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CFO Narcissism and Financial Reporting Quality

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ABSTRACT

We investigate the effect of CFO narcissism, as measured by signature size, on financial reporting quality. Experimentally, we validate that narcissism predicts misreporting behavior, and that signature size predicts misreporting through its association with narcissism. Empirically, we examine notarized CFO signatures and find CFO narcissism is associated with more earnings management, less timely loss recognition, weaker internal control quality, and a higher probability of restatements. The results are consistent for within-firm comparisons focusing on CFO changes and are robust to controlling for CFO overconfidence and CEO narcissism. The results highlight the importance of CFO characteristics in the domain of financial reporting decisions.

JEL codes: G32; H32; M12; M40; M41

Keywords: financial reporting quality; narcissism; CFO; CEO; executives; accruals; real earnings management; internal controls; restatements; conservatism

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1. Introduction

"I ought to be CFO of the year. I've seen it in CFO Magazine. I want it to be me. Do you realize what a great job I've done at this company?" Andrew Fastow, former CFO of Enron, made these statements shortly before the exposure of the massive fraud that he helped orchestrate (Eichenwald [2005]). Eichenwald's interviews with Fastow's colleagues portrayed him as a narcissist who would do anything for his own self-interest at the expense of the welfare of those around him. Psychology research suggests that such behavior is typical of narcissists, as a variety of studies demonstrate that symptoms of narcissism include an excessive sense of self-entitlement, willingness to exploit others to serve one's own needs, domination of decision processes, failure to take feedback from others, and a need for constant recognition and reward (Wink [1991], Oliver and Robins [1994], Rhodewalt and Morf [1995], Lakey et al. [2008], Goncalo, Flynn, and Kim [2010], Nevicka et al. [2011], Tamborski, Brown, and Chowning [2012]). Consistent with a willingness to engage in unethical behavior, narcissists have been shown to be more likely to cheat on their spouses, commit white collar crimes, lie about their own achievements, and commit academic fraud (Buss and Shackelford [1997], Blickle et al. [2006], Menon and Sharland [2011], Hales, Hobson, and Resutek [2012]).

In this paper, we draw from psychology research to investigate the effects of CFO narcissism on financial reporting quality. We focus on CFOs because their duties are financial and because they bear the prime responsibility for reporting accurate and timely financial disclosures for the firm. We focus on narcissism because CFOs with narcissistic personality attributes (e.g., self-entitlement, exploitativeness, domineeringness, and inflated self-perception) are more likely to misreport, consistent with the link between narcissism and unethical behavior in the psychology literature. In particular, we examine the association between CFO narcissism and financial reporting outcomes such as earnings management, timely loss recognition, internal control quality, and financial restatements.

Because executives' personality traits are difficult to directly measure, the empirical literature seeks unobtrusive, valid proxies to capture the underlying constructs.[1] To capture narcissism, prior studies have utilized measures such as the CEO's prominence in annual reports and press releases or the CEO's compensation relative to other executives.[2] However, these previously used measures are largely unavailable for CFOs, are likely influenced by others, and are largely outside of the CFO's control.[3] Further, recent

[1] Executives are understandably unwilling to complete surveys or questionnaires to directly measure personality traits such as narcissism (Koch and Biemann [2014], Olsen, Dworkis, and Young [2014]).

[2] See, for example, Chatterjee and Hambrick [2007], Schrand and Zechman [2012], and Olsen et al. [2014].

[3] For instance, CFOs' pictures are not typically seen in annual reports, there is no CFO letter to shareholders, and they are unlikely to be primary authors of press releases. Further, many

research has questioned the construct validity of previously used narcissism measures (Koch and Biemann [2014], Carey et al. [2015]). Instead, we utilize a measure that is publicly available for a large representative sample of CFOs and is unlikely to be influenced by others in the firm: their signature size.[4]

The use of signatures in society has a long history, with specific instructions on signatures included in the Talmud from the fifth century. A substantial body of literature in psychology highlights the importance of signatures as a "powerful symbolic representation of the self."[5] Children, for example, often spend hours perfecting their signatures, fans seek autographs from celebrities, artists maintain unique signatures and charge more for signed prints, and official forms often must be signed by hand in the presence of a notary public. As a result, it does not seem surprising that personality attributes such as narcissism could influence signatures.

The link between narcissism and signature size has a long history in the psychology literature (Zweigenhaft and Marlowe [1973], Jorgenson [1977], Zweigenhaft [1977]).[6] However, given that the link between signature size and financial misreporting has not been explicitly examined in the prior literature, we first validate the link between signature size, narcissism, and misreporting in an experimental setting. In our experiment, subjects receive an endowment that is self-reported to a partner, on the basis of which the endowment is shared. We examine the relation between signature size (as measured by the area-per-letter of the signature on the consent form), attributes of narcissism based on Narcissistic Personality Inventory (NPI-40) scores, and the willingness to misreport the initial endowment.

We document a positive and monotonic relation between signature size quartiles and (1) the NPI-40 narcissism score, and (2) the magnitude of misreporting. The relation is primarily driven by factors associated with exploitativeness and authoritativeness as measured by the NPI-40. Mediation analyses indicate that the positive association between signature size and misreporting is driven by the effects of narcissism.

Having documented the link between signature size, narcissism, and misreporting in an experimental setting, we examine the relation between CFO signature size and financial reporting quality for publicly traded firms.

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corporations have disclosure committees and investor relations consultants that influence the firm's annual reports and press releases, as well as compensation committees that determine executive compensation packages.

[4] Webb et al. [1966] advocate that social science researchers seek out unobtrusive "physical trace" measures left behind by subjects that are unlikely to be influenced by the researcher or others and are under the subject's control. Our measure should satisfy those criteria because our laboratory subjects and CFOs were unlikely to expect their signatures to be analyzed and were in control of their signature size.

[5] See, for example, Chou [2015], Bryan, Adams, and Monin [2013], Bryan et al. [2011], Kettle and Haubl [2011], and Shu et al. [2012].

[6] See also Snyder and Fromkin [1977], Dillon [1988], Kettle and Haubl [2011], Shu et al. [2012], Lee, Gregg, and Park [2013], Ham, Seybert, and Wang [2017], and Chou [2015].

We measure signature size based on notarized CFO signatures provided to the SEC. While others in the organization may affect financial reporting quality, we expect CFOs to be particularly important because they oversee internal control, attestation, and financial reporting decisions. Controlling for other executive- and firm-level characteristics, we provide evidence that narcissistic CFOs are more willing to use accruals and real earnings management to influence reported outcomes. Further, narcissistic CFOs are less likely to recognize losses in a timely manner, as reflected in lower conditional conservatism, consistent with a willingness to cover up past mistakes. Finally, their firms are more likely to have ineffective internal controls and to have their annual financial reports restated, consistent with an increased incidence of misreporting.

We next compare the results based on CFO signature size to those based on CEO signature size. Given their direct role in the financial reporting process, we expect CFOs to have greater influence on financial reporting quality than CEOs. Further, the fact that we can control for CEO signature size helps to ensure that our results do not reflect more general firm-level characteristics. For example, despite the executives' signatures being handwritten and notarized, signature size could be indirectly influenced by the investor relations department in the firm. Alternatively, firms may hire executives of a certain type, such that CFO narcissism simply reflects CEO narcissism, or a more general firm characteristic. As expected, CFO narcissism is a better predictor of financial reporting quality than CEO narcissism. Further, our CFO signature size results are robust to inclusion of CEO signature size, reinforcing the specificity of CFO traits in explaining financial reporting choices.[7]

Finally, we compare the period before the CFO was instated with the period during which the CFO was in place. A difficulty with this approach is that we do not observe the signature size for the previous CFO. However, this approach has the advantage of permitting a within-firm comparison. Consistent with our prior results, CFOs with larger signatures exhibit more evidence of misreporting than their predecessors, as reflected in more evidence of accruals and real earnings management and an increased incidence of restatements, again suggesting that firm-level factors do not drive our empirical results.

Our results contribute to the literature in several ways. First, we provide some of the first evidence in the literature linking specific CFO personality characteristics to financial misreporting.[8] Second, we extend the literature

[7] An exception is with respect to real earnings management, which is correlated with both CFO and CEO signature size. It is not surprising that CEO traits would be associated with real earnings management because real operating decisions fall within the scope of the CEO and prior research suggests that CEO narcissism is associated with firm-level investment and performance (Ham, Seybert, and Wang [2017]) and real earnings management (Olsen, Dworkis, and Young [2014]).

[8] Our analysis is closest in spirit to Ge, Matsumoto, and Zhang [2011], who find that CFO-fixed effects have explanatory power for financial reporting outcomes, but that demographic

focusing on CEO effects on corporate decision-making.[9] Given the CFO's oversight role, we expect CFO characteristics to have a particularly important influence, incremental to CEOs, on financial misreporting. Third, by explicitly incorporating CEO characteristics into our analysis, we are able to differentiate between CFO and CEO effects and identify contexts in which CFO characteristics appear to be particularly important. In addition, we provide evidence that CFO narcissism is incrementally important after controlling for other factors such as overconfidence and equity-based compensation incentives.[10] Finally, we combine experimental and archival approaches to explicitly link signature size, narcissism, and misreporting, and validate our findings across multiple research methods.

Our analysis is subject to certain caveats. First, while we rely on the psychology literature for our measure of narcissism and confirm the measure in a laboratory setting, signature size is a crude measure of narcissism. However, it has the advantage that it can be objectively measured and is available for a large, representative sample of CFOs unlike annual report photographs, which are typically only available for CEOs and are influenced by the firm's investor relations department. The primary goal of our research is not to advocate for signature size as an indicator, but to provide evidence that narcissism is a potentially important attribute in CFO oversight of financial reporting.[11] Second, it is difficult to measure financial reporting quality. Rather than relying on a single proxy, we provide consistent evidence across various measures and specifications. Recognizing these limitations, we believe it is important to understand the role of CFO characteristics in influencing financial reporting quality.

The remainder of the paper is organized as follows: Section 2 discusses the related literature in more detail. Section 3 describes the experimental validation of our narcissism measure and misreporting behavior. Section 4 details the empirical methodology. Section 5 reports the empirical results and section 6 concludes.

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characteristics such as age, gender, and education have limited ability to explain the fixed effects. They conclude that other omitted CFO personality attributes are likely to explain the primary variation. Our results complement their analyses by providing confirmatory evidence that CFO personality attributes have significant explanatory power and identify CFO narcissism as an important determinant of financial misreporting.

[9] See, for example, Bertrand and Schoar [2003], Bamber, Jiang, and Wang [2010], Schrand and Zechman [2012], Demerjian et al. [2013], Jia, van Lent, and Zeng [2014], Davidson, Dey, and Smith [2015], Davis et al. [2015], and Dikolli et al. [2016].

[10] Because there is no uncertainty about the payouts in our laboratory setting, overconfidence or risk aversion should not play a role in the experimental analyses. Prior research indicates that narcissism and overconfidence are distinct traits (Campbell, Goodie, and Foster [2004]), and our empirical analyses that control for overconfidence and risk preferences via CFO option exercise behavior suggest that our results are not attributable to overconfidence or risk aversion.

[11] While narcissists might be effective leaders in some contexts, our results suggest that they may not be well-suited to the oversight of financial reporting.

2. Related Literature

While there is little existing empirical evidence on the link between specific CFO personality attributes and misreporting, our analysis contributes to several related streams of literature that help to motivate our empirical approach.

2.1 EXECUTIVE MANAGERIAL STYLES

Whereas neoclassical economics asserts that individuals are rational optimizers and thus managers are homogenous substitutes for one another (Bertrand and Schoar [2003]), upper echelons theory argues that managers' experiences, values, and personalities affect firm-related decisions and, therefore, different managers placed in the same situation will make different decisions (Hambrick and Mason [1984], Hambrick [2007]). Consistent with Hambrick and Mason's (1984) upper echelons theory, studies have documented manager-specific fixed effects, or styles, in the context of a variety of firm decisions and outcomes.

2.1.1. CEO Studies. Most studies of executives to date have focused on CEOs because they control a wide range of activities in the firm. Further, CEOs are highly visible so it is possible to develop proxies for CEO attributes based on observables such as the CEO's prominence in the firm's annual reports and press releases, and the CEO's use of personal pronouns in interviews. Similarly, CEOs are more likely to control the content of corporate communication such as annual reports, conference calls, and press releases, as well as compensation packages (Chatterjee and Hambrick [2007]).

Studies have investigated the effects of CEO traits such as frugality (Davidson, Dey, and Smith [2015]), ability (Demerjian et al. [2013]), masculinity (Jia, van Lent, and Zeng [2014]), integrity (Dikolli et al. [2016]), and overconfidence (Hirshleifer, Low, and Teoh [2012], Libby and Rennekamp [2012], Schrand and Zechman [2012], Ahmed and Duellman [2013], Hribar and Yang [2016]), among others.[12] CEO narcissism has been linked to firm performance (Ham, Seybert, and Wang [2017], Olsen, Dworkis, and Young [2014]), firm performance volatility (Chatterjee and Hambrick [2007]), aggressiveness in mergers and acquisitions (Aktas et al. [2016]), corporate tax avoidance (Olsen and Stekelberg [2014]), and overinvestment (Ham, Seybert, and Wang [2017]).[13]

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[12] Davidson, Dey, and Smith [2015] document that CEOs with a criminal record are more likely to commit fraud whereas frugal CEOs are less likely to have their financials restated. Using CEOs' facial width-to-height ratios as a proxy for masculinity, Jia, van Lent, and Zeng [2014] document that CEO masculinity is positively associated with financial misreporting. Dikolli et al. [2016] provide evidence that CEO integrity is negatively associated with tone-at-the-top material weaknesses and audit fees, but is not associated with SEC enforcement actions.

