



Readability, Financial Literacy, and the Reliance of Investors

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Abstract

In 1998, the SEC published Rule 421(d) to mandate the use of “plain English” in disclosures and filings in order to make such documents more readable, more informative, and thus more useful to investors. Past research shows that high readability increases investors’ reliance on the disclosure through increased feelings of processing fluency, which are subjective feelings of ease felt when reading something easily comprehensible. Past research also shows that more financially literate investors process financial information differently from their less financially literate counterparts: the former is mediated by both processing fluency and understanding of the information, while the latter is mediated by processing fluency only. I predict and find that less financially literate investors—who are influenced to a greater degree by changes in processing fluency—would also be more sensitive to changes in readability levels.

Key words: Readability; Financial literacy; Management disclosures; Textual information; Investor decision-making

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INTRODUCTION

In 1998, the Securities Exchange Commission (SEC) began truly advocating for readable disclosures. The Plain English Rule 421(d) that was put into effect requires that

plain English principles be obeyed in firm prospectuses, in order to encourage better communication between management and investors. In the same year, SEC also published *A Plain English Handbook*, which provides a practical guideline for preparing plain English disclosures. Recommendations mostly fall into one of two categories: linguistic (i.e. short sentences, active voice, concrete everyday language, etc.) or formatting (i.e. clear hierarchy of headings, tabulated information presented in bullet points, appropriate use of tables and graphs, etc.). All of this is based upon a relatively simple and “obvious” assumption: the more readable the financial disclosure, the easier it is for investors to understand what is going on, and the more informative and useful these disclosures are for their decision-making processes.

Yet there has admittedly not been an overabundance of empirical research to support this fundamental assertion until recent years, when the topic began to catch on. Early studies find that readability has a discernible effect on investors, especially upon small investors, possibly by limiting their willingness or ability to extract information from financial disclosures (Li, 2008; You & Zhang, 2009; Miller, 2010). Rennekamp (2012) builds upon the cognitive psychology theory of processing fluency and existing studies by Novemsky, Dhar, Schwarz, and Simonson (2007) and Alter and Oppenheimer (2009) to discover that readability play a role in “magnifying” investor judgments, and that readability acts upon investor judgment through changes in processing fluency, which is the subjective feeling of ease felt when reading the disclosure and which also manages to influence investors’ willingness to rely upon the information in the disclosure. Tan, Wang, and Zhou (2015) find that processing fluency’s effect seems to only be significant when performance benchmark is inconsistent, otherwise understanding of financial information ends up mediating investor judgment instead. Cui (2015) find that the readability effect is not uniform for all investors: more financially

literate investors are mediated by both processing fluency and understanding, while less financially literate investors are mediated only by processing fluency.

In synthesizing the aforementioned experimental studies on readability and its effect on investor judgment, I posit that because investors of varying sophistication levels process information according to differing cognitive pathways and thus have different degrees of sensitivity to changes in readability, the difference observed in investor judgments of future firm performance should also be apparent in the degree to which they rely on the information contained in the disclosure. Differences in readability result in differences in processing fluency, which affect the degree to which investors choose to rely on the disclosure.

I design an experiment to test this hypothesis, by examining the interaction between disclosure readability and investor financial literacy to see how the two act independently and in tandem in order to affect investors' subjective intention to rely on the disclosure. Participants are divided into the high financial literacy and low financial literacy groups based on demographic information, according to the methods of Tan, Wang, and Zhou (2014), and told to assume the role of a retail investor and then randomly assigned a version of an earnings release for a fictional company. Participants read the earnings release and accompanying background information on the company, and then answer questions about how credible they find the information in the earnings release to be, and how willing they are to make investment decisions based on this information.

I find that, much like the Rennekamp (2012) study, management credibility is not directly affected by changes in readability in either the high financial literacy or the low financial literacy investor group—but reliance is. More specifically, more financially literate investors appear to be less sensitive to changes in readability levels, while less financially literate investors are notably unwilling to rely on low-readability disclosures. These findings are in line with previous research, which finds that while more financially literate investors are influenced both by processing fluency and by understanding, their less financially literate counterparts are influenced solely by processing fluency (Cui, 2015).

In the next section, I give a brief review of both existing research and the theoretical framework, and develop my hypothesis. This follows with my experimental design, including participation recruitment, experimental manipulations, and experimental procedure. I then summarize the results of my experiment, and provide analysis for the test of hypothesis. The final section concludes.

