is relevant in this research since the narcissism of a CEO is a signal that investors consider when evaluating a deal. Recent research has also stated that when the risk is greater, the market will pay more attention to the details (Aalbers, McCarthy, & Heimeriks, 2021). This in turn, can influence the stock market reaction (Certo, 2003; Zhang and Wiersema, 2009).

American Psychiatric Association (APA), (2013) defines narcissism according to the *Diagnostic and Statistical Manual for Mental Disorders*, the DSM. Narcissism is defined as a multifaceted personality trait that combines grandiosity, attention seeking, an unrealistically inflated self-view, a need for that self-view to be continuously reinforced through self-

regulation, and a general lack of regard for others. The study of Cragun, Olsen, & Wright, (2020) has identified and compared definitions used in prominent CEO narcissism articles and has found that most definitions of narcissism could be traced back to the DSM.

Grandiosity suggests entitlement, self-centeredness and a belief that one is better than others (APA, 2013). CEOs are likely to favor grandiosity, as opposed to stability. As a result, narcissistic CEOs tend to deliver extreme performance and fluctuating performance for their organizations (Chatterjee & Hambrick, 2007). In line with grandiosity as one of the personality traits of a narcissistic CEO, narcissists will favour acquisitions since acquisitions are grandiose attention-getters (Chatterjee & Hambrick, 2007). Acquisitions, particularly large acquisitions, are one of the most visible initiatives a CEO can take (Haspeslagh and Jemison, 1991). Acquisitions are highly visible and attract the audience that is needed by the narcissistic CEO since it feeds the need of a narcissistic CEO to be seen as bold and daring (Wallace and Baumeister, 2002).

Signaling theory has also been used as a theoretical lens in research that investigates behavioral perspective on market reaction. Research of Aalbers et al., (2021) uses acquisition announcements as a behavioral trigger and states that investors react to market signals which in turn, affects the market's response. When taking into account narcissistic CEOs, researchers have investigated the relationship between an acquisition announcement of a narcissistic CEO and the market reaction. The outcome of these studies is that the market reacts less favorably, expressed in cumulative abnormal return (CAR), to acquisitions announced by narcissistic CEOs (Aabo et al., 2020; Aktas, et al., 2016). The CAR around the acquisition announcement was lower for acquisitions announced by firms run by more narcissistic CEOs compared to similar announcements by firms run by less narcissistic CEOs (Aabo et al., 2020). This research starts by testing the outcome and replicating a part of these studies. Therefore, it is expected to find the same results.

Hypotheses 1: The stock market reacts less favorably when an acquisition announcement is made by a narcissistic CEO.

## **2.2 Signaling theory, stock market reaction and environmental uncertainty**

Research has stated that investors look for more signals in uncertain environments (Aalbers et al., 2021). Environmental uncertainty induces variability in an organization's reported earnings. It emphasizes the information asymmetry between its managers and outside stakeholders (Habib, Hossain, and Jiang, 2011). Information asymmetry could result in efforts

by investors to collect information about the target that can be used to better value opportunities (Fralich and Papadopoulos, 2020). A signaler may be motivated to attempt false signaling and if this were to happen, misleading signals would increase rapidly until receivers learn to ignore them (Connelly et al., 2011). However, investors might be aware of this and it encourages investors to engage in costly private information acquisition (Habib et al., 2011). Private information acquisition refers to a wide range of activities that allow investors to become better informed than others (Cuijpers and Peek, 2010). The concept of information asymmetry can be applied in this situation since investors are aware that they could potentially make better decisions if they had more information (Connelly et al., 2011).

Research of Ghosh and Olsen, (2009) states that uninformed investors lose more from trading with informed investors. This discourages uninformed investors from actively participating in stock trading, with the consequences of increased illiquidity and reduced stock price. In addition, environmental uncertainty increases the risk of accurately assessing future earnings (Ghosh and Olsen, 2009). Previous research has investigated the effect of an uncertain event on the stock market reaction and the outcome of the study was that this had effected the stock market negatively (Bash and Alsaifi, 2019). In addition, events are an important component of uncertainty since uncertainty is the individual's ability or inability to assign probabilities to events (Duncan, 1972). Therefore, it is assumed that environmental uncertainty has a direct negative effect on the stock market's reaction. Based upon the outcomes of these studies, the following hypotheses is formalized:

Hypotheses 2: Higher levels of environmental uncertainty influences the stock market reaction negatively.

### **2.3 Signaling theory, narcissistic CEOs and environmental uncertainty**

According to the study of Connelly et al., (2011) signaling theory consists of primary elements in the form of a timeline. Signaling theory states that signalers are insiders such as executives or managers, who obtain information about an individual (Spence, 1973), product (Kirmani and Rao, 2000) or organization (Ross, 1977) that is not available to outsiders. Insiders obtain information that outsiders would find useful. This information provides insiders with a privileged perspective regarding the underlying quality of the individual, product or organization. At stage  $t=1$  the signal is sent to the receiver. Insiders obtain positive and negative private information and they must decide whether or not to communicate this information to outsiders (Connelly et al., 2011).

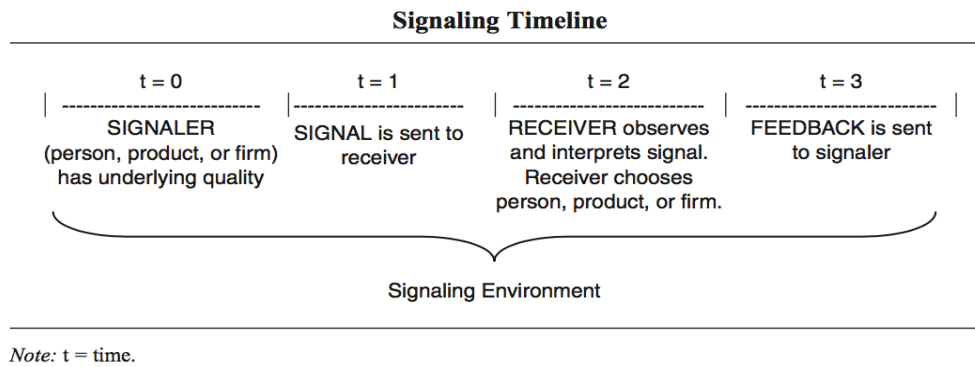


Figure 2: Signaling timeline (Connelly et al., 2011)

According to the article of Chatterjee and Hambrick, (2007) it is possible that narcissistic CEOs would strive to be visible in positive press releases, but invisible in releases of negative news. Researchers have found that narcissistic individuals have a constant need to reinforce their grandiose self-image. In order to obtain this reinforcement, narcissist tend to show a positive bias when evaluating and describing their performance by issuing more positive earnings announcements (Marquez-Illescas et al., 2019). The stock market response at  $t=2$  (Connelly et al., 2011) is less pronounced for narcissistic CEOs, suggesting that the market or investors are aware of the effect of CEO narcissism on announcements (Marquez-Illescas et al., 2019) and at  $t=3$  (Connelly et al., 2011) discount their reaction (Marquez-Illescas et al., 2019).

Research has stressed the importance of the circumstances in which the CEOs lead (Glad and Whitmore, 1991; Robins and Paulhus, 2001; Rosenthal and Pittinsky, 2006). As mentioned earlier in the introduction, environmental uncertainty is defined as ‘*the degree to which future states of the world can not be anticipated and accurately predicted*’ (Salancik and Pfeffer, 1978; p.67). As environmental uncertainty increases, it becomes more difficult for organizational leaders to formulate and implement proper strategies and structures. Researchers have found that environmental uncertainty does not influence investors valuations when taking into account the top management team (TMT) prestige (Lester et al., 2006). Narcissistic individuals feel the intense need for power and prestige and strive after positions of authority and leadership. Studies have found that narcissistic CEOs strive for the potential prestige by pursuing risky strategies since this displays the CEO’s ability to manage complex situations (Oesterle, et al., 2016). In line with the study of Lester et al., (2006) it could be assumed that environmental uncertainty does not influence the investors valuations or the market reaction when taking into account a narcissistic CEO, since some of

the characteristics of a TMT are in common such as the intense need for prestige (Oesterle et al., 2016). However, previous research has taken into account the organizational level (TMT) when investigating the influence of environmental uncertainty (Lester et al., 2006) and not the individual level such as a CEO. In addition, research has stresses the importance of including the characteristics of the acquirer (Aktas, et al.,2016). Therefore, it can not be assumed that the results of the outcome of Lester et al., (2006) is applicable at the individual level.

Researchers have found that the organization's environment can be considered uncertain if business decision makers, who are responsible for the future development of the firm, are not able to accurately predict how the environment will change (Milliken, 1987). As mentioned before, narcissistic CEOs desire risky strategies (Oesterle et al., 2016; Chatterjee and Hambrick, 2007). Risk management has become one of the important strategies in companies, especially in times of high environmental uncertainty (Afifa and Saleh, 2021).

However, narcissists may carry out very little scanning or analysis of the internal or external environments before making decisions that may impact the organization (Vecchiato and Roveda, 2010; Vecchiato, 2012). Since narcissist carry out very little scanning, this could lead to the narcissist experiencing uncertainty due to lacking the sufficient information to predict accurately. Therefore, it is expected in this research that especially a narcissistic CEO, will face these problems caused by environmental uncertainty even more, since the vision of a narcissistic leader can lead to an unrealistic and/or distorted assessment of the environment (Robert & Brandley, 1988), due to the self-serving needs of the narcissistic leader (Cragun et al., 2020; de Vries and Miller, 1985). Based upon the outcomes of these studies, the following hypotheses is formalized:

Hypotheses 3: Environmental uncertainty moderates the relationship between the acquisition announcement made by a narcissistic CEO and the stock market reaction negatively.

## **Chapter 3 | Methodology**

### **3.1 Introduction**

This research will use multiple regression analysis, a statistical technique that can be used to analyse the relationship between a single dependent variable and several independent variables (Hair, Black, Babin, Anderson, 2019). The variables of this research meet the requirements (Hair et al., 2019) in order to use multiple regression analysis since both independent and dependent variables are metrically scaled. The objective is to use the

independent variables, CEO narcissism and environmental uncertainty, to measure perceived narcissism. The assessment of a CEO's degree of perceived narcissism is conducted by fellow master students and respondents of Amazon Mechanical Turk (MTurk). The target group needs to meet the requirement that they should have at least a bachelor's degree. An adapted version of the *Narcissistic Personality Inventory* (NPI), which in this research is referred to as the NPI-16 questionnaire (Gupta and Misangyi, 2018) will be used to predict the single independent variable, CEO narcissism. The dependent variable stock market performance will be measured using cumulative abnormal returns (King et al., 2020). Environmental uncertainty is both the independent variable as the moderator and will be measured indirectly by calculating market uncertainty (Bergh, & Lawless, 1998; Arieftiara et al., 2017)

### **3.2 CEO narcissism as independent variable**

In this research, CEO narcissism is the independent variable. CEO narcissism will be measured using videos of CEO interviews retrieved from YouTube. These videos will be rated by a combination of fellow master students and respondents from MTurk. A survey will be used which is based on the adapted version of the Narcissism Personality Inventory (NPI-16) questionnaire (Gupta and Misangyi, 2018) in order to rate the degree of perceived CEO narcissism.