[13] Using measures of stock option exercise, prior research suggests that overconfident CEOs are more likely to issue optimistic earnings guidance (Libby and Rennekamp [2012], Hribar

The existing research on CEOs complements our analysis by providing evidence consistent with upper echelons theory and validating the notion that personality traits can influence executive decision-making. However, existing research predominantly focuses on CEO characteristics and does not attempt to link CFO personality characteristics such as narcissism to financial misreporting by the firm. We argue that, while CEO attributes are important for many decisions within the firm, CFO attributes are likely to be more important for financial reporting decisions and outcomes.

2.1.2. CFO Studies. Research on CFO personality attributes is more limited due in part to the lower profile of the CFO in the firm and the difficulty in measuring CFO attributes. In addition, the CFO's influence is likely limited to financial decisions, thereby making CFO characteristics prone to influence only a subset of firm decisions.

Recently, a few studies have begun to examine CFO traits in specific contexts. Malmendier and Zheng [2012] measure overconfidence based on an executive's willingness to hold deep-in-the-money options close to maturity. They provide evidence that CFO overconfidence predicts financing decisions such as debt and equity issuances while CEO overconfidence predicts capital budgeting decisions such as investment and acquisitions.[14] Their results complement our analyses by reinforcing the notion that CEOs and CFOs oversee different decisions within the firm.[15]

The primary paper we are aware of that explicitly links CFO effects to financial reporting outcomes is Ge, Matsumoto, and Zhang [2011].[16] The authors provide evidence that CFO-fixed effects are correlated with a set of accounting practices including operating lease classifications, discretionary accruals, the expected rate of return for pension plan assets, and earnings smoothness. However, they find little evidence linking CFO-fixed effects to individual attributes such as gender, age, and education. They conclude that, while individuals are important in accounting decisions, standard demographic characteristics do not capture significant variation in these decisions, and that more subtle personality attributes are likely at play. Our results complement their findings by suggesting that narcissism is one of the personality attributes that influences CFO financial reporting decisions. To the best of our knowledge, ours is the first study to provide consistent evidence of a link between misreporting and a specific CFO personality trait.

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and Yang [2016]), use less conservative accounting policies (Ahmed and Duellman [2013]), and face SEC enforcement actions (Schrand and Zechman [2012]). Our results are robust to controlling for CFO and CEO overconfidence based on stock option exercise behavior.

[14] Ben-David, Graham, and Harvey [2013] survey CFOs and find that those who expect higher future returns have higher firm investment and debt financing.

[15] As Malmendier and Zheng [2012] note, a challenge with using option exercise as a measure of overconfidence is disentangling the effects of overconfidence from factors such as risk aversion, insider information, procrastination, signaling, and agency issues.

[16] Dyreng, Hanlon, and Maydew [2010] study executive fixed effects, including CFOs, in the context of tax avoidance.

2.2 NARCISSISM AND MISREPORTING

Based on the prior literature, we expect narcissistic CFOs to be more willing to misreport for several reasons.[17] Narcissists tend to be characterized by excessive self-focus and self-entitlement. As a consequence, they are more likely to take actions that benefit themselves even at the expense of others. In addition, they tend to be exploitative and believe that rules do not apply to them. As a result, they are more willing to violate explicit rules or social norms to benefit themselves. Narcissists also tend to dominate decision processes and are less willing to take advice from others, so they are likely to violate existing control systems or to design systems that permit them greater flexibility to achieve their goals. Young et al. [2015] suggest that narcissists have a lower tolerance for monitoring and Chatterjee and Pollock [2017] indicate that narcissistic executives prefer to hire employees who are less likely to be effective monitors (e.g., lower status, younger, and less experienced). As a result, we expect firms with narcissistic CFOs to establish less effective internal control systems, resulting in more intentional, as well as potentially unintentional, misreporting.

Multiple empirical studies provide evidence that narcissists are more likely to engage in unethical actions. For example, Blickle et al. [2006] document a positive relation between narcissism and white collar crime, Buss and Shackelford [1997] find that narcissists are more susceptible to infidelity in their first year of marriage, Menon and Sharland [2011] find that narcissism is associated with greater academic cheating (wherein the effect is primarily driven by the exploitativeness component of narcissism), and Hales, Hobson, and Resutek [2012] find that narcissists are more likely to publicly exaggerate their performance on GMAT questions.

Overall, we expect the sense of entitlement, willingness to exploit others, need for recognition, authoritativeness, and domination of decisions by narcissistic CFOs to be reflected in higher levels of financial misreporting. Further, a positive association between narcissism and misreporting would be consistent with the link between narcissism and unethical behavior in other settings.

2.3 SIGNATURE SIZE AND NARCISSISM

The link between signature size and correlates of narcissism has a long history in the psychology literature. Early research such as Zweigenhaft and Marlowe [1973] and Zweigenhaft [1977] finds that individuals with larger signatures tend to have inflated self-perceptions, a greater sense of entitlement, and other attributes of narcissism. Snyder and Fromkin [1977] find that individuals with larger signatures feel a sense of superiority, while

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[17] For a general discussion of attributes associated with narcissism, see, for example, Wink [1991], Oliver and Robins [1994], Rhodewalt and Morf [1995], Goncalo, Flynn, and Kim [2010], Nevicka et al. [2011], and Tamborski, Brown, and Chowning [2012].

Jorgenson [1977] finds that individuals with larger signatures have a tendency to exhibit control and dominance over others.

More generally, an individual's signature has long been viewed as an official representation (where simply printing or typing one's name would be insufficient) for authoritatively linking oneself, one's actions, or official compliance with a particular contract or agreement (e.g., tax returns, mortgages, etc.). More recently, a number of studies have demonstrated that a person's signature is strongly associated with his or her self-identity (Kettle and Haubl [2011], Shu et al. [2012], Chou [2015]) and that narcissists exhibit a desire to distinguish themselves from others (Lee, Gregg, and Park [2013]). Similarly, Ham, Seybert, and Wang [2017] document a significant positive association between signature size and narcissism for a sample of business graduate students, and Dillon [1988] finds that subjects who embellish their signatures tend to have significantly higher narcissism scores than those who do not.

Although prior studies provide reasons to expect a link between signature size and narcissism, we validate this link in a laboratory study and investigate the mediating effect of narcissism in explaining the association between signature size and misreporting.

3. Laboratory Validation of Signature Size, Narcissism, and Misreporting Behavior

3.1 STUDY DESIGN AND PARTICIPANTS

To validate our signature size measure, as well as its link to narcissism and misreporting, we first utilize a laboratory study. This allows us to determine whether the area-per-letter measure of signature size is significantly correlated with scores on the NPI-40 narcissism personality scale, and whether these measures are jointly linked to misreporting behavior. The laboratory setting has the advantage of permitting us to establish links between signature size, narcissism, and misreporting while controlling for other factors such as overconfidence and risk aversion.

Sixty-three participants were recruited in two junior-level accounting courses at a *U.S. News* top-twenty-five ranked business school in return for an expected payment of $5 and a roughly 1 in 60 chance to win a $200 pair of Beats by Dre headphones.[18] Participants received a four-page document that included a consent form, a brief economic experiment, and a follow-up personality survey. The subjects printed and signed their name on the consent form, providing the signature that forms the basis of our area-per-letter narcissism measure. Participants then proceeded to the study

[18] Of 65 initial participants, one participant failed to write or sign his name on the consent form and another participant signed her name using Chinese characters. These participants were excluded from the analysis. Participants' signed names were verified when they came to pick up their payments for the study.

description, which informed them that there was a $5 payment jointly allocated to them and one other person.[19]

Each participant was randomly and anonymously paired with one other participant. They were informed that their default allocation was $2.50 but that different participants may have received different default allocations that were greater or less than $2.50, and therefore their paired participant would not know the true value of their default allocation. Participants were tasked with reporting their default allocation to the other participant, which determined the actual payouts. Participants could misreport the default allocation that determined the amount that they retained, while the paired participant received the remainder. Each member of the pair performed both roles in the task, resulting in a maximum payment of $10 and a minimum payment of $0 for each participant.[20] Following the monetary reporting decision, participants completed the 40-question Narcissistic Personality Inventory (NPI-40) based on Raskin and Terry [1988], which measures their clinical level of narcissism, and returned the packet to the administrator.[21] The experimental task (displayed in appendix A) is similar to a two-way dictator game (Kahneman, Knetsch, and Thaler [1986]) where the final payout to each participant depends upon the participants' willingness to misreport their predetermined monetary allocation to their peer.

While it is not possible to capture all aspects of the CFO's financial reporting environment in an experimental setting, our goal was to design a simple experiment that captured (in an admittedly stylized manner) several important features of the reporting environment for CFOs and investors. First is the notion of information asymmetry. Specifically, the participant making the allocation decision knew the underlying "truth" while the paired participant did not (and could not infer it from the allocation). Second, the participants were provided with a baseline allocation of $2.50 to provide a sense of the extent to which they were misreporting. Third, the participants' increase in welfare by misreporting came at the expense of others.[22]

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[19] Because Jia, van Lent, and Zeng [2014] suggest a link between misreporting and testosterone as measured by facial width-to-height ratios, we also obtain these measurements from our participants' digital student identification images to examine the relationship between facial ratios and our key variables of interest.

[20] The maximum (minimum) payment of $10 ($0) is received if the participant allocates $5 ($0) to him or herself and the paired participant allocates $0 ($5) to him or herself.

[21] The NPI-40 score is a commonly used measure of narcissism in social science research based on responses to 40 pairs of statements (e.g., "I can usually talk my way out of anything" vs. "I try to accept the consequences of my behavior"). The complete NPI-40 questionnaire is reported in appendix B.

[22] The correspondence between the experiment and CFO setting is admittedly imperfect. CFOs might also be motivated to inflate results for reputational reasons or reduce misreporting because of potential penalties for detection in later periods. However, we expect directionally consistent relations in the CFO setting.

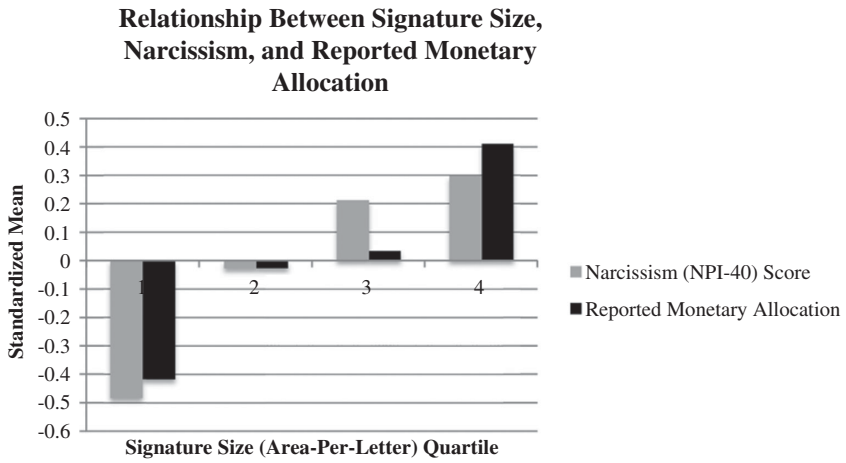

FIG. 1.— NPI-40 narcissism score and monetary allocation reported by quartile of signature size. This figure displays the relationship between signature size, narcissism, and misreporting. The standardized levels of narcissism (NPI-40 score) and monetary allocation reported are plotted by quartile of signature size.

Our laboratory setting allows us to separate narcissism from other characteristics such as overconfidence and risk aversion. In particular, the payoffs in the task are deterministic given the choice made by the subject. As a result, differences across subjects in risk aversion or overconfidence should not affect decision-making because there is no uncertainty over which to be risk averse or overconfident.

3.2 EXPERIMENTAL RESULTS

Consistent with prior psychology and business research (e.g., Zweigenhaft [1977], Ham, Seybert, and Wang [2017]), a rectangle was drawn around each signature, with each side touching the most extreme endpoint of the signature. The square-area of the rectangle was measured and standardized by the number of letters in the signature. Using this measure, the NPI-40 score, and the result of the experimental task, we conducted a mediation analysis of the effect of signature size on narcissism and the monetary allocation reported.

Figure 1 displays the standardized mean monetary allocation and NPI-40 narcissism score by quartile of signature size. Two points are worth noting. First, consistent with prior research (Ham, Seybert, and Wang [2017]), there is a monotonic relation between signature size and the NPI-40 narcissism scores across quartiles, confirming that the individuals with larger signatures tended to exhibit narcissistic traits. The raw correlation between signature size and the narcissism score is positive and significant ($r = 0.30$, $p = 0.017$). Second, the monetary allocation to the other participant decreases monotonically with signature size. These findings indicate that participants with larger signatures were more narcissistic and were more

TABLE 1

Relationship Between Signature Size, Monetary Allocation Reported, and NPI-40 Narcissism Score Subscales

Signature Size (Area-per-Letter)			Monetary Allocation Reported		
NPI Subscale	Correlation	*p*-Value	NPI Subscale	Correlation	*p*-Value
Authoritativeness	**0.26**	**0.04**	***Authoritativeness***	**0.31**	**0.01**
Self-Sufficiency	0.01	0.95	*Self-Sufficiency*	0.15	0.25
Superiority	0.18	0.15	*Superiority*	0.15	0.25
Entitlement	0.13	0.32	*Entitlement*	0.15	0.23
Exploitativeness	**0.40**	**0.00**	***Exploitativeness***	**0.27**	**0.03**
Vanity	0.19	0.13	*Vanity*	0.10	0.43
Exhibitionism	0.15	0.25	*Exhibitionism*	−0.02	0.89

This table displays the correlations between the seven components of the NPI-40 narcissism scale and signature size (left side) and monetary allocation reported (right side) from the laboratory study.

willing to underreport the initial allocation to their partners to gain a larger payout for themselves.