1. HYPOTHESIS DEVELOPMENT

Past research has found that disclosure readability affects investors and their decisions. Earlier research tries to

equate disclosure length with readability—or rather, find that they are inverses of each other, such that shorter disclosures are deemed more readable. You and Zhang (2009) find that as the report length increases (and readability decreases), market under-reaction to 10-K filings becomes more severe. Miller (2010) finds that for small investors who trade at values beneath \$5,000, high readability is associated with greater trading volume, and low readability is associated with a decrease in investor consensus that is not observed with large investors. This may be due to small investors being less willing to or less able to extract information from a less readable financial disclosure (Grossman & Stiglitz, 1980; Bloomfield, 2002; Hirshleifer & Teoh, 2003).

Yet although studies have used disclosure length as a measure of readability (Li, 2008; You & Zhang, 2009; Miller, 2010; Loughran & McDonald, 2011), this might not be the best measure. Plain English often also means concise English, and concise writing is generally shorter in length; thus, it is difficult to know whether investors are reacting to an increase in readability or a decrease in disclosure length (Miller, 2010; Rennekamp, 2012).

But all in all, how does readability influence the judgment of investors? In general, research shows that people like texts that feel easy to process: the feelings experienced while processing a certain target can transfer to become instead feelings about the target itself, and so the subjective ease felt when reading something with high processing fluency can be translated into the following heuristic: “if it is easy to read, it is good”—i.e. reliable, dependable, true, etc. This is not, however, always true: Schwarz (2004) finds that processing fluency can be affected by context, while Briñol, Petty, and Tormala (2006) and Labroo and Kim (2009) both find that by negatively framing ease, high processing fluency can lead to lower evaluations, implying that an opposite heuristic may also come into play: “something worth achieving is going to take a greater amount of effort”—and so something that can be easily processed is actually viewed negatively.

For the most part, however, empirical findings do still support the idea that processing fluency is associated with positive reactions, like higher ratings of truth, preference for both message and messenger, willingness to rely on information, etc. (Alter & Oppenheimer, 2009). Syntactically memorable traits, such as rhyming (McGlone & Tofiqbakhsh, 2000) and easy pronunciation (Alter & Oppenheimer, 2006), would likewise lead to more positive reactions.

Aside from simply feeling positively predisposed toward information with higher processing fluency, Shah and Oppenheimer (2007) also find that individuals weigh more fluent information more heavily in their judgments, while Hafner and Stapel (2010) posit that processing fluency serves as a cue for the usability of information—that is to say, the higher the processing fluency, the more useful the information might be deemed for decision-making. Thus, SEC (1998) in *A Plain English Handbook*

suggests that since plain English corresponds with how information processing naturally occurs, highly readable disclosures would increase processing fluency and thus increase investors' willingness to rely on the disclosures.

Specifically in accounting literature, there have only been a few studies that have referenced theories of processing fluency. Novemsky et al. (2007) and Alter and Oppenheimer (2009) both find results to be generally in line with the consensus: processing fluency may arise from the ease of generating thoughts and accessing past memories. Disclosures that present information in "scenario form" unintentionally lead analysts to be optimistic (Sedor, 2002), because such a format lowers the cognitive effort for analysts when they try to envision how management's plans will fare in action, and the ease with which they can picture this predisposes them to feel more positively about the plans (Kadous, Krische, & Sedor, 2006; Sedor, 2002). Conversely, being asked to perform a task that is more subjectively difficult reduces analyst optimism (Kadous et al., 2006): since generating many counter-explanations is more difficult than generating just a few counter-explanations, the subjective feeling of ease (or difficulty) acts as a heuristic cue that influences investor judgment.

On the experimental side of things for readability research, Tan et al. (2015) focus instead on how readability and consistency in benchmark performances interact, finding that benchmark consistency affects the degree to which readability impacts investor judgment, and also that readability affects performance judgments by impacting the participants' understanding rather than processing fluency. Tan et al. (2014) in the meantime focus upon how readability as a mediating variable influences the framing effect that positive disclosure tone may have on investor judgment, finding that when financial information is mixed and disclosures are difficult to read, unsophisticated investors are easily duped by enthusiastic and optimistic management tone while sophisticated investors are more likely to "punish" management for their unwarranted optimism by giving low ratings.

Rennekamp (2012) finds that more readable disclosures lead to stronger reactions from small investors, and that this result is mediated by the greater processing fluency from more readable disclosures, which act as a subconscious heuristic cue for investors to feel that they can trust and rely on the disclosure—but does not, however, appear to directly influence investor perceptions of management credibility. Cui (2015) finds that the information processing pathway of less financially literate investors is dominated to a much greater extent by processing fluency than it is by understanding, implying that these investors would be more sensitive to changes in processing fluency. Thus, less financially literate investors would be much more likely than their more financially literate counterparts to show a significantly lower willingness to rely on the disclosure at low readability.