### **3.3 Stock market response as dependent variable**

M&A research that examines the performance implication of deal characteristics often uses the stock market's response around an acquisition announcement (King et al., 2020). Daily stock prices for acquiring firms around the announcement dates are collected in order to measure stock market performance and eventually measure stock market's reaction (Gaur, Malhotra, & Zhu, 2013).

Following the article of King et al. (2020), Cumulative Abnormal Returns (CAR) will be used in order to measure stock performance. In this research, CARS are calculated using a 11-day event window centred on the announcement date (Day 0) following the event window on previous research on CEO narcissism and the take-over process (Aktas et al., 2016). According to Campbell, Lo, MacKinlay, & Whitelaw, (1998) the estimation window in an event study could range from 120 days to 210 days. Previous M&A research has selected an estimation window of 120 trading days (-125, -6) to avoid loss of transactions due to the lack of sufficient observations within the estimation window. Therefore, in line with previous M&A research an estimation window of 120 days will be selected (Ma, Pagan, & Chu, 2009).

### **3.4 Environmental uncertainty as an independent variable and moderator**

Environmental uncertainty will be used in this research as an independent variable to find out to what extent it has a direct influence on stock market reaction. It will also be used to measure to what extent it moderates the relationship between CEO narcissism and the stock market reaction. Since this research uses third party ratings, the sample had some implications by applying the most common measurement method in order to measure environmental uncertainty. The most common measurement method is the 18 items scale from the research of DeSarbo, Anthony Di Benedetto, Song, and Sinha, (2005) since it is specifically made to measure environmental uncertainty directly, and it is also used by other studies to measure environmental uncertainty (Parnell, Koseoglu, Long, and Spillan, 2012). However, this scale could only be used if respondents rate their strategic business unit on each of the strategic capability scale items, relative to their major competitors (DeSarbo et al., 2005). Since this research is conducted by using surveys that are filled in by third-party respondents, this 18-items scale can not be used since this research does not have the opportunity to send questionnaires directly to S&P 500 CEOs.

Therefore, another method has to be used to measure environmental uncertainty. Research has stated that it is possible to measure environmental uncertainty through measuring market uncertainty since it is a proxy of environmental uncertainty (Ghosh and Olsen, 2009; Bergh and Lawless, 1998; Dess and Beard, 1984; Arieftiara et al., 2017). In order to measure environmental uncertainty, the annual sales and average sales of a company during the previous 5 years is needed in order to calculate the coefficient of variation. A higher standard deviation of sales indicates a greater degree of market uncertainty which indicates a greater degree of environmental uncertainty, faced by the company (Gosh and Olsen, 2009; Arieftiara et al., 2017).

### **3.5 Control variables**

Including control variables in the model should ensure that the results are not affected by any other variables that could influence the stock market reaction. Several CEO, firm and industry specific variables are included in the model as control variables that could influence the outcome of the stock market reaction.

*CEO controls.* Several CEO control variables are included in this research. *CEO tenure* has been included since research has stated that long-tenured CEOs are more risk taking (Simsek, 2007). The study of Chatterjee and Hambrick, (2007) have found that

narcissistic CEOs tend to take bold and risky actions to gain attention and admiration and also deliver extreme performance outcomes and could therefore, influence the stock market reaction. *CEO-chairman duality* (a dummy variable that equals 1 if the CEO is also chairman of the board and 0 otherwise) since research has stated that mentioning board chair CEOs are negatively processed by investors, revealing a negative perception by investors about CEO duality (Caiffa, Farina, and Fattobene, 2021). Following the article of Chatterjee and Hambrick (2007) *CEOs relative cash compensation* has been included by calculating CEOs cash compensation (salary and bonus) divided by that of the second-highest-paid executive in the firm.

Narcissistic individuals feel the intense need for power and prestige and strive after positions of authority and leadership (Oesterle, et al., 2016; Uppal, 2020). Since CEOs with more power make more acquisitions (Dutta, MacAulay and Saadi, 2011) *CEO multiple acquisitions* (1 if the CEO has conducted multiple acquisitions, 0 otherwise) has been included. *CEO age* has been included since risk-taking behavior, which is linked to attention and admiration (Chatterjee and Hambrick, 2007), decreases as CEOs become older (Serfling, 2014). *CEO gender* (a binary variable that equals 1 if the CEO is male) has been included since research has investigated that leader's and follower's gender jointly determine the perceived effectiveness of narcissistic leaders (De Hoogh, Den Hartog, & Neuvicka, 2015) which could influence the stock market reaction.

*CEO founder* is included in the model since founders may be more aligned toward shareholders (Shabbir and Kousar, 2019) and because of their privileged position, founders may be able to extract higher private benefits of control (Jayaraman, Khorana, Nelling, and Covin, 2000) which could influence the stock market reaction.

*Firm controls*. Firm performance has been included by calculating the return on assets (ROA), *firm size* measured as the logarithm of the total assets of the firm and *firm age* measured from the year the firm was founded. As mentioned before, acquisitions, particularly large acquisitions, are one of the most visible initiatives a CEO can take (Haspeslagh and Jemison, 1991) and attract the audience that is needed by the narcissistic CEO since it feeds the need of a narcissistic CEO to be seen as bold and daring (Wallace and Baumeister, 2002). Therefore, the control variable *Percentage of public acquisitions* is also included. Finally, *Industry group*. Industry group will be used as a control variable in order to distinguish technological companies versus non technological companies by implementing a binary variable based on the Standard Industrial Classification (SIC) code. If the company belongs to the tech industry, it is coded as 1 and 0 otherwise.

### **3.6 Data collection and sample size**

The final sample consists of S&P500 CEOs that conducted full acquisitions of public targets between 2017 and 2020. At first, a time window of two years (2019-2020) was chosen since a comparison will be made between a year that was not effected by environmental uncertainty and the first year that is effected by environmental uncertainty (Barrero, & Bloom, 2020). However, the corresponding final sample consists of only 20 CEOs and 89 deals. This sample was too little to conduct this research. Therefore, a larger sample size was needed since an increased sample size always produces greater power for the statistical test (Hair et al., 2019).

Previous research that has measured CEO narcissism has used a time window of 3 years (Chatterjee and Hambrick, 2007). In order to measure to what extent environmental uncertainty moderates the relationship between the CEO acquisition announcement and the stock market reaction, 3 years that are unaffected by environmental uncertainty should be taken into account and the first year that is effected by environmental uncertainty (Barrero, & Bloom, 2020). Therefore, a new time window of 4 years (2017-2020) has been chosen. When conducting multiple regression analysis, a minimum of 50 and preferably 100 observations is needed (Hair et al., 2019). A total of 186 deals and 99 CEOs are included in the final sample and therefore, meets the requirement to conduct multiple regression analysis.

Zephyr, ExecuComp and BoardEx US has been used in order to retrieve data of acquisition deals and the CEOs tenure. Eikon has been used in order to retrieve data for calculating the CARs, return on assets and total assets. Initially, the sample consists of 313 deals and 145 CEOs. Of the 313 deals, 298 were full acquisitions, 8 were partial acquisitions and 7 were acquisition deals with unknown remaining stake percentage. The companies and the corresponding deals that had the same CEO in the given timeframe are included in the final sample. Therefore, the sample consists of 298 full acquisition deals. The 298 deals were executed by 145 CEOs of which 132 CEOs were in the office between 2017-2020. Due to video restrictions, which will be explained in the *video metric approach* part, the final sample consists of 99 CEOs and therefore, 99 cases.

### **3.7 Video metric approach**

Research of Röttger and Aalbers, (2021) has applied the thin-sliced video approach to M&A research. This research will use the same approach by utilizing the outcomes of third-party ratings of video samples. This provides valid access to direct but unobtrusive measurement of CEO characteristics (Petrenko, Aime, Ridge, & Hill, 2016). This method is particularly beneficial for use in populations of interest that are difficult to interview or get to respond to

surveys (Cycyota & Harrison, 2002; 2006 Finkelstein, Hambrick and Cannella, 2004; Hambrick and Mason, 1984). Research has indicated before that top executives are reluctant about participating in survey research (Chatterjee and Hambrick, 2017, 2011). To overcome this, the characteristic of a CEO can still be measured indirectly by third-party ratings recruited by implementing a video metric approach. This approach provides direct access to a large sample of CEOs because video samples of CEOs in the public domain are already online available (Hill et al., 2019). Research has indicated that third-party ratings have greater validity than self-reported attributes (Oh, Wang and Mount, 2011). In addition, using a video metric approach provides the opportunity to measure the sample with a validated psychometric scale such as the adapted NPI-16 questionnaire. Therefore, this approach provides valid access to an otherwise potentially biased and rarely accessible population. The videos have to be edited to omit identifying information such as the position of the CEO and the name of the company that could bias the evaluation of the respondents (Petrenko et al., 2016). In addition, segments are chosen in which information of the company was not mentioned in order to prevent bias (Hill, Petrenko, Ridge, & Aime, 2019). In line with previous research, there has to be 3 respondents per video (Hill et al., 2019). Each survey consists of 5 videos and therefore, a total of at least 60 respondents have to be recruited for the survey.

Research that has used a video metric approach before to assess the level of CEO narcissism with a NPI questionnaire has used several groups of respondents such as doctoral students and undergraduate students (Röttger et al., 2021; Hill et al., 2019; Petrenko et al., 2016; Gentile, Miller, Hoffman et al., 2013). It has been decided to recruit respondents that have at least a bachelor's degree for several reasons. First of all, this research utilizes a quite new approach to measure perceived CEO narcissism (Petrenko et al., 2016). The respondents should know how to assess people relatively and the adapted NPI-16 questionnaire (Appendix 2, table 1) requires a solid understanding of English and handles rather complex terms. Each filter that has been selected in MTurk in order to filter the group of participants costs €0,50 per participant. Therefore, it has been an economic decision to use the filter 'Bachelor's degree' since this one particular filter enables the researcher to incorporate all the criteria whilst also saving money. Respondents are recruited from MTurk and fellow master students. Hourly wage will be around €5,50 for respondents that rate on MTurk and is funded by the Centre of Organizational Restructuring at Radboud University Nijmegen.

Quantitative research will be conducted by using *Statistical Package for the Social Sciences* (SPSS) programme and using short interview video clips of S&P 500 CEOs.

These video clips are searched and acquired from YouTube and edited to omit identifying information that could bias evaluations by respondents e.g. the position of the CEO and the name of the company (Petrenko et al., 2016). In addition, sections in which the camera focus was not on the CEO was also omitted (Gupta, and Misangyi, 2018). After editing the videos, a survey which is created in Qualtrics will be used. This survey is based on the adapted version of the NPI-16 questionnaire (Gupta and Misangyi, 2018) and uses a 5 point Likert scale from strongly disagree to strongly agree (Appendix 2 table 1).