Because the NPI-40 score captures a variety of factors, it is useful to examine which factors are primarily responsible for the observed relation between signature size, narcissism, and misreporting. There are two primary factor decompositions of the NPI scale. An early factor analysis by Emmons [1984] revealed four latent factors—Authoritativeness/Leadership, Self-Absorption/Self-Admiration, Superiority/Arrogance, and Entitlement/Exploitativeness. Raskin and Terry [1988] suggested that Emmons's [1984] analysis under-identified the number of factors due to an inappropriate method of analysis and identified seven latent factors using a larger sample and different method. This analysis resulted in the 40-item NPI scale with seven subcomponents: Authoritativeness, Self-Sufficiency, Entitlement, Superiority, Exhibitionism, Vanity, and Exploitativeness. Appendix B displays the entire NPI-40 assessment instrument with item numbers segmented into the subscale groupings.

Table 1 reports correlations between the seven components of narcissism, signature size, and the reported monetary allocation. Of the seven subscales, Exploitativeness ($r = 0.40$, $p = 0.001$) and, to a lesser extent, Authoritativeness ($r = 0.26$, $p = 0.04$), are most strongly correlated with both signature size and misreporting. This result is consistent with Hales, Hobson, and Resutek [2012], who found that the best fit for their model of performance reporting was obtained from replacing the general narcissism score with the score on the Emmons [1984] Entitlement/Exploitativeness subscale.

In terms of specific statements, the five statements from the exploitativeness subscale that are most strongly associated with signature size in our data are:

1. I can usually talk my way out of anything.
2. I find it easy to manipulate people.
3. I can read people like a book.

4. Everybody likes to hear my stories.
5. I can make anybody believe anything I want them to.

While it is a stretch to draw strong conclusions from the results for specific questions or to extrapolate from undergraduates to CFOs, the questions and components of narcissism that are most highly correlated with signature size are descriptively interesting because they suggest the types of attributes that may be associated with a tendency to misreport. Presumably, an executive who is willing to misreport would likely be one who is also willing to be exploitive and manipulative and who feels that they can exert authority over others.

Because our signature size measure might be capturing testosterone levels (Jia, van Lent, and Zeng [2014]), we also obtained the facial width-to-height ratios for our subjects.[23] Photographs were available for 62 of the 63 participants. In general, there are no significant correlations between the facial ratio metric and narcissism, misreporting, or signature size. Specifically, whereas the correlation between signature size and narcissism is highly significant ($r = 0.30$), the correlation between facial ratio and narcissism is insignificant ($r = -0.015$). Facial ratio is also not significantly correlated with signature size ($r = 0.03$) or the reported monetary allocation ($r = -0.01$). These correlations remain insignificant when segmenting participants by gender.[24]

We next determine the direct and indirect relations between our key variables of interest. Figure 2 displays the results of a Baron and Kenny [1986] mediation analysis, which tests whether the effect of signature size on misreporting operates primarily through narcissism. While the association between signature size and misreporting has the most direct link to our archival analyses that follow, it is useful to establish the extent to which the correlation reflects narcissism. The mediation analysis includes four steps. Step one, reported at the top of figure 2, tests whether signature size predicts the reported monetary allocation. Consistent with the analysis in figure 1, the positive and significant relation ($\beta = 0.36$, $p = 0.035$) indicates that misreporting is significantly higher for subjects with larger signatures. To give a sense of the magnitudes, in the smallest signature size quartile subjects expropriated 12% of their partner's neutral allocation ($0.30/$2.50), versus 31% for the second quartile, 34% for the third quartile, and 53% for the fourth quartile.

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[23] Consistent with Jia, van Lent, and Zeng [2014], the facial width-to-height ratio is defined as the horizontal distance between the widest point of the cheeks scaled by the vertical distance from the upper lip to the upper edge of the eye.

[24] These results conform to untabulated archival analyses using our sample of executives. While facial images are typically not available for CFOs, we collected a sample of facial width-to-height ratios for CEOs that overlapped with approximately half of our CEO sample (259 CEOs with measurements averaged over two publicly available photographs). For the CEOs, facial ratio was insignificantly correlated with signature size and the real earnings management results were robust to inclusion of CEO facial ratio.

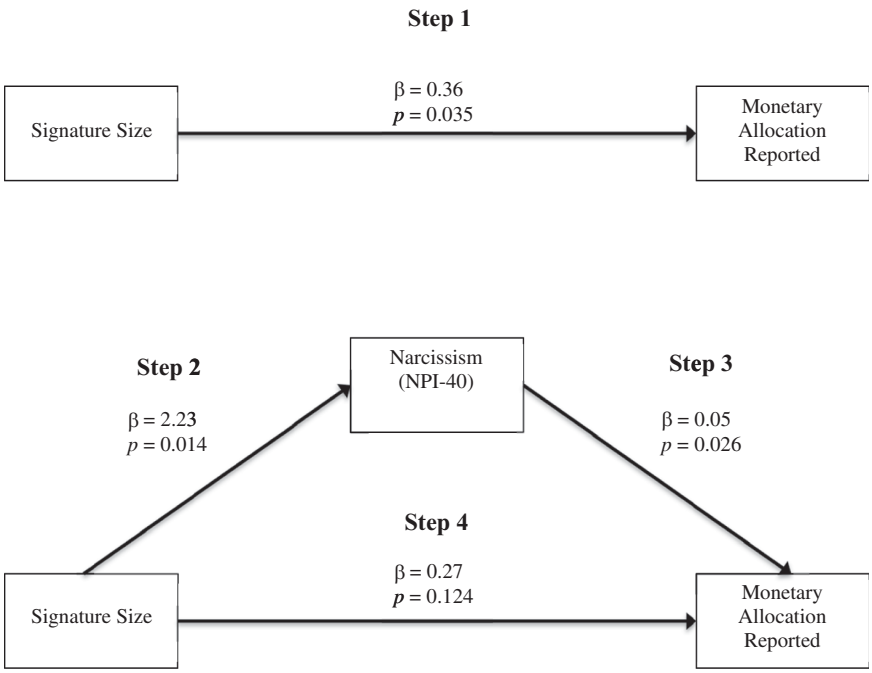

FIG. 2.— Mediation analysis of signature size, NPI-40 narcissism score, and monetary allocation reported. This figure displays the four steps of mediation analysis between signature size, narcissism (NPI-40 score), and misreporting. All *p*-values are two-tailed.

The remaining steps assess whether the positive association between signature size and misreporting obtains primarily through the effects of narcissism. Step two demonstrates that signature size is positively associated with narcissism ($\beta = 2.23$, $p = 0.014$). Step three demonstrates a positive and significant association between narcissism and misreporting ($\beta = 0.05$, $p = 0.026$). Step four requires that both signature size and narcissism be included in a regression predicting the reported monetary allocation. If signature size operates primarily through narcissism, signature size should become statistically insignificant in predicting the reported allocation in the presence of the NPI-40 variable. As indicated in figure 2, the relation between signature size and the reported monetary allocation becomes insignificant in the presence of narcissism ($\beta = 0.27$, $p = 0.124$), suggesting that signature size operates primarily through narcissism in influencing misreporting.

Two alternative methods of mediation analysis yield similar inferences. First, the Sobel test (Sobel [1982]) provides a similar measure of whether signature size indirectly affects monetary allocation through its effect on narcissism. This analysis yields a significant mediation effect (Sobel statistic = 1.69, $p < 0.05$, one-tailed). Second, the bootstrap mediation test developed by Preacher and Hayes [2004] and used in prior accounting

research (Maksymov and Nelson [2017]) reveals a significant indirect effect of signature size on monetary allocation at the 95% confidence level, providing increased confidence that the results support our theory.

Given the extant literature focusing on overconfidence (e.g., Schrand and Zechman [2012], Malmendier and Zheng [2012]), we also consider the potential effect of overconfidence in our setting. As noted earlier, our task involved no uncertainty or risk—the outcomes were deterministic and the formula was clearly stated—so differences in overconfidence or risk aversion should not have affected subjects' choices. Further, the NPI-40 subscales typically associated with overconfidence, superiority, and self-sufficiency (Campbell, Goodie, and Foster [2004]) are insignificantly associated with signature size. Nevertheless, we control for the standard archival proxy for overconfidence in our archival analysis robustness tests. While it is admittedly difficult to entirely rule out the potential effects of overconfidence, our results suggest that our narcissism measure captures attributes beyond overconfidence.

Taken together, the results of our laboratory study suggest that signature size predicts narcissism as well as misreporting, and that the effect of signature size on misreporting is primarily attributable to its relation with narcissism. This evidence is designed to complement the archival analysis that follows. Subject to the caveat that our experiment does not map perfectly into the archival analysis, we take comfort in the fact that we are able to establish significant links between signature size, narcissism, and misreporting in an experimental setting where it is easier to control for other factors and assess causality.

4. Archival Analysis of CFO Narcissism and Misreporting Behavior

4.1 DATA AND SAMPLE SELECTION

On June 27, 2002, the SEC issued an order requiring the senior executives of certain publicly traded firms to certify the accuracy of their financial statements. Specifically, the SEC required signed statements, under oath, from the CEO and CFO of 947 publicly traded companies with revenues greater than $1.2 billion. The statements were required to be signed and sworn before a notary public.[25]

We hand-collected all the statements from the SEC's Web site, including signed statements from 940 CFOs and 945 CEOs from 939 unique firms.[26]

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[25] File No. 4-460: Order Requiring the Filing of Sworn Statements Pursuant to Section 21(a)(1) of the Securities Exchange Act of 1934 can be found at: http://www.sec.gov/rules/other/4-460.htm.

[26] The SEC required statements from 947 firms, but only 939 complied. The remaining firms' reporting requirements terminated before the submission deadline (e.g., due to being acquired before the deadline). The number of statements differs from the number of firms due to co-CEOs or co-CFOs. The data source can be found at: http://www.sec.gov/spotlight/officerstatements.htm.

We matched each executive-firm pair to the Execucomp database, yielding a total of 754 CFOs and 822 CEOs. Because we standardize the signature by the number of letters signed, illegible signatures were omitted, resulting in 540 CFO and 536 CEO signatures.[27] Finally, requiring Compustat and CRSP data to calculate the outcome and control variables in our central tests yielded a final sample of 512 CFO and 513 CEO signatures. For tests involving internal controls and restatements, we merge this data set with Audit Analytics.

This data source has several advantages. First, the signatures were all notarized, indicating that they were signed by hand (as opposed to electronically pasted). In addition, all the executives were providing the same attestation for the same purpose, so the signatures should be comparable across executives and across firms. Finally, the structure of the form did not substantially constrain the space available for the signature. Appendix D displays two examples of the signed reports.

We focus on CFOs because we expect that CFOs (as opposed to CEOs) are likely to have primary control over financial reporting decisions, especially in large companies. However, we also report the results using CEO signature size for comparison purposes. From a measurement perspective, the fact that our results obtain primarily for CFO signature size, and are robust to controlling for CEO signature size, is reassuring because it indicates that our results are driven primarily by CFO characteristics and are not indicative of more general firm-level effects.

4.2 EMPIRICAL SPECIFICATION

We conduct five sets of tests involving accruals earnings management, real earnings management, accounting conservatism, internal control quality, and financial restatements. Given the difficulty in measuring financial reporting quality, we include a wide range of financial reporting measures that are likely to be, at least in part, under the control of the CFO. To the extent that we reach consistent conclusions across these measures, it provides assurance that our results are not dependent on a single approach. Unless otherwise noted, all models include two-digit SIC industry fixed effects and standard errors are clustered by firm.[28]

We test the relation between CFO narcissism and accruals quality, absolute discretionary accruals, and real activities manipulation via the follow-

[27] We limit our primary analysis to legible signatures to control for the length of the underlying name being signed (e.g., both the length of the original name as well as potential abbreviations and initials). Results are robust to including observations for which we estimate the length of the name being signed. Legible signatures do not differ significantly from the illegible signatures based on any of our misreporting measures.