Thus, I arrive at the following hypothesis:

H1: The willingness of investors to rely upon the information contained in an earnings disclosure drops significantly for less financially literate investors when readability is low, but remains unchanged for more financially literate investors.

2. EXPERIMENT

2.1 Participants

121 participants are recruited through Amazon's Mechanical Turk (MTurk) platform. On average, participants are 37 years old and have 16.04 years of work experience, and the gender breakdown is 40% male and 60% female. Participants also have taken 1.9 accounting classes and 1.8 finance classes on average, analogous to the number completed by actual average retail investors (Elliott et al., 2007). 73% of participants have previously evaluated financial statements, and after controlling for US residency and English as native language, 70% have prior experience investing. Therefore, participants recruited through MTurk are an appropriate proxy of retail investors, once appropriate screening procedures are implemented.

2.2 Experiment Design

Company information is generated for a fictional company based on a real company listed on the New York Stock Exchange (NYSE). Experimental manipulations are presented in the form of an earnings release, adapted from actual earnings releases issued by other listed companies from the same industry. Two versions of the earnings release are used: they are either easy to read (high-readability) or difficult to read (low-readability); information content in the releases remains constant between the two versions.

I use a 2 x 2 between-subjects design to test the hypotheses. The two independent variables are financial literacy (more vs. less) and readability (high vs. low). The main dependent variables are: investors' judgment of management credibility, and investors' willingness to use (rely on) information in the releases.

2.3 Manipulations

Financial literacy of participants is measured based on demographic information, according to the method used by Tan et al. (2014). Participants' sophistication scores are determined based on the number of accounting and finance courses they have taken, their frequency of reading annual reports, and their frequency of reading earnings releases. Those with a below-median sophistication score form the less financially literate (unsophisticated) group, while those with an above-median sophistication score form the more financially literate (sophisticated) group.

Readability is manipulated based on SEC (1998) guidelines for plain English writing principles. More

specifically, the high-readability version presents numbers-heavy financial information in tabular/bulleted form, uses short concise sentences and the active voice, and uses simple and easily understandable diction where possible. The low-readability version presents the numbers-heavy financial information in paragraph form, uses long complex sentences and the passive voice, and uses jargon and complicated technical terms. Readability is manipulated while holding information content constant.

2.4 Procedure

I ask participants to assume the role of a retail (i.e. nonprofessional) investor and provide them with information about a company of interest to them, including the company background, a recent four-year financial summary, and a randomly assigned version of the most recent quarter’s earnings release.

After reading over the provided information, participants answer a response questionnaire. I ask the participants to identify how hard they felt the earnings release was to read and how hard it was to understand. I then ask the participants how plausible they find the financial information to be, and whether they are willing to use this management-provided earnings release as the basis of their investment activities.

Finally, participants are debriefed and demographics information is collected.

respectively, while the mean ratings in the high readability condition were 6.21 and 5.54. The ratings are significantly higher for the high readability condition than they are for the low readability condition ($p < 0.01$ for reading and $p = 0.01$ for understanding), suggesting that the participants perceive the high-readability version of the earnings release to be easier to read and process than the low-readability version of the release, which means that the readability manipulation is successful. The combined score along these two measures also comprises the processing fluency score given by the investor to the earnings release.

3.2 Test of Hypothesis

First, I measure the participants’ judgment of firm credibility by asking them to assess the extent to which they agree with the statement: “The information in the earnings release is believable”. Participants are asked to identify their position on an 11-point Likert scale, with 0 being “Strongly Disagree” and 10 being “Strongly Agree”. The results offer some support for the findings of Rennekamp (2012)—readability does not appear to have a significant direct effect on investor perceptions of management credibility. As can be seen in Panel A of Table 1, which provides descriptive statistics for investor judgment of management credibility, only readability has a marginally significant (3.87 vs. 4.85, $p = 0.03$) effect. That is to say, investor judgment of management credibility does not vary significantly for investors at different sophistication levels, and only varies somewhat with variations in readability. Analysis of variance (ANOVA) further supports this conclusion (Panel B), with readability having a marginal ($p = 0.04$) effect and both financial literacy ($p = 0.75$) and the interaction term ($p = 0.67$) being statistically insignificant. It is not known why readability has a marginal effect here while having no effect in the Rennekamp (2012) study; the discrepancy may be due to experimental design differences, as she explicitly measures directionality of financial information as well while this study does not.