Initially, the research sample consisted of 132 cases that refers to 132 CEOs that are in the office between 2017-2020. However, it was not possible to include all CEOs for several reasons. First of all, 9 CEOs do not have any videos available on YouTube. Second, of 17 CEOs, interviews could not be found but only videos such as annual general announcements or presentations which might be scripted. In line with previous research, those videos are also excluded since the CEO does not respond spontaneously to questions (Aktas et al., 2016). Lastly, the length of the videos has to meet a certain duration. Research about certain video durations have been conducted by using the interrater correlation coefficient (ICC), which estimates the covariation between different respondents in relation to individual executives (Bliese, 2000) and interrater agreement, which evaluates the degree to which respondents make the same mean-level assessments (James, Demaree and Wolf, 1984; Kozlowski and Hattrup, 1992). Research has found that the ICC is positive for 1 minute and 20 second video samples (0.45) and grows significantly to 0.71 with 2.5-minute video samples (Petrenko et al., 2016). Therefore, the length of the video has to have a minimum of 1 minute and 20 seconds but the time frame that is strived for is as close as possible to 2 minutes and 30 seconds based on the ICC. Seven videos did not meet the minimum requirement of the video length and were left out of the final sample. Therefore, the final video sample consists of 99 cases and thus 99 CEOs with the corresponding videos that should be edited and included in the survey.

### **3.8 Survey**

The survey is created by using the program Qualtrics. In order to inform respondents with the task as a whole, it starts with an explanation about this research and survey (Appendix 1a figure 1, *Introduction survey*) which intentionally does not mention that these people are CEOs. It also leaves information out that perceived narcissism is going to be measured since previous research has stated that information that could bias the evaluation of the respondents should be omitted (Petrenko et al., 2016). An example video (Appendix 1b figure 2, *Example video*) with the corresponding attention check question (Appendix 1c figure 3, *Example*

*attention check question*) is shown first in order to familiarize respondents with the survey (Hill et al., 2019).

After completing the example video, the corresponding attention check question and the survey, each respondent should rate another 5 videos. In order to prevent the respondent from not viewing the video completely, a timer has been included in the survey. Therefore, the respondent can only continue with the survey when the video is over. In order to execute an attention check, an attention check question has also been included in the survey before rating the CEOs behavior on the adapted NPI-16 scale. The intention of an attention check question is to identify respondents that are not paying close attention to survey questions (Liu, and Wronski, 2018). Previous research on identifying non-attentive respondents has found that the percentage of respondents who did not select the correct response in the attention check question, was higher among less attentive participants and lower among more attentive participants. The same research showed that passing the attention check question was associated with better logical judgments (Oppenheimer, Meyvis, and Davidenko. 2009). Therefore, it is important to include an attention check question after each video since it could be that respondents are providing a sub-optimal response to not only the attention check question itself but also to the statements of the survey (Liu, and Wronski, 2018). In order to incorporate the attention check questions into the NPI score, the analysis will be conducted two times. The first analysis will include a NPI score which is based on the outcome of all the respondents, the second analysis will only include the outcome of the statements if the respondent answered the corresponding attention check question right. An analysis has to be conducted in order to investigate whether the results differ from each other.

### **3.9 Amazon Mechanical Turk**

One of the goals in research is to maximize the efficiency in order to go from generating hypotheses to testing them, analysing results and updating the theory. The limiting factor in this process is the time it takes to do careful science and it often happens that research is delayed because of the time it takes to recruit subjects and recover from errors in the methodology. With access to a large pool of subjects online using MTurk, recruitment is simplified (Mason and Suri, 2012).

MTurk is a crowdsourcing web service that coordinates the supply and the demand of tasks that require human intelligence to complete (Ritchey, Kuroda, Rung, & Podlesnik, 2021; Paolacci, Chandler and Ipeirotis, 2010). The benefit of this platform to behavioral researchers is that people are willing to do task, including participating in research studies, for relatively

low pay. MTurk is a crowdsourcing site with one of the largest subject pools. Therefore, the respondents tend to be from a very diverse background, spanning a wide range of age, ethnicity, socio economic status, language and country of origin (Mason and Suri, 2012; Gupta, Nadkarni, and Mariam, 2019).

However, the advantages that researchers (Mason and Suri, 2012; Gupta et al., 2019) have discussed, using MTurk, are also discussed by other researchers (Paolacci et al., 2010) as a concern and are even stated as potential threats to validity and generalizability. A concern of researchers about this method, is that MTurk respondents are paid so little that one may wonder whether they take experiments seriously (Paolacci et al., 2010). However, researchers have found that there is little evidence to suggest that data collected online is necessarily of poorer quality than data collected from subject pools (Krantz and Dalal, 2000; Gosling, Vazire, Srivastava, and John, 2004). Research has investigated if the results of the studies that are conducted using MTurk, are comparable with results that were obtained in other domains as well as offline settings. Replications of standard judgment and decision-making experiments were conducted using MTurk, as well as with subjects recruited through online discussion boards and through the subject pool at a university (Paolacci et al. 2010). Several studies were replicated using MTurk such as 'Asian disease' of Tversky and Kahneman, (1981) and the 'Linda' problem of Baron and Hershey, (1988) and there were only very slight differences between the results from MTurk and the subjects recruited using the other methods and qualitatively, the results were identical (Mason and Suri, 2012; Gupta et al., 2019). Therefore, this new method in combination with a classical method to recruit respondents is chosen and it is assumed that this way of testing is sufficient in this research.

### **3.10 Measuring CEO narcissism (NPI-16)**

After framing the sampling, videos will be rated by a mix of respondents on MTurk and master students by using a survey which is based on the adapted version of the Narcissism Personality Inventory (NPI-16) questionnaire (Gupta and Misangyi, 2018). Respondents will watch the video clips of the CEOs and rate on a survey how narcissistic a CEO appears to them. In other words, respondents will rate the degree of perceived CEO narcissism. Appendix 2 table 1, *Adapted NPI-16 measurement questionnaire* is the table<sup>1</sup> with items which will be rated on at a 5 point Likert scale from strongly disagree to strongly agree.

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<sup>1</sup> This table has been adapted based on the obtained version of Abhinav Gupta by reaching out to the author of the article 'Follow the leader (or not): The influence of peer CEOs' characteristics on interorganizational imitation'

NPI is the most widely used assessment of narcissism as a personality trait and is considered accurate and valid (Gentile et al., 2013; Raskin & Terry, 1988). Research has indicated that third-party ratings have been meta-analytically shown to provide higher validity of personality traits when compared to self-reports (Oh et al., 2016). Utilizing third-party ratings of video samples provides valid access to direct but unobtrusive measurement of CEO characteristics (Petrenko et al., 2016). The NPI has been used as the basis for self-report and third-party psychometric measurement of CEO narcissism (Chatterjee and Hambrick, 2007). While the 40-question NPI best captures the multifaceted nature of narcissism, shorter versions have also been used (e.g., NPI-16; Gentile et al., 2013). The results of the survey will be used in order to give a NPI score for each CEO. The NPI score is based on the outcome of the survey. The mean of the 16 items is the average NPI score of each respondent. Since each CEO has been rated 3 or 4 times, the corresponding NPI score has been calculated by taking the mean of the respondents.

### 3.11 Measuring environmental uncertainty

In order to measure environmental uncertainty, market uncertainty will be measured since this is a proxy of measuring environmental uncertainty (Arieftiara et al., 2017; Ghosh and Olsen, 2009; Bergh and Lawless, 1998; Dess and Beard, 1984). This firm specific measure of environmental uncertainty is validated as an objective measure of environmental uncertainty (Snyder and Glueck, 1982) and has been used before in multiple studies in order to measure environmental uncertainty (Ghosh and Olsen 2009; Arieftiara et al., 2017; Habib et al., 2011) by calculating the coefficient of variation of sales, which indirectly measures environmental uncertainty, has been applied by using the following formula:

$$CV(Z_i) = \frac{\sqrt{\sum_{k=1}^5 \frac{(z_1 - \bar{z})^2}{5}}}{\bar{z}}$$

CV is the coefficient of variation,  $Z_i$  is the observed annual sales for the corresponding company, and  $\bar{z}$  is the average sales during the previous 5 years of the acquisition. Since the time window of this research is between 2017-2020, data between 2012 and 2019 of the annual sales has been used in order to calculate the average for the corresponding year of each particular deal. A higher standard deviation of sales indicates a greater degree of market

uncertainty which indirectly indicates a greater degree of environmental uncertainty, faced by the company (Ghosh and Olsen, 2009; Arieftiara et al., 2017). Some CEOs have conducted multiple deals and some just a single deal. For CEOs that have conducted multiple deals, the average of the corresponding environmental uncertainty value has been calculated and used for the analysis.

### 3.12 Measuring the stock market reaction

As mentioned before in the previous section, this research follows the article of King et al. (2020), and uses CARs in order to measure stock performance with a 11-day event window centred on the announcement date (Day 0) (Aktas et al., 2016) and an estimation window of 120 days (-125, -6) (Ma, et al., 2009). The CAR is the deviation between the expected return and the realized return of the company and can be calculated by implementing the following formulas (McWilliams and Siegel, 1997):

$$AR_{it} = R_{it} - (a_i + b_i R_{mt}),$$

$AR_{it}$  indicates the abnormal return for firm  $i$  on day  $t$ .  $R_{it}$  is the rate of return on the share price of firm  $i$  on day  $t$ .  $R_{mt}$  indicates the rate of return on a market portfolio of stocks on day  $t$ . The remaining variables  $a_i$  and  $b_i$  are the parameter estimates acquired from the regression of  $R_{it}$  on  $R_{mt}$  within the estimated period. The abnormal returns ( $AR_{it}$ ) represents the returned earned by the firm after the analyst has adjusted for the normal return process. In addition, the rate of the return on the stock is adjusted by subtracting the expected return form the actual return. If the outcome has any significant difference, it can be considered to be an abnormal return (McWilliams and Siegel, 1997). After calculating the  $AR_{it}$  the standardized abnormal return ( $SAR$ ) can be calculated where the abnormal return is standardized by its standard deviation (SD).  $SAR$  can be calculated with the following formula from

$$SAR_{it} = AR_{it}/SD_{it},$$

The standardized abnormal return can be cumulated over a number of  $k$  days to calculate the cumulative abnormal return ( $CAR$ ) for each firm with the following formula:

$$CAR_i = (1/k^{0.5}) \sum_{t=1}^k SAR_{it}.$$

## Chapter 4 | Data preparation and results

### 4.1 Data preparation

Before conducting a multiple regression analysis, the sample size, metric level of the variables and underlying assumptions were checked following the preparation of Hair et al., (2019).