[28] Results are very similar if we cluster by firm and year. We cluster by firm because results are more conservative (i.e., standard errors are wider clustering by firm). The intercept and industry-fixed effects are not tabulated for parsimony.

ing model:

$$\begin{aligned} EM_{ijt} = \beta_0 &+ \beta_1 SignatureSize_{ijt} + \beta_2 lnAssets_{ijt} + \beta_3 B/M_{ijt} \\ &+ \beta_4 FirmAge_{ijt} + \beta_5 Leverage_{ijt} + \beta_6 Loss_{ijt} + \beta_7 OCFVol_{ijt} \\ &+ \beta_8 SalesVol_{ijt} + \beta_9 \%\Delta CashSales_{ijt} + \beta_{10} NI/P_{ijt} + \beta_{11} \Delta ROA_{ijt} \\ &+ \beta_{12} Delta_{ijt} + \beta_{13} Vega_{ijt} + \beta_{14} Gender_{ijt} + \beta_{15} Tenure_{ijt} + e_{ijt}. \end{aligned}$$

In this and all subsequent equations, the subscripts *ijt* are associated with executive *i* and firm *j* in year *t*. We use five earnings management (EM) proxies in the empirical tests and argue that narcissistic CFOs are likely to more aggressively manage earnings to achieve the desired results. In each case, the earnings management proxy is measured such that higher values imply greater levels of earnings management. The first EM proxy is $AbsAccruals_{ijt}$, defined as the absolute value of discretionary accruals from the modified Jones [1991] model, as modified by Dechow, Sloan, and Sweeney [1995] and Kothari, Leone, and Wasley [2005]. The second EM proxy is $AccrualQuality_{ijt}$, defined as the abnormal change in working capital accruals developed by Dechow and Dichev [2002], as modified by McNichols [2002].

The final three EM variables are proxies for real earnings management developed by Roychowdhury [2006] as implemented in research such as Cheng, Lee, and Shevlin [2014] and Ali and Zhang [2015]. These include $AbDisExp_{ijt}$, abnormal discretionary expenses, $AbCFO_{ijt}$, abnormal cash flows from operations, and $AbProdCost_{ijt}$, abnormal production costs. We multiply the discretionary expense and cash flow measures by negative one so that all three real EM proxies are increasing in the level of earnings management.[29]

$SignatureSize_{ijt}$ is the area-per-letter signature size metric for each executive that is a proxy for the executive's level of narcissism. As in our experiment, and consistent with prior psychology and business research (e.g., Zweigenhaft [1977], Ham, Seybert, and Wang [2017]), a rectangle is drawn around each signature, with each side touching the most extreme endpoint of the signature. The area of the rectangle is measured (in centimeters squared) and standardized by the number of letters in the signature. $lnAssets_{ijt}$ is the natural log of total assets, B/M_{ijt} is the ratio of book value of equity to market value of equity, $FirmAge_{ijt}$ is the number of years elapsed since the firm first appeared in CRSP, $Leverage_{ijt}$ is the ratio of short-term plus long-term debt to common equity, $Loss_{ijt}$ is an indicator variable equal to one if the firm incurred a loss in the prior year and zero otherwise. $OCFVol_{ijt}$ and $SalesVol_{ijt}$ are the standard deviation

[29] Survey evidence in Graham, Harvey, and Rajgopal [2005] indicates a willingness of executives to manipulate real activities even if the manipulation potentially reduces firm value. For example, 80% of financial executives indicated that they would be willing to decrease discretionary expenditures on R&D, advertising, and maintenance to increase earnings.

of operating cash flows and sales over the past five years scaled by total assets, respectively. We include these volatility controls because Dechow and Dichev [2002] find that they are significantly associated with accruals quality.

$\%\Delta CashSales_{ijt}$ is the percentage change in sales minus the change in accounts receivable over the previous year. NI/P_{ijt} is net income scaled by the market value of equity. ΔROA_{ijt} is the change in net income scaled by average total assets in the past year. $Delta_{ijt}$ and $Vega_{ijt}$ are the dollar change in the executive's wealth associated with a 1% change in the firm's stock price and with a 1% increase in the standard deviation of stock returns (Core and Guay [2002], Coles, Daniel, and Naveen [2006]),[30] scaled by total compensation, respectively. We include these control variables because Dechow et al. [2011] indicate that the first three represent incentives to materially misreport earnings, while Armstrong et al. [2013] find that the latter two represent incentives to misreport earnings. $Gender_{ijt}$ is an indicator variable equal to one if the executive is female and zero otherwise. $Tenure_{ijt}$ is the number of years that Execucomp identifies the executive as holding the position.

We next test whether CFO narcissism predicts timely loss recognition as measured by conditional accounting conservatism. We expect that narcissistic CFOs will be less willing to acknowledge bad outcomes in a timely manner. We use the primary conditional conservatism measure from Basu [1997], which tests the differential timeliness of good versus bad earnings news via the following model:[31]

$$\begin{aligned} E_{ijt}/P_{ijt-1} = {} & \beta_0 + \beta_1 SignatureSize_{ijt} + \beta_2 D_{ijt} + \beta_3 Ret_{ijt} + \beta_4 D_{ijt} * Ret_{ijt} \\ & + \beta_5 SignatureSize_{ijt} * D_{ijt} + \beta_6 SignatureSize_{ijt} * Ret_{ijt} \\ & + \beta_7 SignatureSize_{ijt} * D_{ijt} * Ret_{ijt} + Controls_{ijt} \\ & + Controls_{ijt} * D_{ijt} + Controls_{ijt} * Ret_{ijt} + Controls_{ijt} \\ & * D_{ijt} * Ret_{ijt} + e_{ijt}. \end{aligned}$$

E_{ijt}/P_{ijt-1} is current year earnings before extraordinary items scaled by lagged market value of equity. Ret_{ijt} is the cumulative market-adjusted return for the firm beginning in month −8 and ending in month +3 surrounding the fiscal year end month. D_{ijt} is an indicator variable equal to one if Ret_{ijt} is negative and zero otherwise. A positive coefficient on the $D_{ijt} * Ret_{ijt}$ interaction indicates that earnings are more responsive to negative news and thus are more conditionally conservative. We predict a

[30] We thank Coles, Daniel, and Naveen [2006] for making the delta and vega data available online.

[31] Basu [1997] suggests a supplementary earnings-based approach that measures conservatism based on reversals in the following year. That approach is not well-suited to our setting because, as long as the CFO is in place, they will have an incentive to continue to delay loss recognition, and our sample is too recent to examine reversals once the CFO leaves.

negative coefficient on the $SignatureSize_{ijt} * D_{ijt} * Ret_{ijt}$ interaction term, indicating that narcissistic CFOs are less willing to recognize bad earnings news in a timely manner. We include control variables and all of their two- and three-way interactions (suppressed in the results for ease of presentation). Specifically, we include: $lnMVE_{ijt}$, M/B_{ijt}, $Leverage_{ijt}$, $Gender_{ijt}$, and $Tenure_{ijt}$. $lnMVE_{ijt}$ is the natural log of the market value of equity, and all other variables are as previously defined. Following prior research, we exclude financial and regulated utility firms.

We next test whether CFO narcissism predicts weaker internal control quality. To the extent that narcissists have a tendency to misreport and are domineering, we expect them to be less willing to put in place strong internal control structures that would limit their ability to control financial reporting outcomes. We test the relation between CFO narcissism and internal control quality via the following model:

$$\begin{aligned} Controls_{ijt} = {} & \beta_0 + \beta_1\ SignatureSize_{ijt} + \beta_2 lnAssets_{ijt} + \beta_3 B/M_{ijt} \\ & + \ \beta_4 FirmAge_{ijt} + \beta_5 Leverage_{ijt} + \beta_6 \%Loss_{ijt} \\ & + \beta_7 SalesGrowth_{ijt} \ + \ \beta_8 Inventories_{ijt} \\ & + \beta_9 AuditFees_{ijt} + \beta_{10} Gender_{ijt} + \beta_{11} Tenure_{ijt} + e_{ijt}. \end{aligned}$$

$Controls_{ijt}$ is defined as an indicator variable equal to one if the internal controls are ineffective and zero otherwise in a binary logit specification ($IneffControls_{ijt}$), and is defined as the number of material weaknesses in an ordinal logit specification ($NumWeaknesses_{ijt}$). $AuditFees_{ijt}$ is the level of current year audit fees scaled by total assets, and controls for the complexity of the firm's operations and accounting systems. $SalesGrowth_{ijt}$ is the cumulative percentage change in sales over the prior three years. We also control for $Inventories_{ijt}$, inventories scaled by total assets, to capture firms' operating characteristics that are likely to expose them to greater accounting measurement application risks (Ashbaugh-Skaife, Collins, and Kinney [2007]), and replace $Loss_{ijt}$ with $\%Loss_{ijt}$, the proportion of years that the firm reports negative earnings in the prior four years, in accordance with Krishnan [2005] and Ashbaugh-Skaife, Collins, and Kinney [2007]. All other control variables are as previously defined.

The final test examines a key financial reporting outcome. To the extent that narcissistic CFOs have a greater tendency toward misreporting, we expect an increased likelihood of accounting restatements as misreporting is later uncovered. Restatements have the added advantage of representing a more objective, ex post measure of misreporting. However, restatements are relatively rare and likely do not capture all instances of misreporting. We test the relation between CFO narcissism and the probability of a financial restatement via the following model:

$$Restate_{ijt} = \ \beta_0 + \beta_1 SignatureSize_{ijt} + \beta_2 lnAssets_{ijt} + \beta_3 B/M_{ijt}$$

$$+ \beta_4 Leverage_{ijt} + \beta_5 FirmAge_{ijt} + \beta_6 \Delta Inventories_{ijt}$$
$$+ \beta_7 \Delta Receivables_{ijt} + \beta_8 AuditFees_{ijt} + \beta_9 \%\Delta CashSales_{ijt}$$
$$+ \beta_{10} E/P_{ijt} + \beta_{11} \Delta ROA_{ijt} + \beta_{12} Delta_{ijt} + \beta_{13} Vega_{ijt}$$
$$+ \beta_{14} Gender_{ijt} + \beta_{15} Tenure_{ijt} + e_{ijt}.$$

$Restate_{ijt}$ is a binary variable equal to one if the current year financial statements were restated and zero otherwise. In addition, we control for $\Delta Inventories_{ijt}$, $\Delta Receivables_{ijt}$, the changes in inventory and accounts receivable scaled by average total assets in the past year, respectively. Increases in working capital, and decreases in cash sales could be related to aggressive earnings management and the probability of future restatement (Beneish [1999], Dechow et al. [2011]). The remaining control variables are those previously used in the earnings management regressions and found by prior research (e.g., Dechow et al. [2011], Armstrong et al. [2013]) to predict misreporting. All other variables are as previously defined.

5. Results

5.1 DESCRIPTIVE STATISTICS

Table 2 reports descriptive statistics for our primary dependent and independent variables separately for the CFO and CEO sample. For the most part, the samples are very similar. Overall, the samples comprise large, publicly traded companies that are in good financial health. In the CFO sample, the average firm age is 34.7 years, the average book-to-market ratio is 0.48, 11% of firms incurred a loss during the prior year, and the average cumulative three-year sales growth is 30%. Regarding executive characteristics, 8% of CFOs are female whereas only 1% of CEOs are female. The average time spent in the current position is just over five years for CFOs and six years for CEOs. There is substantial variation in signature size—the 75th percentile is approximately twice as large as the 25th percentile.

Table 3 reports Pearson correlations for the CFO and CEO samples separately. CFO signature size is positively correlated with absolute discretionary accruals and negatively correlated with accrual quality, consistent with higher accruals-based earnings management for firms with narcissistic CFOs. Similarly, CFO signature size is positively correlated with abnormal discretionary expenses, abnormal cash flows, and abnormal production costs, all consistent with greater real earnings management for narcissistic CFOs. CFO signature size is also positively correlated with ineffective internal controls, the number of material weaknesses, and accounting restatements, providing ex post evidence of misreporting among narcissistic CFOs.

TABLE 2
Descriptive Statistics

Panel A: CFO Sample

	N	Mean	Std. Dev.	p25	p75
Δ*Inventory*	2,472	0.00	0.01	0.00	0.01
Δ*Receivables*	2,472	0.00	0.02	0.00	0.01
Δ*ROA*	3,062	0.00	0.03	−0.01	0.01
%Δ*CashSales*	3,062	0.09	0.34	−0.01	0.16
%*Loss*	1,524	0.11	0.21	0.00	0.25
AbCFO	3,117	0.07	0.12	0.00	0.11
AbDisExp	2,346	−0.11	0.24	−0.22	0.00
AbProdCost	3,074	−0.01	0.19	−0.10	0.06
AbsAccruals	3,062	0.05	0.05	0.02	0.07
AccrualQuality	2,697	0.00	0.05	−0.02	0.02
AuditFees	2,472	572.67	543.90	199.60	801.32
B/M	3,062	0.48	0.49	0.28	0.65
Delta	3,062	0.08	0.20	0.03	0.08
E/P	2,198	0.05	0.09	0.03	0.08
FirmAge	3,062	34.70	21.42	17.00	46.00
Gender	3,062	0.08	0.26	0.00	0.00
IneffControls	1,524	0.97	0.17	1.00	1.00
Inventories	1,524	0.12	0.14	0.02	0.17
Leverage	3,062	0.94	2.73	0.28	1.15
lnAssets	3,062	8.52	1.28	7.56	9.43
lnMVE	2,198	8.32	1.37	7.36	9.15
Loss	3,062	0.11	0.31	0.00	0.00
M/B	2,198	3.20	3.59	1.57	3.70
NI/P	3,062	0.01	0.33	0.03	0.07
NumWeaknesses	1,524	0.07	0.53	0.00	0.00
OCFVol	3,062	0.03	0.03	0.01	0.04
Restatement	2,472	0.11	0.31	0.00	0.00
Ret	2,198	−0.00	0.39	−0.24	0.19
SalesGrowth	1,524	0.30	0.66	0.05	0.44
SalesVol	3,062	0.17	0.17	0.06	0.21
SignatureSize	3,062	0.78	0.44	0.48	0.93
Tenure	3,062	5.30	3.53	2.00	7.00
Vega	3,062	0.03	0.03	0.01	0.03

Panel B: CEO Sample

	N	Mean	Std. Dev.	p25	p75
Δ*Inventory*	2,973	0.00	0.01	0.00	0.01
Δ*Receivables*	2,973	0.01	0.02	0.00	0.01
Δ*ROA*	4,046	0.00	0.03	−0.01	0.01
%Δ*CashSales*	4,046	0.10	0.46	−0.01	0.17
%*Loss*	1,767	0.09	0.20	0.00	0.00
AbCFO	4,133	0.08	0.13	0.00	0.13
AbDisExp	3,138	−0.12	0.24	−0.23	0.00
AbProdCost	4,051	−0.02	0.19	−0.10	0.06
AbsAccruals	4,046	0.05	0.05	0.02	0.07
AccrualQuality	3,549	0.00	0.05	−0.02	0.02
AuditFees	2,973	555.96	553.29	191.25	755.77

(*Continued*)

TABLE 2—*Continued*

Panel B: CEO Sample

	N	Mean	Std. Dev.	p25	p75
B/M	4,046	0.45	0.43	0.26	0.60
Delta	4,046	0.51	2.16	0.04	0.16
E/P	3,183	0.05	0.08	0.04	0.08
FirmAge	4,046	32.84	21.46	15.00	43.00
Gender	4,046	0.01	0.09	0.00	0.00
IneffControls	1,767	0.97	0.18	1.00	1.00
Inventories	1,767	0.10	0.11	0.01	0.14
Leverage	4,046	1.06	3.05	0.27	1.17
lnAssets	4,046	8.55	1.40	7.55	9.43
lnMVE	3,183	8.44	1.44	7.43	9.31
Loss	4,046	0.09	0.29	0.00	0.00
M/B	3,183	3.29	3.46	1.69	3.94
NI/P	4,046	0.01	0.31	0.03	0.07
NumWeaknesses	1,767	0.06	0.43	0.00	0.00
OCFVol	4,046	0.03	0.02	0.01	0.04
Restatement	2,973	0.11	0.31	0.00	0.00
Ret	3,183	−0.00	0.40	−0.24	0.19
SalesGrowth	1,767	0.29	0.46	0.04	0.42
SalesVol	4,046	0.16	0.16	0.06	0.21
SignatureSize	4,046	0.86	0.51	0.51	1.06
Tenure	4,046	6.36	4.01	3.00	9.00
Vega	4,046	0.04	0.05	0.01	0.05

Panel A presents summary statistics for our variables of interest for the sample of 512 CFOs. Panel B presents summary statistics for our variables of interest for the sample of 513 CEOs. *N* is the number of observations, Std. Dev. is the standard deviation, and p25 (p75) is the 25th (75th) percentile of the variable's distribution. Variable definitions are reported in appendix C.

CEO signature size is not significantly correlated with the accruals measures, the internal control quality measures, or restatements, consistent with the notion that financial reporting quality is the primary scope of the CFO. However, CEO signature size is significantly correlated with the real earnings management variables, suggesting that the CEO does have some influence on real earnings management. While not controlling for other factors, the univariate results are generally consistent with our expectations and provide a preview of the regression results that follow.

5.2 EMPIRICAL RESULTS

5.2.1. Accruals Earnings Management. Table 4 reports the results of the accruals earnings management regressions. The first specification examines absolute discretionary accruals and the second specification examines accruals quality. The first two columns test the effects of CFO narcissism. The coefficient on CFO signature size is significantly positive in the abnormal discretionary accruals model ($\beta_1 = 0.009$, $p < 0.01$) and the accruals quality model ($\beta_1 = 0.004$, $p < 0.10$). Consistent with the univariate results, the coefficient on CEO signature size is insignificant in both specifications. Taken together, the results confirm prior predictions that narcissistic CFOs

TABLE 3
Pearson Correlation Matrices

Panel A: CFO Sample

		1	2	3	4	5	6	7	8
1	*AbsAccruals*								
2	*AccrualQuality*	−.11*							
3	*AbDisExp*	−04*	.00						
4	*AbCFO*	−.16*	.13*	.21*					
5	*AbProdCost*	.02	−.04*	.50*	.39*				
6	*NumWeaknesses*	−.01	.01	.04	.04	.02			
7	*IneffControls*	−.01	−.00	.04	.03	.03	.74*		
8	*Restatement*	.03*	−.01	.06*	−.00	.02	.18*	.27*	
9	*SignatureSize*	.05*	.03*	.07*	.04*	.07*	.07*	.06*	.05*

Panel B: CEO Sample

		1	2	3	4	5	6	7	8
1	*AbsAccruals*								
2	*AccrualQuality*	−.08*							
3	*AbDisExp*	−.01	−.01						
4	*AbCFO*	−.12*	.11*	.23*					
5	*AbProdCost*	.02	−.02	.46*	.41*				
6	*NumWeaknesses*	.02	.01	.04	.05*	.06*			
7	*IneffControls*	−.01	.02	.04	.05*	.07*	.69*		
8	*Restatement*	.03*	−.01	.04*	.01	.04*	.24*	.27*	
9	*SignatureSize*	−.02	.00	.06*	.05*	.09*	−.02	−.01	−.01

Panel A presents Pearson correlations between our variables of interest for 512 CFOs. Panel B presents Pearson correlations between our variables of interest for 513 CEOs. *denotes significance at $p < 0.10$. Variable definitions are reported in appendix C.

are more likely to aggressively manage accruals, while the relation for CEOs is insignificant.[32]

5.2.2. Real Earnings Management. Table 5 reports the results of the real earnings management regressions. The first three columns test the effects of CFO narcissism. As noted earlier, we multiply the discretionary expense and cash flow variables by negative one so that all variables are increasing in the level of real earnings management. As predicted, the coefficient on signature size is positive for all three real earnings management variables, significantly for abnormal discretionary expenses ($\beta_1 = 0.051$, $p < 0.05$) and abnormal production costs ($\beta_1 = 0.035$, $p < 0.10$). Al-

[32] The CEO result is consistent with Olsen, Dworkis, and Young [2014], who find no relation between CEO narcissism and discretionary accruals. It may seem surprising that *Delta*, our proxy for stock option incentives, does not predict abnormal accruals. However, Jiang, Petroni, and Wang [2010] find that the directional effect of these incentives flipped from positive to negative following the implementation of Sarbanes-Oxley. Consistent with this, we find that *Delta* positively predicts abnormal accruals prior to 2002 but negatively predicts abnormal accruals post 2002. Because our sample spans both periods, the aggregate effect of *Delta* is insignificant.

TABLE 4
Discretionary Accruals and Accrual Quality

	CFO Narcissism		CEO Narcissism	
	AbsAccruals	*Accrual Quality*	*AbsAccruals*	*Accrual Quality*
SignatureSize	**0.009*** **	**0.004***	**−0.001**	**0.001**
	(0.003)	**(0.002)**	**(0.002)**	**(0.002)**
lnAssets	−0.001	−0.001	−0.000	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)
B/M	−0.005	−0.003	−0.007**	0.003
	(0.004)	(0.003)	(0.003)	(0.002)
FirmAge	−0.000	0.000	−0.000*	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	−0.001	0.000	0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Loss	0.016***	−0.007*	0.012***	−0.005
	(0.005)	(0.004)	(0.003)	(0.004)
OCFVol	0.033	−0.002	0.159***	0.056
	(0.062)	(0.070)	(0.042)	(0.066)
SalesVol	0.031***	−0.021**	0.023**	−0.023*
	(0.010)	(0.010)	(0.009)	(0.013)
%ΔCashSales	0.018***	−0.025***	0.015***	−0.026***
	(0.005)	(0.007)	(0.004)	(0.009)
NI/P	−0.000***	0.000	−0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
ΔROA	−0.119**	0.074	−0.176***	0.146**
	(0.059)	(0.055)	(0.049)	(0.060)
Delta	−0.002	0.002	0.000	0.000
	(0.004)	(0.003)	(0.000)	(0.001)
Vega	−0.001	0.031	0.009	−0.021
	(0.027)	(0.026)	(0.014)	(0.017)
Gender	−0.001	−0.005*	0.005	−0.005
	(0.004)	(0.003)	(0.011)	(0.008)
Tenure	−0.000	0.000	−0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
N	3,064	2,697	4,047	3,550
Adjusted *R*-squared	0.13	0.04	0.10	0.03

This table presents the results of OLS regressions testing the effects of CFO and CEO narcissism (signature size) on accruals earnings management, where abnormal discretionary accruals are based on the Dechow, Sloan, and Sweeney [1995] modified Jones model and accruals quality is based on McNichols [2002]. All models include two-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

though insignificant, the coefficient on signature size is also positive ($\beta_1 = 0.006$, $p > 0.10$) in the abnormal cash flows model. Taken together, the results suggest higher levels of real earnings management for narcissistic CFOs.

The second three columns test the effects of CEO narcissism on real earnings management. CEO narcissism is interesting in this context because one might expect CEOs to have more of an influence on real economic decisions than on accruals. Our results are generally consistent with that perspective. The coefficient on signature size is significantly positive in the

TABLE 5
Real Earnings Management

	CFO Narcissism			CEO Narcissism		
	AbDisExp	*AbCFO*	*AbProdCost*	*AbDisExp*	*AbCFO*	*AbProdCost*
SignatureSize	**0.051****	**0.006**	**0.035***	**−0.002**	**0.014****	**0.023***
	(0.026)	**(0.008)**	**(0.018)**	**(0.020)**	**(0.006)**	**(0.013)**
lnAssets	0.051***	−0.004	0.010	0.062***	−0.008**	0.007
	(0.011)	(0.004)	(0.007)	(0.010)	(0.004)	(0.007)
B/M	0.014	0.024***	0.047***	0.036**	0.029***	0.065***
	(0.015)	(0.005)	(0.014)	(0.016)	(0.007)	(0.016)
FirmAge	−0.000	0.001***	0.001**	−0.001	0.001***	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.001	0.001	0.002	0.001	0.001	−0.001
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Loss	0.006	0.033***	0.028**	−0.007	0.047***	0.043***
	(0.019)	(0.008)	(0.014)	(0.018)	(0.007)	(0.013)
OCFVol	−0.110	−0.214	−0.713**	−0.031	−0.274*	−0.578*
	(0.295)	(0.142)	(0.278)	(0.348)	(0.159)	(0.296)
SalesVol	0.102*	0.096***	0.269***	0.169**	0.106***	0.282***
	(0.057)	(0.020)	(0.065)	(0.083)	(0.022)	(0.071)
%ΔCashSales	−0.032	−0.042***	0.030**	−0.050*	−0.050***	0.018
	(0.023)	(0.011)	(0.012)	(0.029)	(0.010)	(0.013)
NI/P	−0.000	−0.000*	−0.000	−0.000	−0.000***	−0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ΔROA	−0.035	−0.135*	−0.186*	0.166	−0.142**	−0.224***
	(0.113)	(0.081)	(0.109)	(0.140)	(0.069)	(0.085)
Delta	0.006	−0.014	−0.016	−0.004	−0.004***	−0.003
	(0.019)	(0.014)	(0.024)	(0.004)	(0.001)	(0.004)
Vega	0.004	−0.234***	−0.302*	−0.024	0.021	−0.057
	(0.198)	(0.084)	(0.182)	(0.111)	(0.059)	(0.086)
Gender	−0.001	0.012	0.011	−0.409***	0.125***	−0.194***
	(0.042)	(0.012)	(0.033)	(0.105)	(0.029)	(0.070)
Tenure	–0.002	0.002***	0.001	−0.004*	0.001*	0.000
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
N	2,347	3,120	3,077	3,138	4,134	4,052
Adjusted *R*-squared	0.23	0.33	0.22	0.25	0.33	0.23

This table presents the results of OLS regressions testing the effects of CFO and CEO narcissism (signature size) on real earnings management, where abnormal discretionary expenses, cash flows, and production costs are based on Roychowdhury [2006] and are increasing in levels of earnings management. All models include two-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

abnormal cash flow model ($\beta_1 = 0.014$, $p < 0.05$) and in the abnormal production costs model ($\beta_1 = 0.023$, $p < 0.10$), although it is insignificant in the abnormal discretionary expense model ($\beta_1 = -0.002$, $p > 0.10$).[33] Taken together, these results suggest that both CEO and CFO narcissism influence real earnings management decisions.

[33] The CEO results are consistent with Olsen, Dworkis, and Young [2014] who find a positive relation (no relation) between CEO narcissism and both abnormal cash flows and abnormal production costs (abnormal discretionary expenses).

TABLE 6
Conditional Accounting Conservatism

	CFO Narcissism *E/P*	CEO Narcissism *E/P*
SignatureSize	−0.008	−0.006
	(0.011)	(0.006)
D	−0.034	−0.017
	(0.040)	(0.032)
Ret	0.114	−0.025
	(0.104)	(0.077)
D ∗ *Ret*	0.084	0.235*
	(0.164)	(0.138)
SignatureSize ∗ *D*	−0.001	0.016
	(0.012)	(0.011)
SignatureSize ∗ *Ret*	0.022	0.015
	(0.021)	(0.018)
SignatureSize* ∗ *D* ∗ *Ret	**−0.066****	**0.017**
	(0.031)	**(0.043)**
N	2,198	3,183
Adjusted *R*-squared	0.11	0.11

This table presents the results of OLS regressions testing the effects of CFO and CEO narcissism (signature size) on conditional accounting conservatism, where earnings-returns sensitivity is based on Basu [1997]. Control variables including *lnMVE*, *M/B*, *Leverage*, *Gender*, and *Tenure*, as well as their two- and three-way interactions with *D* and *Ret*, are suppressed for ease of presentation. Both models include two-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

5.2.3. Conditional Conservatism. Table 6 reports the results of the conditional conservatism regressions. This analysis tests whether narcissistic CFOs are less willing to recognize losses in a timely manner. We expect narcissists to delay the recognition of poor outcomes to the extent that they are preoccupied with their own success, unwilling to admit failure, and believe they can mislead others.