*Sample size.* As mentioned before in the previous section, when conducting multiple regression analysis, a minimum of 50 and preferably 100 observations is needed (Hair et al., 2019). After excluding all the data that do not meet the requirements of this study, a total of 99 cases are included in the final sample and therefore, meets the requirement to conduct multiple regression analysis. In addition, Hair et al., 2019 gives a minimum ratio of 5:1, referring to five observations that have to be made for each independent variable. This requirement is also met since the sample size is above the minimum ratio that Hair et al., 2019 states.

*Metric scale.* When conducting a multiple regression analysis the variables, both dependent and independent variables, need to be metrically scaled (Hair et al., 2019). Since this study also uses control variables that were not metrically scaled, dummy variables were created to meet this requirement. The following variables that are converted into dummy variables are: CEO gender, coded as: 1, male and 0 female. CEO chairman duality, coded as: 1 if the CEO is also the chairman of the board, 0 otherwise, CEO founder as: 1 if the CEO is also the founder of the company, 0 otherwise (Malhotra et al., 2018) and CEO multiple acquisitions as: 1 if the CEO has conducted multiple acquisitions, 0 otherwise.

*Normality.* In order to see whether the variables are normally distributed, the Test of Normality has been conducted and skewness and kurtosis of the variables has been checked. Skewness is a measurement method of the symmetry of a distribution and the comparison is made to a normal distribution. Kurtosis is a measure of the peakedness or flatness of a distribution and again, this is compared with a normal distribution (Hair et al., 2019). As seen in Appendix 3a, all the variables except for the NPI score and CEO age, have a significant result. Therefore, the null hypothesis has been rejected and all the variables are not normally distributed except for the NPI score and CEO age. The level of skewness and kurtosis is seen in Appendix 3b. It is acceptable if the values are between -3 and 3 (Hair et al., 2019) therefore a log transformation for these variables that are not normally distributed have been conducted in order to see if it will improve the levels of skewness and kurtosis. After log transformation, the variables Firm size, Environmental uncertainty and CEO tenure were not significant (Appendix 3c) and therefore, normally distributed due to the log

transformation. The kurtosis value of CAR was less after the log transformation. However, when using the log transformation of this variable, too much variables (N=53) were missing and therefore, the non-transferred data of CAR has been used. The regression has used the original values except for firm size, environmental uncertainty and CEO tenure.

*Linearity.* An implicit assumption of all multivariate techniques is linearity (Hair et al., 2019). To check if the regression model is linear, a scatter plot is conducted based on ZRESID (the standard residuals, or errors) and ZPRED (the standardized predicted values of the dependent variable based on the model). Since the scatterplots do not have any non-linear patterns (Appendix 3e) the linearity assumption has not been violated. Therefore, there is no need for any additional transformations.

*Multicollinearity.* When conducting a multiple regression analysis, it is preferred that the independent variables correlate highly with the dependent variable but with just little correlation among themselves (Hair et al., 2019). The variance inflation factor (VIF) should be below 10 since this the highest acceptable level. Another indicator of multicollinearity is the tolerance value, the higher to 1.0 the low the multicollinearity (Hair et al., 2019). As seen in Appendix 3f, the values are below 10 in the VIF column and close to 1 in the Tolerance column. Therefore, there is no indication of multicollinearity.

*Centering.* A variant of standardization is centering. Even though there is no indication of multicollinearity based on the VIF and tolerance value (Appendix 3f) centering has been conducted as a correction for multicollinearity and also for improvements in interpretation of moderation and interaction effects in multiple regression (Appendix 3g) by subtracting the mean value from each observation's actual value. The objective is to retain the original variation among the values but make all variable relative to their mean (Hair et al., 2019). Since this research investigates if environmental uncertainty moderates the effect of CEO narcissism on stock market reaction, CEO narcissism and environmental uncertainty have been centred and the centred interaction effect has been used as the moderator in order to improve the interpretation when analysing the results.

*Constant variance.* The assumption of homoscedasticity is related to dependence relationships between variables. It refers to the assumption that dependent variable(s) have equal levels of variance across the range of predictor variable(s). The assumption of an equal spread of variance across independent variables is critical when conducting a regression analysis. Homoscedasticity is desirable because the variance of the dependent variable should not be concentrated in only a limited range of the independent values (Hair et al., 2019).

As seen in Appendix 3h, variance is equally spread and therefore, this assumption is met and no further procedures were conducted.

#### **4.2 Regression model and fit**

When conducting the multiple regression analysis, the 'enter' method within SPSS is used with 4 'blocks'. These blocks represent the 4 models that are used in the analysis. The analysis started with the first block. The first model consists of all the control variables: *Percentage acquisition public, Mean firm performance, Firm size, Firm age, CEO relative cash compensation, CEO age, CEO tenure, CEO gender, CEO chairman duality, CEO founder CEO multiple acquisition and Industry*. The second block has been expanded with the independent variable *Mean narcissism value* and the third block is expanded with the independent variable *Mean uncertainty*. The fourth and last block is expanded with *Mean uncertainty* as a moderator by the centred interaction effect of *Mean narcissism value (NPI)* and *Environmental uncertainty*.

When testing for the significance of the model, the adjusted coefficient of determination (Adjusted  $R^2$ ) has to be taken into account. This is a modified measure of the coefficient of determination that takes into account the number of independent variables included in the regression equation and the sample size (Hair et al., 2019). The reason to use the adjusted  $R^2$  instead of the  $R^2$ , is that the  $R^2$  will always increase if a variable is added, even if not significant predicted variables are added (Hair et al., 2019). The adjusted  $R^2$  increased slightly when comparing all the models. The highest value (0.026) of the adjusted  $R^2$  is seen in Appendix 4b. This value explains the proportion of the variance of the dependent variable that is explained by the independent variable (Hair et al., 2019).

#### **4.3 Interpretation of (regression) results**

The second regression model in Appendix 4b is conducted in order to give an answer to the first hypothesis: *The stock market reacts less favorably when an acquisition announcement is made by a narcissistic CEO*. The mean narcissism score (NPI) is positively significant (2.705,  $p=0.024$ ) which indicates that a higher level of CEO narcissism leads to a higher stock market return. This is not in line with the first hypothesis since the opposite was expected. Therefore, the first hypothesis is rejected. Many factors could influence the outcome which will be explained in the discussions and limitations part. The third regression model had included the independent variable *Mean uncertainty* as a direct effect on *Stock market reaction* in order to give an answer to the second hypothesis:

*Higher levels of environmental uncertainty influences the stock market reaction negatively.*

As seen in Appendix 4b *Mean uncertainty* is negatively significant (-7.425,  $p=0.058$ ) at a 0.1 level. This result is in line with the second hypothesis and is therefore accepted.

The fourth regression model in Appendix 4b had included the variable *Mean uncertainty* and the interaction (moderation) effect of mean narcissism value and environmental uncertainty. The fourth model was conducted to investigate the third hypothesis: *Environmental uncertainty moderates the relationship between the acquisition announcement made by a narcissistic CEO and the stock market reaction negatively.* As seen in Appendix 4b, the interaction effect of mean narcissism value and environmental uncertainty was not significant (14.786,  $p=0.142$ ). The results are not in line with the third hypothesis and is therefore rejected.

As mentioned before in chapter 2.1 *Signaling theory and narcissistic CEOs*, as a result of grandiosity, narcissists will favour acquisitions since acquisitions are grandiose attention-getters (Chatterjee & Hambrick, 2007). Research has investigated that CEO narcissism is positively related to strategic grandiosity, as indicated by the number of acquisitions (Chatterjee & Hambrick, 2007). This is in line with the results of Appendix 4c regression model 3 and 4 since the control variable *CEO multiple acquisitions* is marginally positive significant for model 3 and 4 with (1.291,  $p=0.100$ ), (1.254,  $p=0.109$ ), respectively at a 0.1 level. The highest value of the adjusted  $R^2$  is 0.026 (Appendix 4b). Therefore, just 2.6 percent of the variance of the stock market reaction is described by the variables that are used in the model. Since this percentage is extremely low, there seem to be other variables outside this model which influence the stock market reaction.

The F-test in Appendix 4a, indicates the overall model fit. This test whether the overall regression model is a good fit for the data (Dhakal, 2018). These values are not significant as seen in Appendix 4a. Regression model 1,2,3,4 have a value of  $F_1 = (12,86) = 0.463$ ,  $p(0.931) > 0.05$ ,  $F_2 = (13,85) = 0.855$ ,  $p(0.602) > 0.05$ ,  $F_3 = (14,84) = 1.083$ ,  $p(0.385) > 0.05$ ,  $F_4 = (15,83) = 1.172$ ,  $p(0.310) > 0.05$ , respectively. Therefore, there is not a significant change in the explained variance of the independent variables in relation to the dependent variable and it can be concluded that there is not a good overall fit.

#### **4.4 Robustness check**

*Dependent variable.* To check if the results were robust, additional tests are conducted. The first robustness check is conducted by replacing the sampling period and time periods of the stock market reaction. In M&A research, it is very common to use 270 days sampling period

with time periods of 1 to 5 days centred on the announcement date (Day 0) (King et al., 2020). There are 3 different sampling periods used in the additional test: 3,5,7 days.

The results of the additional test vary as seen in Appendix 4b to Appendix 4e. The first result of the regression with regard to the first hypothesis is (2.705,  $p=0.024$ ). The results of the additional test with regard to the first hypothesis are for the 3-5-7-days event window (1.161,  $p=0.182$ ), (1.768,  $p=0.058$ ), (2.148,  $p=0.043$ ) respectively. The result of the 3-days event window (1.161,  $p=0.182$ ) is not significant. The results of the 5 and 7-days event window are marginally significant. However, the value of the previous regression analysis is much smaller. Therefore, the results regarding the first hypothesis of the additional tests are not similar with the previous regression analysis.

The result of the previous analysis regarding the second hypothesis is (-7.425,  $p=0.058$ ). The results of the 3-5-7-days event window are (-6.905,  $p=0.016$ ), (-6.671,  $p=0.029$ ), (-6.578,  $p=0.059$ ) respectively. These values show similar results to the previous analysis. The third hypothesis in the previous analysis had a value of (14.786,  $p=0.142$ ). The results of the 3-5-7-days event window are (9.358,  $p=0.200$ ), (13.660,  $p=0.079$ ) and (14.869, 0.097), respectively. It is remarkable that the values of the 5 and 7 days' event windows are significant at a 0.1 level. However, the results are not in line with the previous analysis. Of all three hypotheses, the robustness check only provides hypothesis 2 with a significant effect and the values of the first and third hypothesis with regard to the robustness check differ.