The first column tests the effects of CFO narcissism on accounting conservatism. The primary variable of interest is the three-way interaction between signature size, abnormal stock returns, and the negative return indicator variable.[34] The coefficient on the three-way interaction is significantly negative ($\beta_7 = -0.066$, $p < 0.05$), indicating that narcissistic CFOs are more likely to delay the recognition of bad news.[35] The coefficient on the three-way interaction is insignificant in the CEO narcissism specification. Taken

[34] Control variables including *lnMVE*, *M/B*, *Leverage*, *Gender*, and *Tenure*, as well as their two- and three-way interactions with *D* and *Ret*, are suppressed for ease of presentation.

[35] In untabulated tests, we also tested whether prior negative earnings changes exhibit greater future reversal for narcissistic CFOs and CEOs. Because this requires two years of lagged earnings during the executive's tenure, we lose crucial observations. In addition, as Gerakos [2012] notes, it is unclear whether a one-year reversal period is appropriate. The coefficient on the interaction between negative earnings changes and CFO signature size reveals a positive but insignificant coefficient for one-year reversal periods ($\beta = 0.167$, $p = 0.25$) but a positive and significant coefficient for two-year reversal periods ($\beta = 0.229$, $p < 0.10$). For

TABLE 7
Internal Control Quality

	CFO Narcissism		CEO Narcissism	
	InEffControls	*Num Weaknesses*	*InEffControls*	*Num Weaknesses*
SignatureSize	**0.641***	**0.637***	**−0.590**	**−0.587**
	(0.371)	**(0.386)**	**(0.424)**	**(0.434)**
lnAssets	0.173	0.182	0.185	0.215
	(0.260)	(0.284)	(0.299)	(0.301)
B/M	0.407	0.382	0.575	0.620
	(0.538)	(0.520)	(0.481)	(0.484)
FirmAge	−0.015	−0.014	−0.005	−0.005
	(0.012)	(0.013)	(0.011)	(0.012)
Leverage	0.097**	0.091**	0.015	0.018
	(0.044)	(0.037)	(0.024)	(0.024)
%Loss	1.134	1.210	1.726**	1.663**
	(0.832)	(0.864)	(0.735)	(0.742)
SalesGrowth	−0.280	−0.258	−0.294	−0.214
	(0.354)	(0.360)	(0.342)	(0.345)
Inventories	−4.637	−4.324	2.107	1.964
	(4.351)	(4.338)	(2.794)	(2.775)
AuditFees	0.001***	0.001**	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Gender	0.285	0.323	0.036	0.031
	(0.835)	(0.952)	(0.893)	(0.887)
Tenure	−0.089	−0.085	−0.035	−0.031
	(0.064)	(0.065)	(0.056)	(0.057)
N	1,524	1,524	1,767	1,767
Pseudo *R*-squared	0.20	0.16	0.28	0.25

This table presents the results of binary and ordinal logit models testing the effects of CFO and CEO narcissism (signature size) on the probability of ineffective internal controls and the number of material weaknesses. All models include two-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

together, these results suggest that, as expected, narcissistic CFOs are less willing to recognize bad news in a timely manner.

5.2.4. Internal Control Quality. Table 7 reports the results of the internal control quality regressions. The first two columns test the effects of CFO narcissism on internal control quality. Signature size is positively associated with the probability of internal controls being assessed as ineffective ($\beta_1 = 0.641$, $p < 0.10$) and positively associated with the number of material weaknesses reported ($\beta_1 = 0.637$, $p < 0.10$). The second two columns test the effects of CEO narcissism on internal control quality. Again, the effect of CEO narcissism is insignificant. These results are consistent with the notion that narcissistic CFOs prefer relatively weak oversight by others within the organization. Further, limited oversight suggests a reason why the

CEOs, the interaction coefficient is inconsistent in sign and not significant for either reversal period.

TABLE 8
Financial Restatements

	CFO Narcissism *Restatement*	CEO Narcissism *Restatement*
SignatureSize	**0.455****	**−0.281**
	(0.211)	**(0.263)**
lnAssets	−0.003	0.065
	(0.127)	(0.124)
B/M	0.412	0.575**
	(0.254)	(0.267)
FirmAge	−0.013**	−0.011*
	(0.006)	(0.006)
Leverage	−0.056	0.035
	(0.060)	(0.027)
Δ*Inventory*	−17.352***	−1.399
	(5.490)	(4.983)
Δ*Receivables*	4.554	0.124
	(3.466)	(3.175)
AuditFees	−0.000	0.000
	(0.000)	(0.000)
%ΔCashSales	0.256	0.294*
	(0.325)	(0.173)
NI/P	0.000	−0.001
	(0.000)	(0.001)
Δ*ROA*	2.610	0.880
	(2.017)	(1.882)
Delta	−0.921*	0.058*
	(0.509)	(0.035)
Vega	2.675	1.818
	(2.636)	(1.312)
Gender	−0.234	−0.011
	(0.337)	(0.947)
Tenure	0.012	−0.055**
	(0.030)	(0.026)
N	2,478	2,973
Pseudo *R*-squared	0.10	0.10

This table presents the results of binary logit models testing the effects of CFO and CEO narcissism (signature size) on the probability of an accounting restatement. Both models include two-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

aggressive earnings management and lack of timely loss recognition documented above may go undetected.

5.2.5. Financial Restatements. Table 8, the final set of primary tests, reports the results of the financial restatements regressions. As noted earlier, the earnings management proxies are subject to measurement error whereas restatements provide a relatively objective ex post validation of misreporting. To the extent that narcissistic CFOs are more likely to misreport, we expect to observe a higher incidence of restatements.

The first column reports the results for CFO narcissism. Signature size is positively associated with the probability of an accounting restatement ($\beta_1 = 0.455$, $p < 0.05$).[36] These findings are consistent with the previous results, and indicate that firms with greater earnings management, less timely loss recognition, and weaker internal controls are likely to experience more frequent restatements.[37] The fact that CEO signature size is not significantly associated with restatements in column two is consistent with the preceding results indicating that CEO signature size was not significantly associated with accruals earnings management, timely loss recognition, or internal control quality. While CEO signature size was positively associated with real earnings management, real earnings management should not result in increased restatements.

5.2.6. Within-Firm Analysis. A potential concern with the analysis thus far is that we could be capturing firm-effects as opposed to CFO-effects. That possibility is mitigated by the fact that the results are robust to inclusion of a range of firm-level and executive-level controls, as well as CEO signature size. An alternate approach to address this concern is to conduct a within-firm analysis. It is not possible to conduct a true within-firm analysis with our data because we only observe one CFO per firm and because the time-series for most of the executives is quite short. However, an approach that permits within-firm evidence is to compare the firm before the CFO was instated with a period in which he or she was CFO.[38] There are at least two inherent issues with this approach in our setting. First, we do not observe the signature size of the previous CFO. If we assume that, in terms of narcissism, CFOs are not systematically assigned to firms, then the previous CFO's signature size should approximate the average for the sample.[39] This assumption adds noise to our analysis. Second, it is not possible to conduct

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[36] While it is more difficult to assess economic significance with respect to variables such as accruals quality, it is more interpretable with respect to the probability of a restatement. Based on the interquartile range and the odds ratio from the logit regression, increasing from the 25th to the 75th percentile of CFO signature size is associated with an increase in the odds of a restatement of 23%.

[37] As noted earlier, we expect narcissistic CFOs' preference for limited oversight to result in a greater incidence of intentional as well as, potentially, unintentional misreporting. To provide evidence on the type of misreporting, we split the sample based on the direction of the restatement. We find that CFO narcissism is only associated with overstatements of income, suggesting that the restatements we observe are more likely to reflect intentional misstatement.

[38] We cannot conduct an analogous comparison for the period after the CFO left the firm because, given the timing of the signatures, most CFOs are still with the firm or have left only very recently.

[39] To the extent that this assumption is violated, it would likely bias against our results (firms with narcissistic CFOs would also be more likely to have had narcissistic CFOs in the past). In untabulated analysis, we investigated determinants of the decision to hire a narcissistic CFO such as poor firm-level governance but found no significant link, suggesting that CFO narcissism is unlikely to be a strategic choice by the firm.

tests of internal control weaknesses because the internal control reports on which that analysis is based were not required prior to 2004.

Subject to these caveats, we conduct a within-firm analysis by comparing our measures of accruals and real earnings management, restatements, and conditional conservatism prior to the tenure of the CFOs in our sample with those during the tenure of the CFOs as a function of the signature size of our sample CFOs. We include five years of pre-appointment data for all executives to compare the outcomes prior to their appointment, though our results are not sensitive to the number of pre-appointment years. Given that we need to identify when the CFO first entered the position, we exclude CFOs who appeared in Execucomp prior to 1995 because coverage of the S&P 1500 was incomplete prior to 1995. We estimate the following model:

$$\begin{aligned} Outcome_{ijt} = \; & \beta_1 SignatureSize_{ijt} + \beta_2 After_{ijt} \\ & + \beta_3 SignatureSize_{ijt} * After_{ijt} + FirmControls_{ijt} + \; e_{ijt}. \end{aligned}$$

$After_{ijt}$ is an indicator variable equal to one if the year falls after the CFO was appointed and zero if the year falls before the CFO was appointed. $Outcome_{ijt}$ represents the five accruals or real earnings management variables, conditional conservatism, or the restatement indicator variable used in our central tests, and firm control variables are as previously described. The primary variable of interest is the interaction between signature size and the post-appointment indicator variable. We expect the coefficient signs to be the same as in our central tests, indicating that the CFO's signature size post-appointment is incremental to the effect of signature size in the pre-appointment period. Table 9 reports the results and the inferences are generally consistent with our previous analyses.

In terms of accruals earnings management, the evidence suggests that larger CFO signatures are associated with higher absolute discretionary accruals and worse accruals quality post-appointment, consistent with the prediction that narcissistic CFOs are more likely to engage in accruals earnings management relative to their predecessors. Larger CFO signatures are also associated with greater real earnings management based on abnormal cash flows and abnormal production costs. The only inconsistency relative to the main results is that discretionary expenses, which had been positive in our primary analysis, are now significantly negative. However, overall the results are consistent with higher levels of earnings management after narcissistic CFOs are appointed relative to predecessor CFOs. The conditional conservatism results are also consistent with our central results, where the negative coefficient indicates lower sensitivity of earnings to negative returns in the post-appointment period for CFOs with larger signatures. Finally, the results for restatements are again consistent with our primary specifications and expectations. In particular, the interaction between CFO signature size and the post-appointment indicator variable is significantly positive,

TABLE 9

Within-Firm Pre- and Post-Appointment Tests of CFO Narcissism

	AbsAccruals	*Accrual Quality*	*AbDisExp*	*AbCFO*	*AbProdCost*	*Restatement*	*E/P*
SignatureSize* ∗ *After	**0.011*****	**0.008*****	**−0.032****	**0.016***	**0.008****	**0.345*****	
	(0.000)	**(0.000)**	**(0.001)**	**(0.002)**	**(0.000)**	**(0.074)**	
SignatureSize* ∗ *D* ∗ *Ret* ∗ *After							**−0.018*****
							(0.000)
N	4,237	3,783	3,195	4,323	4,281	2,669	3,198
Adjusted/Pseudo *R*-squared	0.07	0.05	0.06	0.07	0.05	0.02	0.07

This table presents the results of the effects of CFO narcissism (signature size) on accruals and real earnings management, the probability of accounting restatements, and conditional accounting conservatism. *After* is an indicator variable equal to one if the year occurs after the CFO's appointment and zero if it occurs before the CFO's appointment. All models include identical firm-level control variables to those in our central tests and two-way interactions between control variables and *After* (and three- and four-way interactions in the case of conservatism), but we repress the coefficients for ease of presentation. Standard errors are reported in parentheses and are clustered by appointment period. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

indicating that narcissistic CFOs are more likely to experience restatements relative to their predecessors.[40]

Subject to the caveats noted above, we take comfort that the results from the within-firm analysis with respect to accruals and real earnings management, restatements, and conditional conservatism are generally consistent with our primary specifications, suggesting that cross-firm variation does not drive our results.

5.2.7. Executive Overconfidence. Another potential concern is that our results reflect overconfidence rather than narcissism. Malmendier and Zheng [2012] provide evidence that CFO overconfidence, based on stock option exercise behavior, predicts financing decisions such as the issuance of debt and equity. Given that we control for leverage, it is unlikely that financing choices of overconfident CFOs would affect the results in our primary specifications.

As noted earlier, it is difficult to measure CFO overconfidence directly. However, we replicate our primary tests after controlling for the options-based measure of overconfidence as used in prior literature. $Overconfidence_{ijt}$ is defined as an indicator variable that equals one if the executive's unexercised vested options are 67% in the money and zero otherwise, similar to Hirshleifer, Low, and Teoh [2012]. Table 10 reports the results for the CFO and CEO samples. The respective control variables are included in the regressions, but not reported for brevity. In all cases, our conclusions are robust to inclusion of this proxy for overconfidence.

While it is difficult to completely rule out the influence of overconfidence, the fact that the results are consistent in the experiment (where overconfidence is unlikely to influence the reported allocation), combined with the lack of an effect of overconfidence in our archival analysis, provides comfort that our results are likely to be attributable primarily to narcissism.

5.2.8. Joint Effects of CFO and CEO Narcissism. Our analyses to this point do not require both a CFO and CEO signature, and thus the CFO and CEO regressions are potentially estimated on different firm-years due to data availability constraints. In our primary analysis we include all available observations with nonmissing data in each specification to ensure that our sample is as comprehensive and representative as possible.

To ensure that differences in samples do not drive our results and that the CFO results are robust to inclusion of CEO signatures, table 11 reports

[40] In general, the magnitudes and significance of the coefficient estimates are similar between our main and pre-/post-appointment analyses, reflecting the fact that signature size is generally not significantly positive in the pre-appointment period. This is reassuring because it confirms that, as expected, a given CFO's narcissism is only relevant during the period in which the CFO is actually in place (i.e., it does not reflect other firm-level characteristics). The exception is for abnormal discretionary expenses, which were significantly positive in the pre-appointment period and became insignificantly positive in the post-appointment period, and abnormal production costs, which were significantly positive in the pre-appointment and post-appointment periods.

TABLE 10

Narcissism and Financial Reporting Quality Controlling for Overconfidence

Panel A: CFO Sample

	AbsAccruals	*Accrual Quality*	*AbDisExp*	*AbCFO*	*AbProdCost*	*IneffControls*	*Restatement*	*E/P*
SignatureSize	**0.008*** **	**0.004***	**0.047***	**0.010**	**0.035***	**0.676***	**0.515** **	
	(0.003)	**(0.003)**	**(0.026)**	**(0.008)**	**(0.018)**	**(0.354)**	**(0.212)**	
Overconfidence	0.001	0.004*	−0.007	−0.031***	−0.023*	−0.195	−0.093	
	(0.002)	(0.003)	(0.016)	(0.007)	(0.013)	(0.516)	(0.235)	
***SignatureSize* ∗ *D* ∗ Ret**								**−0.071***
								(0.040)
Overconfidence ∗ D ∗ Ret								−0.051
								(0.046)
N	2,809	2,467	2,169	2,863	2,825	1,349	2,299	1,938
Adjusted/Pseudo *R*-squared	0.13	0.05	0.23	0.34	0.23	0.21	0.10	0.13

Panel B: CEO Sample

	AbsAccruals	*Accrual Quality*	*AbDisExp*	*AbCFO*	*AbProdCost*	*IneffControls*	*Restatement*	*E/P*
SignatureSize	**−0.001**	**0.000**	**−0.005**	**0.012** **	**0.026***	**−0.709**	**−0.317**	
	(0.002)	**(0.002)**	**(0.021)**	**(0.006)**	**(0.014)**	**(0.477)**	**(0.267)**	
Overconfidence	0.002	0.003	−0.011	−0.029***	−0.009	−0.320	0.135	
	(0.002)	(0.002)	(0.013)	(0.006)	(0.010)	(0.411)	(0.214)	
SignatureSize ∗ D ∗ Ret								**0.016**
								(0.057)
Overconfidence ∗ D ∗ Ret								−0.089*
								(0.049)
N	3,688	3,220	2,886	3,774	3,692	1,611	2,800	2,813
Adjusted/Pseudo *R*-squared	0.10	0.03	0.26	0.33	0.24	0.31	0.10	0.10

This table presents the results of the effects of CFO and CEO narcissism (signature size) on accruals and real earnings management, the probability of ineffective internal controls, the probability of accounting restatements, and conditional accounting conservatism, controlling for the options-based measure of overconfidence following Hirshleifer, Low, and Teoh [2012]. All models include identical control variables to those in our central tests, as well as two- and three-way interactions for conservatism, but we repress the coefficients for ease of presentation. All models include two-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

TABLE 11

Joint Effects of CFO and CEO Narcissism on Financial Reporting Quality

	AbsAccruals	*Accrual Quality*	*AbDisExp*	*AbCFO*	*AbProdCost*	*IneffControls*	*Restatement*	*E/P*
CFOSignatureSize	**0.010*****	**0.008****	**0.058***	**0.016***	**0.048****	**0.743***	**0.649****	
	(0.004)	**(0.003)**	**(0.031)**	**(0.010)**	**(0.022)**	**(0.406)**	**(0.277)**	
CEOSignatureSize	**−0.003**	**−0.001**	**−0.006**	**0.007**	**0.014**	**−1.265****	**−0.364**	
	(0.002)	**(0.002)**	**(0.020)**	**(0.007)**	**(0.013)**	**(0.636)**	**(0.324)**	
CFOSignatureSize * D * Ret								**−0.095***
								(0.051)
CEOSignatureSize * D * Ret								**0.038**
								(0.045)
Z-statistic CFO = CEO	**2.91*****	**2.50*****	**1.73***	**0.74**	**1.33**	**2.66*****	**2.38*****	**−1.96****
N	2,243	1,964	1,679	2,285	2,251	940	1,795	1,595
Adjusted/Pseudo *R*-squared	0.11	0.05	0.27	0.35	0.26	0.13	0.15	0.13

This table presents the results testing the joint effects of CFO and CEO narcissism (signature size) on accruals and real earnings management, the probability of ineffective internal controls, the probability of accounting restatements, and conditional accounting conservatism. Only firm-years in which both executives held office are included. All models include identical control variables to those in our central tests for both CFOs and CEOs, as well as two- and three-way interactions for conservatism, but we repress the coefficients for ease of presentation. All models include two-digit SIC fixed effects, except the *InEffControls* model includes one-digit SIC fixed effects. Standard errors are reported in parentheses and are clustered by firm. Coefficients marked with a ***, **, or * are significant at the $p < 0.01$, 0.05, or 0.10 level, respectively. Variable definitions are reported in appendix C.

the results while restricting the sample to firm-years where both CFO and CEO signature size are available. This approach also enhances our ability to statistically compare the importance of CFO and CEO narcissism because signatures for both executives are included in the same regression. All models include firm and executive control variables identical to our central tests.[41] We include executive-specific controls for both the CFO and CEO.

Despite the smaller sample size, the differential effects of CFO and CEO narcissism on our primary dependent variables appear even more pronounced. The CFO signature size results are in most cases at least as strong as in the primary specifications, with signature size predicting negative reporting effects in all models. The CEO signature size results in terms of real earnings management are subsumed by the effect of the CFO, while the probability of ineffective internal controls and restatements are now significantly negative.[42] Table 11 also displays *Z*-statistics testing whether the effect of CFO narcissism significantly differs from that of CEO narcissism. In all but two cases (abnormal cash flows and abnormal production costs), CFO narcissism has a significantly greater effect on financial reporting quality than does CEO narcissism.[43] Overall, these results support our prior analysis by indicating that the results for CFO narcissism are robust to controlling for CEO narcissism and requiring a common sample.

5.2.9. Additional Robustness Tests. We conduct three additional untabulated robustness tests. In the first test, we develop various proxies for the space that each letter in the handwritten signature is expected to consume, allowing us to control for some expected variation in letter size in a signature. While we do not expect letter size to bias our results, it might add noise. Because we are not aware of a general method for assessing expected letter size in signatures, we assess robustness using several approaches. First, we average the number of pixels each letter consumes across all fonts on an Apple computer running OS X. In general, the letters i, l, t, and r tend to be the smallest while M, W, Q, and B tend to be the largest. We weight each letter in the signature by its average pixel size and standardize by the total number of letters in the name to come up with an expected signature size. Second, because signatures are cursive, we assess expected signature size using the average expected

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[41] The internal control quality model includes one-digit SIC fixed effects because the model does not converge with two-digit SIC fixed effects due to the large total number of fixed effects (Allison [2004]).

[42] The negative coefficient on CEO signature size in the restatements specification may reflect the fact that narcissistic CEOs tend to engage in more real earnings management and are therefore less likely to be subject to restatements.

[43] As noted earlier, the fact that differences are insignificant for abnormal cash flows and abnormal production costs is consistent with the notion that both CEOs and CFOs influence real earnings management.

letter size with Edwardian Script. Third, because the effect of letter size may be nonlinear, we control for signatures with a disproportionate number of large or small letters (top or bottom quartile using pixel length from either the average Apple font or Edwardian Script). While expected letter size is moderately correlated with signature size in our sample ($r = 0.10$ on average across our measures), all of our inferences are robust to controlling for letter size. In particular, for each of our primary variables of interest (accruals, real earnings management, conservatism, internal control quality, and restatements), each significant result retains its level of statistical significance.

In the second robustness test, we include executives whose signatures are illegible. We standardize the square area of these signatures by the number of letters in the typewritten name printed below the signature because it is unclear what letters were actually included in their signature. Subject to the caveat that uncertainty regarding the signed names creates additional noise (and perhaps bias), all inferences are consistent with those in our primary analysis.

In the third robustness test, we control for the compensation of the CFO relative to other executives in the firm. Chatterjee and Hambrick [2007] utilize five components to measure CEO narcissism, most of which are not available on a consistent basis for the CFOs in our sample and/or are unlikely to be under the CFO's control. Two of the components that are available for CFOs are the extent of cash and noncash compensation relative to other executives in the firm. While it is more difficult to interpret relative compensation as narcissism in this context (because CFOs are unlikely to control their own compensation), it could reflect the relative importance of the CFO to the organization, which might be correlated with other CFO attributes. We measure CFO total compensation as the proportion of compensation relative to the top five executives in the company and include it as a control in our regressions. The relative compensation variable is insignificant except in the restatement analysis, where it is significantly negative, suggesting that higher CFO pay is associated with fewer restatements. More importantly, all of our accruals earnings management, real earnings management, conditional conservatism, internal control quality, and restatement results remain statistically significant at their respective levels after controlling for the level of CFO compensation relative to other executives in the firm.

6. Conclusion

Research such as Bertrand and Schoar [2003] suggests that executive personality traits, such as narcissism, can affect firm-level decisions. While there is a substantial literature relating CEO characteristics to firm decisions, the extant literature on CFOs has been far less explored. Although CEOs are likely to affect a wide range of firm-level decisions, CFOs' primary responsibilities include financial reporting. We examine the relation between CFO

narcissism, as measured by signature size, and the firm's financial reporting quality.

We begin with a laboratory study to validate signature size as a measure of narcissism and to confirm its anticipated relation with misreporting. The results indicate that signature size is positively related to both narcissism and misreporting. Mediation analyses suggest that the channel through which signature size is related to misreporting is primarily through the individual's level of narcissism.

We then utilize an archival sample of notarized CFO signatures to examine the relation between CFO narcissism and financial reporting quality. We find that CFO narcissism is associated with greater accruals and real earnings management, lower conditional conservatism, weaker internal control quality, and an increased likelihood of restatements. CEO narcissism is not associated with accruals earnings management, conditional conservatism, internal control quality, or restatements, but does correlate with real earnings management. These results reinforce the importance of CFO characteristics in the domain of financial reporting decisions.

Finally, we conduct several robustness tests. First, we conduct within-firm analyses comparing the earnings management, conservatism, and restatement measures pre- and post-appointment of the CFO. The results are consistent with our primary tests, suggesting that our results are not driven by omitted firm-level characteristics. Second, we control for executive overconfidence, again with similar results to our primary analysis. Third, we repeat our CFO analysis controlling for CEO signature size and constraining our sample to firm-years in which both a CFO and CEO signature is available, again with consistent results.

Our study is subject to important caveats. First, we are unable to directly observe the executive's level of narcissism, but instead utilize the executive's signature size to proxy for this personality trait. However, our laboratory study provides evidence validating the use of this measure, and our archival analysis controls for other individual characteristics such as the executive's tenure, gender, and equity-based compensation incentives. Second, our sample is limited to the firms required by the SEC to provide the corporate officer statements. While this limits our sample, it provides a consistent and representative set of executive signatures that are notarized, ensuring the signature's authenticity.

Taken as a whole, our results are consistent across a wide range of specifications in suggesting that CFOs' personality characteristics, such as narcissism, have potentially important effects on firms' financial reporting choices. While the prior literature examines the role of CEO traits in firm-level decisions, our analysis highlights the importance of CFO attributes in financial reporting decisions.

APPENDIX A

Experimental Task

A.1 REPORTING YOUR SHARE

This study involves a very simple task. Each student participating in the study is linked to another student in another class, but neither of you knows the identity of your linked student. Each of you must make a decision regarding the allocation of $5 between the two of you. You will see your default allocation of the $5, which is written below. Different students may receive different default allocations. You do not know what the other student's default allocation is and they do not know what yours is.

Your Default Allocation of the $5: $2.50

Now you must decide how much of the $5 you actually want to allocate to yourself and report to the other student you are linked with. If you choose to report a different number from your actual default allocation to the other student, they will not know the true default allocation that you received, and you will keep whatever you report to them. For example, if you report that your default allocation was $4.25, you will receive $4.25 and they will receive $0.75. If you report that your default allocation was $0.75, you will receive $0.75 and they will receive $4.25. Remember, the other student is making this exact same decision and you will also receive whatever portion of $5.00 that they report to you.

Write in the Default Allocation value that you wish to report to the other student: $_____

When all students have completed the study, the researcher will total up each pair of students' allocations and will e-mail you an office number and time window(s) that you can pick up your total allocated payment.

Please proceed to the next page to fill out a questionnaire about some of your attitudes and beliefs.