*Independent variable.* A robustness check has also been conducted for the independent variable. The regression analysis has been conducted two times with two different mean narcissism value (NPI) scores. As mentioned before in section 3.8 *Survey* the first regression analysis included NPI scores based on the outcomes of all the respondents regardless of whether they have answered the attention check question right or wrong. The outcome of this regression model was that the *Mean Narcissism value* was positively significant (2.164  $p=0.061$ ) at a 0.1 level (Appendix 5a). However, when calculating the mean narcissism scores based on only the right answers of the respondents, the relationship between CEO narcissism and stock market reaction was more significant (2.705,  $p=0.024$ ) at a 0.5 level. This was also expected since research has shown that passing the attention check question was associated with better logical judgments (Oppenheimer et al., 2009) and that could be an explanation why the outcome was more (positively) significant (2.705,  $p=0.024$ ). The robustness check demonstrated only similar results for the second hypothesis. The other results of the robustness checks are not in line with the results of the previous analysis.

*Firm performance.* As mentioned in the introduction, narcissistic CEOs tend to deliver extreme performance and fluctuating performance for their organizations (Chatterjee & Hambrick, 2007). The result of firm performance of the first regression analysis is (-0.031,  $p= 0.752$ ). The results of the 3-5-7-days event window are (-0.120,  $p=0.090$ ), (-0.088,  $p=0.247$ ), (-0.052,  $p= 0.546$ ) respectively (Appendix 4b to Appendix 4e). The results vary from significant (-0.120,  $p=0.090$ ) at a 0.1 level, to not significant at all. Therefore, this is in line with the theory of Chatterjee & Hambrick (2007) due to the fluctuations of the regression results of firm performance.

*Intraclass correlation (ICC).* When calculating the ICC, the degree of dependence among individuals within a higher-level grouping is measured (Hair et al., 2019). The respondents were recruited from MTurk and fellow master students. When creating the survey, the option to rate each CEO equally has been chosen and the amount of times that a CEO had to be rated was set to at least 3 times since this is in line with previous research that also measured CEO narcissism using a video metric approach (Hill et al., 2019). Each CEO has been rated by both groups and the NPI score that has been assigned to each CEO from both groups has been compared in order to calculate the ICC. The ICC measures to what extent the respondents from different groups agree for a specific CEO and measures if the assigning of values are not random. The average measures indicate how consistent the respondents are relative to each other. The ICC is seen in Appendix 5b and has a value of 0.836 which indicates a good reliability (Koo, and Li, 2016).

*Independent T-test.* In addition, the mean, standard deviation and an independent T-test has been conducted between the respondents of MTurk and master students. When conducting a T-test, the  $H_0$  states that the population mean of two unrelated groups are equal ( $H_0 : u_1=u_2$ ) (Hair et al., 2019). Conducting the independent samples test leads to the following results between the respondents of MTurk ( $M= 3.4081$ ,  $SD= 0.35187$ ) and the master students ( $M= 3.5960$ ,  $SD= 0.38675$ ), with  $t(97) = -1.744$ ,  $p= 0.084$  (Appendix 5c, 5d). Since the  $p$  value is not significant at a 0.05 level,  $H_0$  is accepted and therefore, there are no statistically significant differences between the means.

The values of the ICC and the independent T-test was expected since it is consistent with previous research on the reliability of using respondents recruited from MTurk. Several studies were replicated using MTurk such as ‘Asian disease’ of Tversky and Kahneman, (1981) and the ‘Linda’ problem of Baron and Hershey, (1988) and there were only very slight differences between the results from MTurk and the subjects recruited using the other

methods (Paolacci et al., 2010). Qualitatively, the results were identical (Mason and Suri, 2012; Gupta et al., 2019).

All in all, from all the robustness checks that have been performed, only the second hypothesis with regard to the direct negative effect of environmental uncertainty on stock market reaction, demonstrated similar results with the previous regression analysis. Since the T-test was not significant, it can be concluded that there are no significant differences between the mean of the two groups. The ICC (0.836) indicates a good reliability and therefore, the respondents of both groups were not assigning the values randomly.

## **Chapter 5 | Discussion**

### **5.1 Findings**

This research has investigated 3 hypotheses, the first hypothesis was a replication of previous studies that had investigated the relationship between an acquisition announcement of a narcissistic CEO and the stock market reaction. Since these studies have found that the stock market reacts less favourably to acquisition announcements made by narcissistic CEOs (Aabo et al., 2020, Aktas et al., 2016), the expectation was that the replication of the first hypothesis would result in the same outcome. Contrasting to the expectations, the outcome of the second regression model was positively significant (2.705,  $p = 0.024$ ) at a 0.05 level instead of negative significant.

A potential explanation could be that this study has used another method to measure CEO narcissism, this could have influenced the outcome of the study. The studies of Aabo et al., (2020) and Aktas et al., (2016) have used CEOs signature, size, pictures and speeches in order to measure CEO narcissism. This study has used third party ratings combined with a video metric approach, and additional attention check questions. Since this narcissism value is an indication of perceived CEO narcissism, it could have influenced the outcome of the study. In addition, research has investigated that the relationship between CEO narcissism and firm performance is curvilinear. Therefore, narcissism can positively impact firm performance to a point, but may become counter-productive or ineffective beyond that (Uppal, 2020). This could potential be an explanation why the outcome of the first hypothesis is positive significant. Firm performance has been used in previous research in order to investigate stock market performance, after an acquisition announcement made by a narcissistic CEO (King et al., 2020). Although the outcome of the first hypothesis is not in line with the expectation of this research, the contrasting result is plausible and could be explained due to the curvilinear relationship between CEO narcissism and firm performance (Uppal, 2020).

The second hypothesis has included the independent variable *Environmental uncertainty* and it was predicted that this variable has a direct, negative influence on the stock market reaction. The outcome is negatively significant ( $-7.425, p=0.058$ ) at a 0.1 level and in line with the second hypothesis. This was also expected since previous study has investigated before that an uncertain event, which is a part of uncertainty (Duncan, 1971) has a negative effect on the stock market reaction (Bash and Alsaifi, 2019).

The third hypothesis was to investigate if environmental uncertainty moderates the relationship between the acquisition announcement, made by a narcissistic CEO, and the stock market reaction negatively. This expectation was based on previous research which indicates that narcissist carry out very little scanning (Vecchiato and Roveda, 2010; Vecchiato, 2012). This could lead to the narcissist experiencing uncertainty due to lacking the sufficient information to predict accurately. Therefore, it was expected that a narcissistic CEO, will face these problems caused by environmental uncertainty even more, since the vision of a narcissistic leader can lead to an unrealistic or distorted assessment of the environment (Robert & Brandley, 1988), due to the self-serving needs of the narcissistic leader (Cragun et al., 2020; de Vries and Miller, 1985).

However, as seen in Appendix 4b, the outcome of this study was that there is no significant relationship between the interaction effect of mean narcissism value and environmental uncertainty ( $14.786, p=0.142$ ). The results are not in line with the third hypothesis and is therefore rejected. A potential explanation of this result might be found in the way that environmental uncertainty has been measured. Although research has stated that it is possible to measure environmental uncertainty through measuring market uncertainty since it is a proxy of it (Ghosh and Olsen, 2009; Bergh and Lawless, 1998; Dess and Beard, 1984; Arieftiara et al., 2017), calculating the standard deviation of sales might not include all aspects of environmental uncertainty as there are more factors involved in it. As mentioned before in the introduction, researchers have stated that environmental uncertainty includes unpredictability of external forces acting on the company such as the actions of suppliers, customer behavior, labour market changes, economic development and technological developments (Daft, 2002; Dess and Beard, 1984; Hartmann, 2005). The standard deviation of sales which has been used in this research, only incorporates a few of the factors of environmental uncertainty. This could be an explanation why the results are not in line with the expectations.

## 5.2 Theoretical contributions

Researchers have investigated the stock market reaction when a narcissistic CEO announces an acquisition. CEO narcissism has been measured by using first person pronoun in speech and the use of signature size and pictures (Aabo et al., 2016). CEO speeches from fair disclosure wires has also been used to measure the relationship between CEO narcissism and stock market reaction (Aktas et al., 2020). Therefore, previous studies have used either context related information or content related information. This research has used both context and content related information by utilizing third-party ratings of video samples to provide valid access to direct but unobtrusive measurement of CEO characteristics, in order to investigate the relationship between CEO narcissism and stock market reaction.

Although previous research has used CEO speeches from fair disclosure wires in order to measure CEO narcissism (Aktas et al., 2020), this research implemented an additional requirement that presentations, general announcements and speeches could not be included in the video metric approach since this might be scripted. Therefore, it could be that a CEO does not behave spontaneously during a presentation (Aktas et al., 2016). By inserting this extra criterion, it is assumed that the interaction between the CEO and the interviewer is more spontaneous. Recent research that investigates CEO hubris, which is a related construct of CEO narcissism (Chatterjee and Hambrick, 2007) only used interviews too in order to identify CEO hubris (Akstinaite, Garrard, & Sadler-Smith, 2021). Although the research did not explicitly mention why they only used interviews, it is assumed that the same reason is applicable. However, in order to make a valid statement about using only interviews and leave general announcements and speeches out, further research should be conducted.

Lastly, this research includes an extra attention check in the survey by implementing an attention check question in order to measure how serious a participant is when taking the survey. The NPI measurement method has been conducted two times, the first time included all the values of the respondents (2.164,  $p=0.061$ ) (Appendix 5a) and the second time included only the values of the particular question of the respondent that answered the attention check question right (2.705,  $p=0.024$ ) (Appendix 4b). This has led to a more significant result. Although this method needs further research and validation, which will be discussed in detail in the next section, this measurement method is an addition to the literature that uses unobtrusive video measurement method and a NPI-16 survey, in order to measure perceived CEO narcissism.

## 5.4 Limitations and future research opportunities

*Attention check questions.* When conducting research about CEO narcissism, researchers agree that NPI is the most widely used assessment tool of narcissism as a personality trait and is considered accurate and valid (Gentile et al., 2013; Raskin & Terry, 1988). Therefore, there was no doubt to use another assessment tool to measure unobtrusive CEO characteristics. Since this research also recruited respondents from MTurk, a concern of the researcher was that respondents from MTurk would not take the questionnaire seriously since it could be that respondents just want to earn money quickly. Although several studies such as the ‘*Asian disease*’ of Tversky and Kahneman, (1981) and the ‘*Linda*’ problem of Baron and Hershey, (1988) were replicated to test the reliability of MTurk respondents, only very slight differences were found between the two groups (Paolacci et al., 2010).

However, including attention check questions should enhance the reliability of the respondents and the outcome and lower the chance that respondents were only participating into the survey to earn money. Therefore, it was decided to include an attention check into the survey by including an attention check question. The intention of an attention check question is to identify respondents that are not paying close attention to survey questions (Liu, and Wronksi, 2018). Since research has found that passing the attention check question was associated with better logical judgments (Oppenheimer, Meyvis, and Davidenko, 2009), the presumption that including an attention check question would give more reliable results, increased.