APPENDIX B

NPI-40 Narcissism Subscale Items and Signature Size Correlations

		Signature Size Correlation
Exploitativeness Subscale		
6	**A. I can usually talk my way out of anything.**	0.25*
	B. I try to accept the consequences of my behavior.	
13	**A. I find it easy to manipulate people.**	0.16
	B. I don't like it when I find myself manipulating people.	
16	**A. I can read people like a book.**	0.11
	B. People are sometimes hard to understand.	

(Continued)

APPENDIX B–*Continued*

		Signature Size Correlation
23	A. Sometimes I tell good stories.	0.23*
	B. Everybody likes to hear my stories.	
35	A. People sometimes believe what I tell them.	0.39*
	B. I can make anybody believe anything I want them to.	
Authoritativeness Subscale		
1	**A. I have a natural talent for influencing people.**	0.16
	B. I am not good at influencing people.	
8	**A. I will be a success.**	0.11
	B. I am not too concerned about success.	
10	A. I am not sure if I would make a good leader.	0.24*
	B. I see myself as a good leader.	
11	**A. I am assertive.**	0.11
	B. I wish I were more assertive.	
12	**A. I like to have authority over other people.**	0.09
	B. I don't mind following orders.	
32	A. Being an authority doesn't mean that much to me.	0.24*
	B. People always seem to recognize my authority.	
33	**A. I would prefer to be a leader.**	0.07
	B. It makes little difference to me whether I am a leader or not.	
36	**A. I am a born leader.**	0.27*
	B. Leadership is a quality that takes a long time to develop.	
Superiority Subscale		
4	A. When people compliment me I sometimes get embarrassed.	0.10
	B. I know that I am good because everybody keeps telling me so.	
9	A. I am no better or worse than most people.	0.10
	B. I think I am a special person.	
26	A. Compliments embarrass me.	0.04
	B. I like to be complimented.	
37	**A. I wish somebody would someday write my biography.**	0.20
	B. I don't like people to pry into my life for any reason.	
40	A. I am much like everybody else.	0.16
	B. I am an extraordinary person.	
Self-Sufficiency Subscale		
17	A. If I feel competent I am willing to take responsibility for making decisions.	0.35*
	B. I like to take responsibility for making decisions.	
21	**A. I always know what I am doing.**	−0.05
	B. Sometimes I am not sure of what I am doing.	
22	A. I sometimes depend on people to get things done.	−0.24*
	B. I rarely depend on anyone else to get things done.	
31	**A. I can live my life in any way I want to.**	0.01
	B. People can't always live their lives in terms of what they want.	

(Continued)

APPENDIX B–*Continued*

		Signature Size Correlation
34	**A. I am going to be a great person.**	0.00
	B. I hope I am going to be successful.	
39	**A. I am more capable than other people.**	−0.04
	B. There is a lot that I can learn from other people.	
Entitlement Subscale		
5	A. The thought of ruling the world frightens the hell out of me.	0.16
	B. If I ruled the world it would be a better place.	
14	**A. I insist upon getting the respect that is due me.**	0.10
	B. I usually get the respect that I deserve.	
18	A. I just want to be reasonably happy.	0.06
	B. I want to amount to something in the eyes of the world.	
24	**A. I expect a great deal from other people.**	0.07
	B. I like to do things for other people.	
25	**A. I will never be satisfied until I get all that I deserve.**	−0.06
	B. I take my satisfactions as they come.	
27	**A. I have a strong will to power.**	0.05
	B. Power for its own sake doesn't interest me.	
Vanity Subscale		
15	A. I don't particularly like to show off my body.	0.11
	B. I like to show off my body.	
19	A. My body is nothing special.	0.11
	B. I like to look at my body.	
29	**A. I like to look at myself in the mirror.**	0.22
	B. I am not particularly interested in looking at myself in the mirror.	
Exhibitionism Subscale		
2	**A. Modesty doesn't become me.**	−0.09
	B. I am essentially a modest person.	
3	**A. I would do almost anything on a dare.**	−0.12
	B. I tend to be a fairly cautious person.	
7	A. I prefer to blend in with the crowd.	0.30*
	B. I like to be the center of attention.	
20	A. I try not to be a show off.	0.06
	B. I will usually show off if I get the chance.	
28	A. I don't care about new fads and fashions.	−0.06
	B. I like to start new fads and fashions.	
30	**A. I really like to be the center of attention.**	0.32*
	B. It makes me uncomfortable to be the center of attention.	
38	**A. I get upset when people don't notice how I look when I go out in public.**	−0.03
	B. I don't mind blending into the crowd when I go out in public.	

Bolded items indicate higher narcissism. Correlations are reported between the individual questions and signature size from the laboratory experiment. * denotes the correlation is significant at $p < 0.10$.

APPENDIX C

Variable Definitions

Narcissism Proxy	
SignatureSize	Executive's signature size in squared centimeters scaled by the number of letters in the signed name. Signature size is determined by tracing a rectangle around the executive's signature. The signatures are hand-collected from the SEC's Web site (http://www.sec.gov/spotlight/officerstatements.htm) and are sworn before a notary public.
Dependent Variables	
AbsAccruals	Absolute value of discretionary accruals measured as the residual from the following model (Jones [1991], Dechow, Sloan, and Sweeney [1995], Kothari, Leone, and Wasley [2005]): $TA_{it} = \beta_0 + \beta_1 1/AT_{it-1} + \beta_2(\Delta REV_{it} - \Delta AR_{it}) + \beta_3 PPE_{it} + \beta_4 ROA_{it-1} + \varepsilon_{it}$, where *TA* is total accruals calculated as the difference between income before extraordinary items and operating cash flows. *AT* is total assets. ΔREV is the change in revenue. ΔAR is the change in receivables. *PPE* is gross property, plant, and equipment. *ROA* is income before extraordinary items. Variables are scaled by beginning assets. The model is estimated by industry-year.
AccrualQuality	Accruals quality measured as the residual from the following model (Dechow and Dichev [2002], McNichols [2002]): $\Delta WC_{it} = \beta_0 + \beta_1 CFO_{it-1} + \beta_2 CFO_{it} + \beta_3 CFO_{it+1} + \beta_4 \Delta REV_{it} + \beta_5 PPE_{it} + \varepsilon_{it}$, where ΔWC is the change in working capital (measured as current assets less cash and cash equivalents less current liabilities plus debt in current liabilities). *CFO* is cash flows from operations measured as income before extraordinary items less the change in working capital less depreciation and amortization. ΔREV is the change in total revenue. *PPE* is gross property, plant, and equipment. Variables are scaled by beginning assets. The model is estimated by industry-year.
AbDisExp	Abnormal discretionary expenses measured as the residual from the following model multiplied by negative one (Roychowdhury [2006]): $DISEXP_{it} = \beta_0 + \beta_1 1/AT_{it-1} + \beta_2 REV_{it-1} + \varepsilon_{it}$, where *DISEXP* is discretionary expenses calculated as the sum of R&D expenses, advertising expenses, and SG&A expenses. *AT* is total assets. *REV* is total revenue. Variables are scaled by beginning assets. The model is estimated by industry-year.

(Continued)

APPENDIX C–*Continued*

AbCFO	Abnormal cash flows measured as the residual from the following model multiplied by negative one (Roychowdhury [2006]): $CFO_{it} = \beta_0 + \beta_1 1/AT_{it-1} + \beta_2 REV_{it} + \beta_3 \Delta REV_{it} + \varepsilon_{it}$, where *CFO* is operating cash flows scaled by beginning assets. All other variables are defined above. The model is estimated by industry-year.
AbProdCost	Abnormal production costs measured as the residual from the following model (Roychowdhury [2006]): $PROD_{it} = \beta_0 + \beta_1 1/AT_{it-1} + \beta_2 REV_{it} + \beta_3 \Delta REV_{it} + \beta_4 \Delta REV_{it-1} + \varepsilon_{it}$, where *PROD* is production costs calculated as the sum of *COGS* and the change in inventory, scaled by beginning assets. All other variables are defined above. The model is estimated by industry-year.
E/P	Current year earnings before extraordinary items scaled by lagged market value of equity.
IneffControls	Indicator variable equal to one if the firm's internal controls are ineffective and zero otherwise.
NumWeaknesses	Number of material weaknesses.
Restatement	Indicator variable equal to one if the firm's financial statements are restated and zero otherwise.
Independent Variables	
lnAssets	Natural log of total assets.
lnMVE	Natural log of the market value of equity.
B/M	Book value of equity scaled by market value of equity.
FirmAge	Number of years since the firm first appeared in the CRSP database.
Loss	Indicator variable equal to one if the firm incurred a loss on income before extraordinary items in the prior year and zero otherwise.
%Loss	Percentage of loss years over the prior four years.
Leverage	Short-term plus long-term debt scaled by common equity.
OCFVol	Standard deviation of operating cash flows over the past five years scaled by total assets.
SalesVol	Standard deviation of sales over the past five years scaled by total assets.
%ΔCashSales	Percent change in sales minus change in accounts receivable in the past year.
SalesGrowth	Cumulative percentage change in sales over the prior three years.
NI/P	Net income scaled by market value of equity.
ΔROA	Change in net income scaled by average total assets in the past year.
Delta	Dollar change in executive wealth per 1% increase in stock price scaled by total compensation.
Vega	Dollar change in executive wealth per 0.01 increase in standard deviation of stock return scaled by total compensation.
Inventories	Inventory scaled by total assets.
ΔInventory	Change in inventory scaled by average total assets in the past year.
ΔReceivables	Change in accounts receivable scaled by average total assets in the past year.
AuditFees	Audit fees scaled by total assets.

(Continued)

APPENDIX C–*Continued*

Gender	Indicator variable equal to one if the executive is female and zero otherwise.
Tenure	Executive's tenure in years.
M/B	Market value of equity scaled by book value of equity.
Ret	Cumulative market-adjusted return for the firm beginning in month −8 and ending in month +3 surrounding the fiscal year end month.
D	Indicator variable equal to one if *Ret* is negative and zero otherwise.
Overconfidence	Options-based measure of executive overconfidence. Indicator variable equal to one for years the executive holds options that are at least 67% in the money and zero otherwise, similar to Hirshleifer, Low, and Teoh [2012].

APPENDIX D

Example Corporate Officer Statements Pursuant to Section 21(a)(1) of the Securities Exchange Act of 1934

1164

Exhibit 99.2

Statement Under Oath Of Principal Executive Officer And Principal Financial Officer Regarding Facts And Circumstances Relating To Exchange Act Filings

I, Stanley Laybourne, state and attest that:

(1) To the best of my knowledge, based upon a review of the covered reports of Insight Enterprises, Inc., and, except as corrected or supplemented in a subsequent covered report:

- no covered report contained an untrue statement of a material fact as of the end of the period covered by such report (or in the case of a report on Form 8-K or definitive proxy materials, as of the date on which it was filed); and
- no covered report omitted to state a material fact necessary to make the statements in the covered report, in light of the circumstances under which they were made, not misleading as of the end of the period covered by such report (or in the case of a report on Form 8-K or definitive proxy materials, as of the date on which it was filed).

(2) I have reviewed the contents of this statement with the Company's audit committee.

(3) In this statement under oath, each of the following, if filed on or before the date of this statement, is a "covered report":

- Annual Report on Form 10-K for the fiscal year ended December 31, 2001 of Insight Enterprises, Inc.;
- all reports on Form 10-Q, all reports on Form 8-K and all definitive proxy materials of Insight Enterprises, Inc. filed with the Commission subsequent to the filing of the Form 10-K identified above; and
- any amendments to any of the foregoing.

Stanley Laybourne
Chief Financial Officer, Secretary and Treasurer
August 13, 2002

Subscribed and sworn to before me this 13th day of August, 2002.

Notary Public
My Commission Expires: 12/1/05

"OFFICIAL SEAL"
Darren Sharocky
Notary Public-Arizona
Maricopa County
My Commission Expires 12/1/2005

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STATEMENT UNDER OATH OF PRINCIPAL EXECUTIVE OFFICER AND PRINCIPAL FINANCIAL OFFICER REGARDING FACTS AND CIRCUMSTANCES RELATING TO EXCHANGE ACT FILINGS

I, Robert T. D'Alessandro, Principal Financial Officer of UST Inc., state and attest that:

(1) To the best of my knowledge, based upon a review of the covered reports of UST Inc., and, except as corrected or supplemented in a subsequent covered report:

- No covered report contained an untrue statement of a material fact as of the end of the period covered by such report (or in the case of a report on Form 8-K or definitive proxy materials, as of the date on which it was filed); and
- No covered report omitted to state a material fact necessary to make the statement in the covered report, in light of the circumstances under which they were made, not misleading as of the end of the period covered by such report (or in the case of a report on Form 8-K or definitive proxy materials, as of the date on which it was filed).

(2) I have reviewed the contents of this statement with the Company's audit committee.

(3) In this statement under oath, each of the following, if filed on or before the date of this statement, is a "covered report":

- Annual Report on Form 10-K for the fiscal year ended December 31, 2001 of UST Inc. filed with the Commission on March 8, 2002;
- all reports on Form 10-Q, all reports on Form 8-K and all definitive proxy materials of UST Inc. filed with the Commission subsequent to the filing of the Form 10-K identified above; and
- any amendments to any of the foregoing.

Robert T. D'Alessandro
August 7, 2002

Subscribed and sworn to before me this 7th day of August, 2002

Notary Public
My Commission Expires: 12/31/06

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