When the attention check questions were formulated, it was hard to think about a question that was not too easy, but also not too hard. Therefore, the questions were mainly about the content of the interview, mostly about the subject that the CEO was talking about. For example: the CEO of the first video (which was also the example video of the survey) was talking about the incident that had happened what has led to the Black Lives Matter movement. Therefore, the corresponding attention check question was: *Which community did he mention?* (Appendix 1c). The African American community was mentioned a few times during the video and therefore, it was assumed that if the respondent answered the question wrong, that he or she did not paid attention to the video.

However, when reflecting critically about the attention check questions afterwards, it could be that the researcher had drawn the attention of the respondent unconsciously to the language and content. Although language and content is indeed related to a part of the survey (see Appendix 2, table 1 item 8 and 9) other aspects such as: gestures, behavioral habits, tone of voice, facial expression, reacting to and tackling (critical) questions, are evenly important.

Therefore, the attention check question was not formulated in a way that involved attention to overall behavior and this might have influenced the respondent. Therefore, this method using the NPI questionnaire, combined with attention check questions, have to be refined and further investigated in order to make sure that the attention of the respondent is to the content and overall behavior instead of only the content of the video.

*Additional question.* As mentioned before, the respondent had to answer an attention check question after watching the video before rating the survey. However, when critically reflect on the survey, it would have been better to include an extra question whether or not the respondent is familiar with the person in the video since this could have had an effect in assigning the NPI scores. When including the additional question, the researcher takes into account the zero acquaintance effect, which is the initial impression that others have of the person. At zero acquaintance, one does not have any direct information about the thoughts, feelings, opinions or preferences of others (Back, Schmukle, & Egloff, 2010). However, the CEOs featured in the videos are all S&P500 CEOs and therefore, it could be that a participant recognizes a CEO and has already thoughts about the CEO before watching the video. For example, if a respondent recognizes the CEO of Apple Inc. the respondent could rate the survey differently, knowing that this person is very powerful. Therefore, an additional question if the respondent is familiar with the person in the video, should be included in the survey if a similar research is conducted in the future.

*Number of respondents.* The minimal amount of respondents for the survey was based on previous research that has also measured CEO narcissism using a video metric approach (Hill et al., 2019). The minimal amount of respondents for each CEO was 3 and therefore, an amount of 60 respondents was needed, since each respondent rates 5 CEOs and a total of 99 CEOs was included in the research. In total, 68 people from MTurk and master students combined, have filled in the survey. Since each respondent had an hourly wage of around €5,50 and an additional €0,50 per respondent was calculated to include an extra filter, the survey was closed after reaching the minimum amount of respondents since this was sufficient to perform an analysis. In addition, it was also an economic decision since every researcher has a certain budget.

However, the survey should have been available longer to recruit more respondents since this would lead to more statistical power (Hair et al., 2019). When having more respondents, it is possible to add an additional criterion when conducting the analysis. An additional criterion could be that the researcher includes a cut-off point in order to decide if the participant is included in the analysis or not. For example, if a respondent has answered

more than 3 attention check questions wrong, the respondent is excluded from the research since the respondent has not paid enough attention during the survey which influences the reliability of the answers. This is a stricter criterion since the criterion that has been applied in this research did not exclude all the answers from the respondent, only the assigned values that were linked to the specific attention check question that was answered wrong, were excluded. Therefore, it is recommended to recruit more respondents in order to leave respondents out that did not take the questionnaire seriously, and also to conduct more statistical tests, in order to have more statistical power.

*Sample size.* The sample of this research consists of CEOs of S&P500 companies due to the accessibility of information (e.g. data, videos). S&P500 companies are dominant, powerful and wealthy. Therefore, it is harder to generalize the results to smaller and less powerful firms. For further research it would be interesting to execute the similar research design and include smaller firms to determine if the results differ or not compared to powerful companies.

All in all, it would be interesting for further research to expand and refine this novel research method. Formulating the attention check question in order to make sure that the attention of the respondent is to both the content and overall behavior of the CEO. The zero acquaintance effect should be taken into account by including an additional question if the respondent is familiar with the person in the video. In order to generalize results, smaller and less powerful firms should be included and in order to have more statistical power, more respondents should be recruited (Hair et al., 2019). As mentioned before, previous research on measuring CEO narcissism have used CEOs signature, size, pictures and speeches (Aabo et al., 2020; Aktas et al., 2016). Further research that will implement this novel method should take into account and refine the suggestions. This might overcome the limitations that has been encountered in this research. A comparison could be made afterwards of the results of both studies in order to be able to make a statement whether this method of measuring CEO narcissism might be more accurate or not.

## Chapter 6 | Conclusion

This research measures the effect of an acquisition announcement, made by a narcissistic CEO on the stock market reaction, by using a novel media-based measurement technique and utilizing the outcomes of third-party ratings of video samples of S&P500 CEOs. Since research has stressed the importance of the circumstances in which the CEOs lead (Glad and Whitmore, 1991; Robins and Paulhus, 2001; Rosenthal and Pittinsky, 2006) environmental uncertainty has been included in this research as an independent variable and it has been investigated if this variable also moderates the relationship between CEO narcissism and stock market reaction. Signaling theory has been used to examine how director and top management team characteristics influence investor valuation of the firm (Certo, 2003; Certo, Daily, and Dalton, 2001; Higgins and Gulati, 2003; Podolny and Baron, 1997). Attributes of the CEO communicate important information to investors and therefore, serve as important signals to investors which in turn impacts the stock market reaction (Zhang and Wiersema, 2009). This theoretical lens has been applied in order to formulate the three hypotheses.

The second hypothesis is in line with the expectation that environmental uncertainty negatively influences the stock market reaction. The outcomes of the first and third hypothesis were contrasting to the expectations and therefore had no significant result. Although environmental uncertainty has been measured with a validated method, more factors are involved when measuring environmental uncertainty. This could potentially be an explanation why the results are not in line with the expectations. In addition, the method of measuring CEO narcissism is quite new compared to the method that has been used in previous research of CEO narcissism and stock market reaction. Research has investigated that the relationship between CEO narcissism and firm performance is curvilinear. Therefore, narcissism can positively impact firm performance to a point, but may become counter-productive or ineffective beyond that (Uppal, 2020). Although the outcome of the first hypothesis is contrasting to the expectations, it is assumed that based on Uppal, (2020) the outcome is plausible. However, in order to make valid statements, further research with regard to the positive relationship between CEO narcissism and stock market reaction should be conducted and further refined.

Lastly, this research has implemented a new method in order to measure perceived CEO narcissism by adding additional attention check questions after each video. Although the outcome of the study had a better result when implementing this new method, further research and validation should be conducted to refine this method in order to implement it in future research.

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## Appendix

### Appendix 1a | Introduction survey

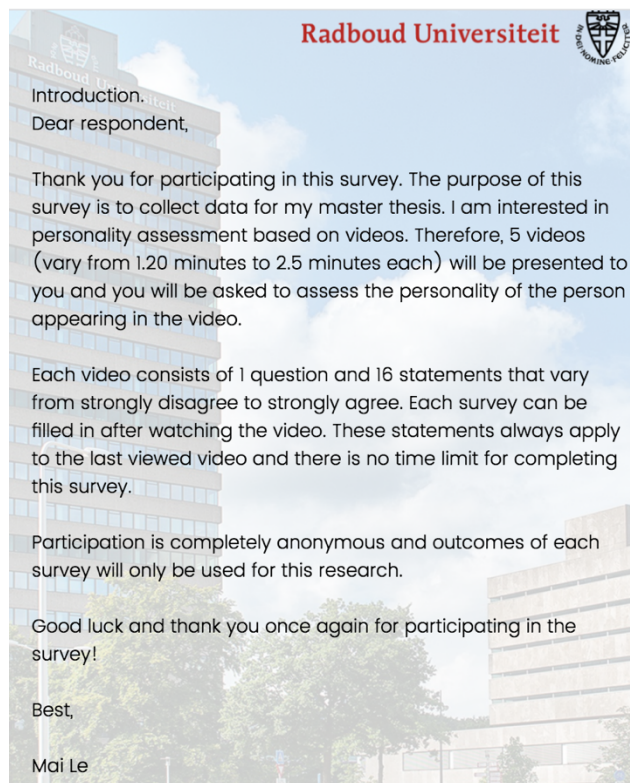


Figure 1, Introduction survey

### Appendix 1b | Example video

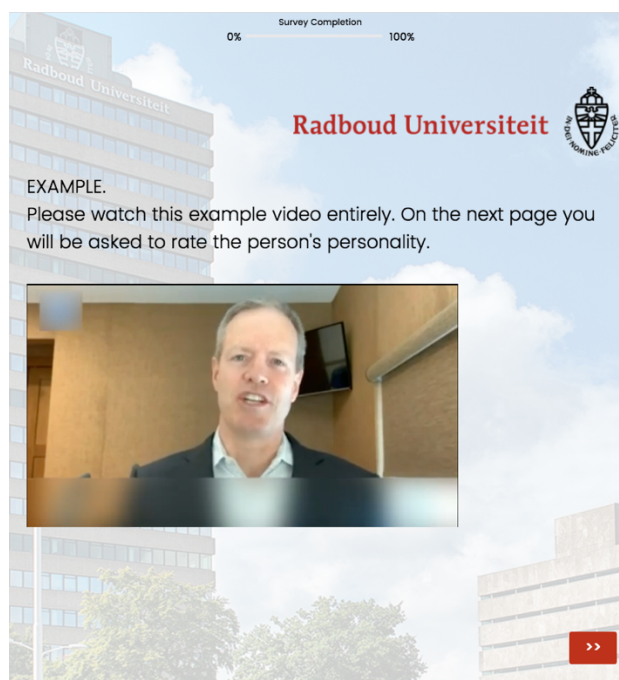


Figure 2, Example video

## Appendix 1c | Example attention check question

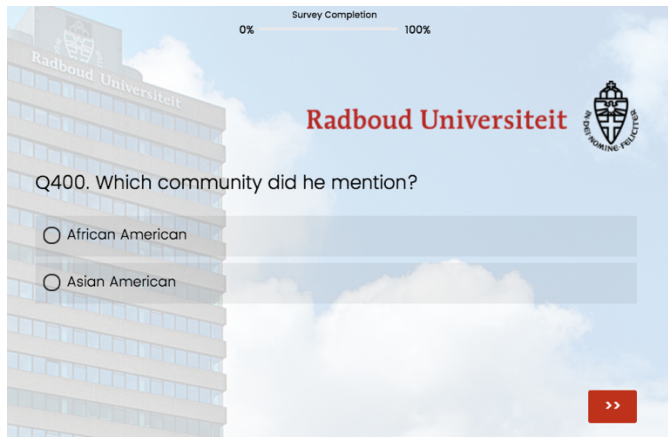


Figure 3, Example attention check question

## Appendix 2 | Table 1, Adapted NPI-16 measurement questionnaire

	Strongly agree (1) Disagree (2) Neither agree nor disagree (3) Agree (4) Strongly agree (5)
1	This person likes people telling her/him that (s)he is good
2	This person likes to be the centre of attention
3	This person thinks that s(he) is a special person
4	This person likes having authority over people
5	This person tries to manipulate people
6	This person insists upon getting the respect that (s)he thinks is due to her/him
7	This person is apt to show off if (s)he gets the chance
8	This person thinks (s)he knows what (s)he is doing
9	This person thinks everybody likes to hear her/his stories
10	This person expects a great deal from other people
11	This person really likes to be the centre of attention
12	This person wants people to recognize her/his authority
13	This person thinks (s)he is going to be a great person
14	This person thinks (s)he can make anybody believe anything (s)he wants them to
15	This person believes (s)he is more capable than other people
16	This person believes (s)he is an extraordinary person

Table 1: Adapted NPI-16 measure (Gupta and Misangyi, 2018; Raskin and Terry, 1988; Raskin, Novacek and Hogan, 1991)

### Appendix 3a, Test of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Mean CAR	0.094	99	0.031	0.948	99	0.001
Mean firm performance (ROA)	0.102	99	0.013	0.946	99	0.001
Mean narcissism value(NPI score)	0.64	99	0.200	0.983	99	0.237
Mean uncertainty	0.134	99	0.000	0.857	99	0.000
Firm size	0.382	99	0.000	0.270	99	0.000
Firm age (years)	0.343	99	0.000	0.219	99	0.000
CEO relative cash compensation	0.264	99	0.000	0.568	99	0.000
CEO age	0.088	99	0.059	0.972	99	0.032
CEO tenure	0.163	99	0.000	0.872	99	0.000

Table 2: Test of Normality

### Appendix 3b, Statistics, skewness and kurtosis

	Valid	Missing	Skweness	Std. Error of Skewness	Kurtosis	Std. Error Kurtosis
Mean CAR	99	0	-0.935	0.243	3.849	0.481
Mean firm performance (ROA)	99	0	0.897	0.243	1.171	0.481
Mean narcissism value (NPI)	99	0	0.287	0.243	-0.019	0.481
Mean uncertainty	99	0	1.519	0.243	2.489	0.481
Firm size	99	0	7.682	0.243	66.620	0.481
Firm age	99	0	9.246	0.243	89.579	0.481
CEO relative cash comp.	99	0	5.006	0.243	35.242	0.481
CEO age	99	0	0.572	0.243	1.138	0.481
CEO tenure	99	0	1.170	0.243	0.665	0.481

Table 3: Statistics, skewness and kurtosis

### Appendix 3c, Test of Normality after Log transformation

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Log10firmsize	0.096	45	0.200	0.970	45	0.299
LogmeanCAR	0.141	45	0.025	0.927	45	0.007
Log10firmperformance	0.073	45	0.200	0.987	45	0.886
Log10Environmentaluncertainty	0.088	45	0.200	0.960	45	0.126
Log10firmage	0.109	45	0.200	0.897	45	0.001
Log10CEOcashcompensation	0.218	45	0.000	0.845	45	0.000
Log10CEOtenure	0.082	45	0.200	0.972	45	0.342

Table 4: Test of normality

### Appendix 3d, Statistics, skewness and kurtosis after Log transformation

	Valid	Missing	Skweness	Std. Error of Skewness	Kurtosis	Std. Error Kurtosis
Log10firmsize	99	0	-0.935	0.243	3.849	0.481
LogmeanCar	99	0	0.897	0.243	1.171	0.481
Log10firmperformance	99	0	0.287	0.243	-0.019	0.481
Log10Environmental uncertainty	99	0	1.519	0.243	2.489	0.481
Log10firmage	99	0	7.682	0.243	66.620	0.481
Log10CEOcashcomp	99	0	9.246	0.243	89.579	0.481
Log10CEOtenure	99	0	5.006	0.243	35.242	0.481

Table 5: Statistics

## Appendix 3e, Normality of the residuals

### NPI

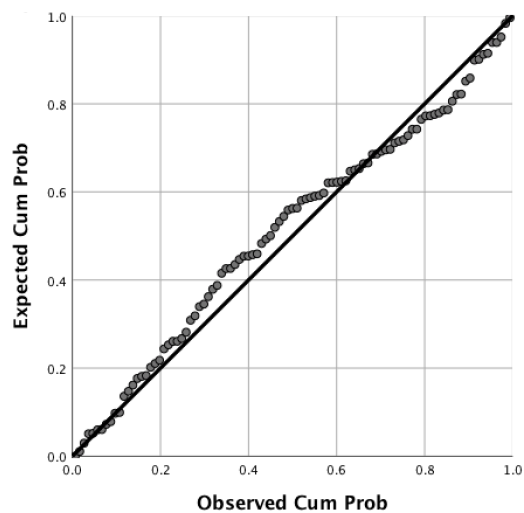


Figure 4, Normality of results, NPI

### Environmental uncertainty

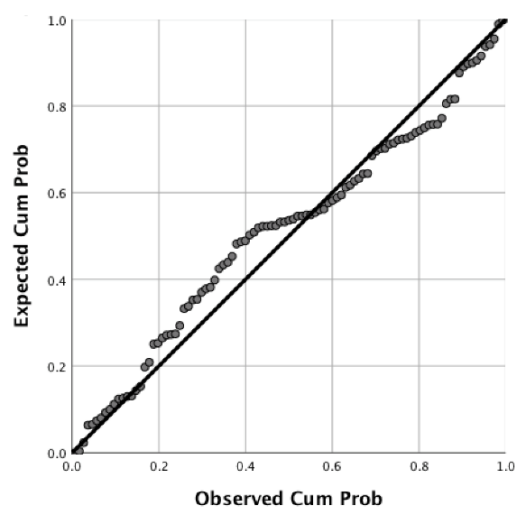


Figure 5, Normality of results, Environmental uncertainty

## Appendix 3f, multicollinearity values

	Tolerance	VIF
Percentage public	0.948	1.054
Mean firm performance (ROA)	0.812	1.232
Log10firmsize	0.806	1.241
Firm age (years)	0.956	1.046
CEO relative cash compensation	0.946	1.057
CEO age	0.928	1.078
Log10CEOtenure	0.883	1.133
Mean narcissism value (npi score)	0.958	1.044
Mean uncertainty	0.928	1.077

Table 6: Multicollinearity values

### Appendix 3g, Interaction plot

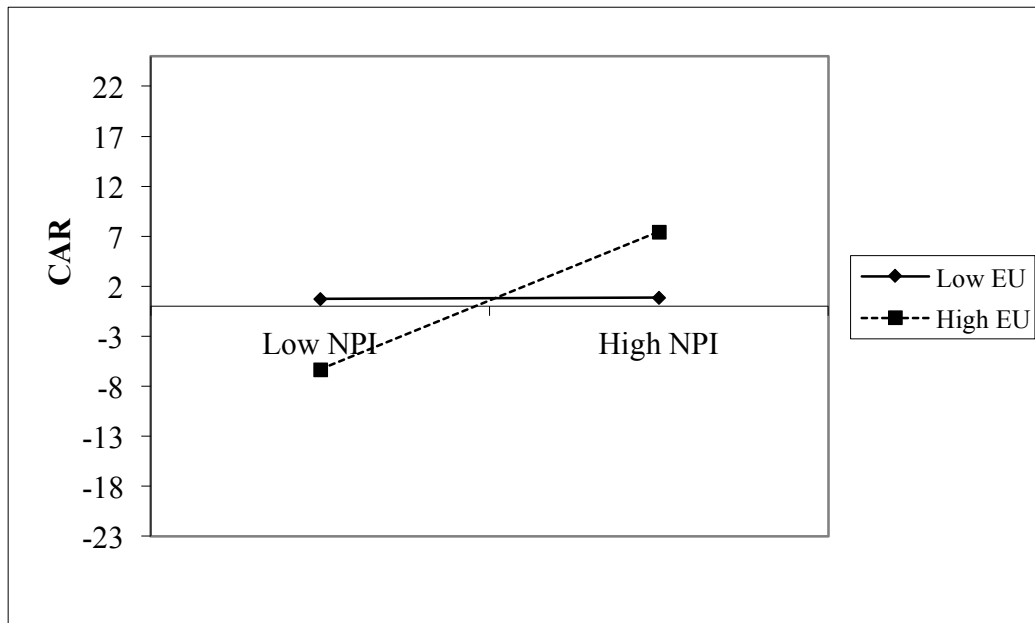


Figure 7: Interaction plot

### Appendix 3h, Scatterplot

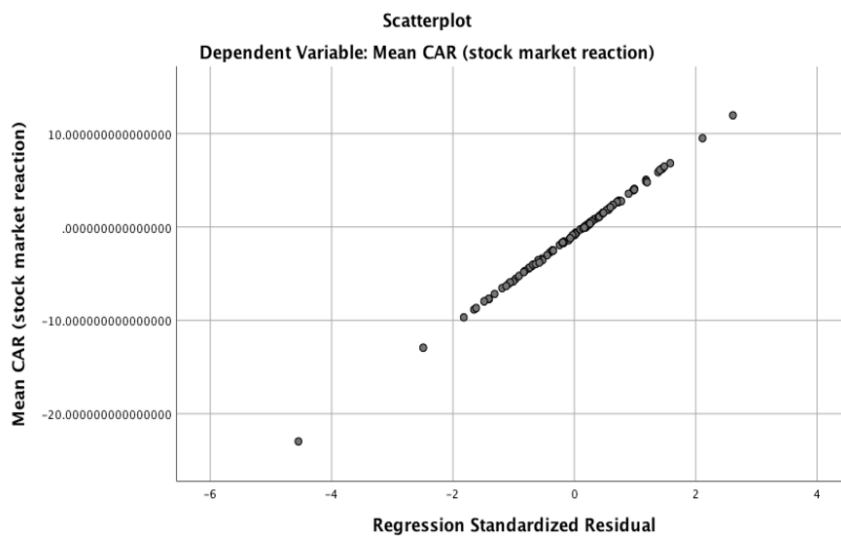


Figure 8: Scatterplot

## Appendix 4a, ANOVA

Model		Sum of Squares	df	Mean square	F	Sig.
1	Regression	139.407	12	11.617	0.463	0.931
	Residual	2158.728	86	25.101		
	Total	2298.135	98			
2	Regression	265.855	13	20.450	0.855	0.602
	Residual	2032.280	85	23.909		
	Total	2298.135	98			
3	Regression	351.404	14	25.100	1.083	0.385
	Residual	1946.731	84	23.175		
	Total	2298.135	98			
4	Regression	401.619	15	26.775	1.172	0.310
	Residual	1896.517	83	22.850		
	Total	2298.135	98			

Table 7, ANOVA

Appendix 4b, Regression model, 11-day event window

	1	2	3	4
<b>Control variables</b>				
Percentage public	-0.135 (1.203)	-0.105 (1.183)	-0.095 (1.166)	-0.097 (1.158)
Mean firm performance (ROA)	0.012 (0.099)	-0.002 (0.097)	-0.037 (0.097)	-0.010 (0.097)
Log10firmsize	0.084 (0.889)	0.064 (0.870)	0.047 (0.859)	0.053 (0.854)
Firm age (years)	0.008 (0.003)	0.003 (0.003)	0.003 (0.003)	0.001 (0.003)
CEO relative cash compensation	0.063 (0.600)	0.090 (0.589)	0.086 (0.580)	0.075 (0.577)
CEO age	-0.004 (0.087)	-0.020 (0.085)	-0.002 (0.084)	0.018 (0.084)
Log10CEOtenure	-0.022 (2.766)	-0.001 (2.706)	0.025 (2.680)	0.065 (2.722)
CEO gender	-0.081 (3.116)	-0.063 (3.049)	-0.041 (3.020)	-0.065 (3.032)
CEO chairman duality	0.111 (1.118)	0.117 (1.092)	0.107 (1.076)	0.076 (1.088)
CEO founder	0.030 (2.391)	0.028 (2.333)	0.063 (2.323)	0.006 (2.418)
CEO multiple acquisitions	0.023 (1.111)	0.036 (1.085)	0.053 (1.072)	0.047 (1.065)
Industry	-0.130 (2.601)	-0.133 (2.539)	-0.128 (2.500)	-0.150 (2.509)
<b>Independent variables</b>				(1.156)
Mean narcissism value (NPI)		0.241** (1.176)	0.246** (1.159)	0.231 (1.156)
Mean uncertainty			-0.205** (3.865)	-0.192 (3.852)
<b>Interaction effect</b>				
NPI_EU_centered				0.165 (9.974)
R <sup>2</sup>	0.061	0.116	0.153	0.175
Adjusted R <sup>2</sup>	-0.070	-0.020	0.012	0.026
F	0.463	0.855	1.083	1.172
F change	0.463	5.289	3.691	2.198

Standard coefficient are reported, standard errors are in parentheses

Significant \*\*\* $p < 0.01$ , \*\*  $p < 0.05$ , \* $p < 0.1$ .

Table 8: Regression model, CAR 11-day event window

Appendix 4c, Regression models Robustness check, 3-day event window

	1	2	3	4
<b>Control variables</b>				
Percentage public	-0.249** (0.865)	-0.232** (0.867)	-0.220** (0.843)	-0.222** (0.840)
Mean firm performance	-0.139 (0.071)	-0.147 (0.071)	-0.191* (0.070)	-0.168 (0.071)
Log10firmsize	-0.064 (0.639)	-0.076 (0.638)	-0.096 (0.621)	-0.091 (0.619)
Firm age (years)	0.011 (0.002)	0.008 (0.002)	0.008 (0.002)	0.006 (0.002)
CEO relative cash compensation	0.016 (0.431)	0.031 (0.432)	0.027 (0.419)	0.018 (0.419)
CEO age	-0.046 (0.062)	-0.055 (0.062)	-0.032 (0.061)	-0.016 (0.061)
Log10CEOtenure	-0.027 (1.988)	-0.015 (1.984)	0.017 (1.938)	0.051 (1.975)
CEO gender	-0.013 (2.240)	-0.003 (2.235)	0.025 (2.184)	0.005 (2.200)
CEO chairman duality	0.136 (0.804)	0.139 (0.800)	0.127 (0.778)	0.101 (0.789)
CEO founder	0.010 (1.718)	0.009 (1.710)	0.052 (1.680)	0.004 (1.754)
CEO multiple acquisitions	0.145 (0.798)	0.153 (0.796)	0.174* (0.775)	0.169 (0.773)
Industry	-0.216 (1.861)**	-0.228 (1.867)**	-0.210* (1.808)	-0.229** (1.820)
<b>Independent variable</b>				
Mean narcissism value (NPI)		0.136 (0.862)	0.143 (0.838)	0.131 (0.838)
Mean uncertainty			-0.252* (2.795)	-0.241** (2.794)
<b>Interaction effect</b>				
NPI_EU_centered				0.138 (7.236)
R <sup>2</sup>	0.154	0.172	0.228	0.243
Adjusted R <sup>2</sup>	0.036	0.045	0.099	0.106
F	1.305	1.355	1.770	1.777
F change	1.305	1.813	6.104	1.673

Standard coefficient are reported, standard errors are in parentheses

Significant \*\*\* $p < 0.01$ , \*\*  $p < 0.05$ , \* $p < 0.1$ .

Table 9: Regression model, CAR 3-days event window

Appendix 4d, Regression model Robustness check, 5-day event window

	1	2	3	4
<b>Control variables</b>				
Percentage public	-0.136 (0.931)	-0.111 (0.923)	-0.099 (0.930)	-0.102 (0.892)
Mean firm performance (ROA)	-0.082 (0.077)	-0.094 (0.076)	-0.134 (0.075)	-0.102 (0.075)
Log10firmsize	-0.111 (0.688)	-0.128 (0.679)	-0.147 (0.666)	-0.140 (0.658)
Firm age (years)	-0.005 (0.002)	-0.009 (0.002)	-0.010 (0.002)	-0.012 (0.002)
CEO relative cash compensation	0.101 (0.464)	0.124 (0.460)	0.120 (0.449)	0.107 (0.445)
CEO age	-0.002 (0.067)	-0.016 (0.066)	0.005 (0.065)	0.029 (0.065)
Log10CEOtenure	-0.062 (2.140)	-0.044 (2.113)	-0.014 (2.077)	0.033 (2.098)
CEO gender	-0.045 (2.411)	-0.031 (2.380)	-0.005 (2.340)	-0.033 (2.337)
CEO chairman duality	0.124 (0.865)	0.129 (0.852)	0.118 (0.834)	0.081 (0.838)
CEO founder	0.066 (1.850)	0.065 (1.821)	0.105 (1.800)	0.038 (1.864)
CEO multiple acquisitions	0.047 (0.859)	0.058 (0.847)	0.077 (0.831)	0.070 (0.821)
Industry	-0.153 (2.012)	-0.155 (1.982)	-0.150 (1.938)	-0.176* (1.934)
<b>Independent variables</b>				
Mean narcissism value (NPI)		0.201* (0.918)	0.207** (0.898)	0.190* (0.891)
Mean uncertainty			-0.236** (2.995)	- (2.969) 0.219**
<b>Interaction effect</b>				
NPI_EU_centered				0.195* (7.687)
R <sup>2</sup>	0.082	0.121	0.170	0.200
Adjusted R <sup>2</sup>	-0.046	-0.014	0.031	0.056
F	0.643	0.897	1.226	1.384
F change	0.643	3.708	4.960	3.158

Standard coefficient are reported, standard errors are in parentheses

Significant \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

Table 10: Regression model, CAR 5-day event window

Appendix 4e, Regression model Robustness check, 7-day event window

	1	2	3	4
<b>Control variables</b>				
Percentage public	-0.119 (1.064)	-0.091 (1.052)	-0.081 (1.038)	-0.084 (1.027)
Mean firm performance (ROA)	-0.023 (0.088)	-0.036 (0.086)	-0.071 (0.086)	-0.040 (0.086)
Log10firmsize	-0.035 (0.786)	-0.053 (0.775)	-0.070 (0.765)	-0.063 (0.757)
Firm age (years)	-0.007 (0.002)	-0.011 (0.002)	-0.011 (0.002)	-0.014 (0.002)
CEO relative cash compensation	0.042 (0.531)	0.066 (0.524)	0.062 (0.516)	0.050 (0.512)
CEO age	0.015 (0.077)	0.000 (0.075)	0.019 (0.075)	0.042 (0.074)
Log10CEOtenure	-0.060 (2.447)	-0.041 (2.409)	-0.015 (2.386)	0.031 (2.414)
CEO gender	-0.076 (2.757)	-0.060 (2.713)	-0.038 (2.688)	-0.065 (2.689)
CEO chairman duality	0.086 (0.989)	0.092 (0.972)	0.082 (0.958)	0.046 (0.965)
CEO founder	0.049 (2.115)	0.047 (2.077)	0.083 (2.068)	0.017 (2.145)
CEO multiple acquisitions	0.082 (0.983)	0.094 (0.966)	0.111 (0.954)	0.104 (0.945)
Industry	-0.109 (2.301)	-0.111 (2.259)	-0.107 (2.225)	-0.132 (2.225)
<b>Independent variables</b>				
Mean narcissism value (NPI)		0.217** (1.047)	0.222** (1.031)	0.206** (1.025)
Mean uncertainty			-0.207* (3.440)	-0.191* (3.416)
<b>Interaction effect</b>				
NPI_EU_centered				0.189* (8.846)
R <sup>2</sup>	0.051	0.096	0.133	0.162
Adjusted R <sup>2</sup>	-0.081	-0.043	-0.011	0.011
F	0.385	0.693	0.924	1.070
F change	0.385	4.210	3.657	2.825

Standard coefficient are reported, standard errors are in parentheses

Significant \*\*\* $p < 0.01$ , \*\*  $p < 0.05$ , \* $p < 0.1$ .

Table 11: Regression model, CAR 7-day event window

Appendix 5a, Regression model value for NPI score without control questions

Regression model	2	
<b>Control variables</b>		
Percentage public	-0.104	(9.172)
Mean firm performance (ROA)	0.009	(1.159)
Log10firmsize	0.055	(0.098)
Firm age (years)	0.002	(0.867)
CEO relative cash compensation	0.054	(0.003)
CEO age	0.065	(0.086)
Log10CEOtenure	0.043	(2.759)
CEO gender	-0.071	(3.071)
CEO chairman duality	0.071	(1.103)
CEO founder	-0.015	(2.458)
CEO multiple acquisitions	0.047	(1.079)
Industry	-0.168	(2.042)
<b>Independent variables</b>		
<i>Mean narcissism value (NPI)</i>	<b>0.198*</b>	<b>(1.141)</b>
R <sup>2</sup>	0.112	
Adjusted R <sup>2</sup>	0.011	
F	1.109	
F change	3.372	

Significant \*\*\* $p < 0.01$ , \*\*  $p < 0.05$ , \* $p < 0.1$ .

Table 12: Regression model value for NPI score without control questions

### Appendix 5b, Intraclass correlation coefficient (ICC)

	Interclass Correlation	Sig.
Single Measures	0.719	0.000
Average Measures	0.836	0.000

Table 13: Intraclass correlation coefficient (ICC)

### Appendix 5c, Mean, standard deviation between 2 groups of respondents

	Mean	N	Std. Deviation	Std. Error Mean
Mturk	3.4081	99	0.35187	0.03536
Masterstudent	3.5960	99	0.38675	0.03887

Table 14: Mean, standard deviation

### Appendix 5d, value Independent T-test

	F	Sig.	t	df	Sig (2-tailed)
Equal variances assumed	0.688	0.409	-1.747	97	0.084
Equal variances not assumed			-1.744	93.879	0.084

Table 15: Value independent T-Test