3. RESULTS

3.1 Manipulation Check

To assess the effectiveness of the readability manipulations, participants were asked to rate whether the earnings release was easy to read and whether it was easy to understand. They rate both statements on an 11-point Likert scale, with 0 = “not easy at all” and 10 = “extremely easy”. The mean ratings in the low readability condition were 4.48 and 4.13 for the easy-to-read and easy-to-understand measures

Table 1
Descriptive Statistics and Analysis of Variance (ANOVA): Management Credibility

Panel A: Descriptive statistics: mean (standard deviation) [sample size]						
Financial Literacy	Readability		Overall			
	Low	High				
Low	3.67 (27) [2.65]	4.87 (33) [2.71]	4.33 (60) [2.73]			
High	4.03 (33) [2.66]	4.82 (28) [2.66]	4.39 (61) [2.65]			
Overall	3.87 (60) [2.64]	4.85 (61) [2.65]	4.36 (121) [2.68]			

Panel B: ANOVA tests of between-subjects effects						
Source	S.S.	df	M.S.	F-statistic	p-value	
Readability	30.09	1	30.09	4.24	0.04	
Financial literacy	0.70	1	0.70	0.10	0.75	
Readability x Financial Literacy	1.33	1	1.33	0.19	0.67	
Error	830.59	117				

Note. DV = Judgement of Manage Credibility. Participants are asked to indicate the extent to which they agree with the statements, “The information in the earnings release is credible” (0 = strongly disagree, 10= strongly agree). Panel A presents descriptive statistics, and Panel B presents the results of the analysis of variance (ANOVA). All p-values are two-tailed.

The willingness of the investors to rely on the earnings release, however, paints a rather different picture. This dependent variable is measured by asking investors to assess the extent to which they agree with the statement: “I would make investment decisions based on the information in the earnings release”. Again, participants are asked to identify their position on an 11-point Likert scale, with 0 being “Strongly Disagree” and 10 being “Strongly Agree”. As the descriptive statistics (Panel A) in Table 2 show,

there is a marginally significant effect between readability levels (6.62 vs. 7.40, $p = 0.03$) and no effect between investor financial literacy levels (6.73 vs. 7.30, $p = 0.11$). ANOVA results (Panel B) show that financial literacy is marginally significant ($p = 0.06$), while readability ($p = 0.02$) and the interaction between readability and financial literacy ($p = 0.01$) are statistically significantly influence how willing an investor is to rely upon the information in an earnings release in order to make financial decisions.

Table 2
Descriptive Statistics and Analysis of Variance (ANOVA): Investor Reliance on Earnings Release

Panel A: Descriptive statistics: mean (standard deviation) [sample size]			
Financial Literacy	Readability		Overall
	Low	High	
Low	5.78 (27) [1.87]	7.49 (33) [1.77]	6.73 (60) [1.99]
High	7.30 (33) [2.19]	7.29 (28) [1.58]	7.30 (61) [1.92]
Overall	6.62 (60) [2.17]	7.40 (61) [1.67]	7.01 (121) [1.97]

Panel B: ANOVA tests of between-subjects effects					
Source	S.S.	df	M.S.	F-statistic	p-value
Readability	21.32	1	21.32	6.06	0.02
Financial literacy	12.82	1	12.82	3.65	0.06
Readability x Financial Literacy	22.21	1	22.21	6.32	0.01
Error	411.41	117			

Note. DV = Judgement of Manage Credibility. Participants are asked to indicate the extent to which they agree with the statements, “I would make investment decisions based on the information in the earnings release” (0 = strongly disagree, 10 = strongly agree). Panel A presents descriptive statistics, and Panel B presents the results of the analysis of variance (ANOVA). All p-values are two-tailed.

In other words, while a highly readable earnings release would not entirely convince investors that the information contained therein is more credible, it would still manage to increase the investor’s subjective willingness to rely upon that information—and this heightened reliance appears to be more significant for less financially literate investors, while the reliance of more financially literate investors remains virtually unchanged. As Rennekamp (2012) find that increases in readability result in increases in processing fluency, and Cui (2015) find that the information processing pathway of less financially literate investors is dominated to a much greater extent by processing fluency, the sharper increase of reliance on more readable disclosures makes sense: the heightened processing fluency resulting from higher readability would affect less sophisticated investors on a more significant scale than it would highly sophisticated investors.

CONCLUSION

In this study, I investigate how financial disclosure readability and investor financial literacy interact to affect investors’ willingness to rely upon the information contained in the disclosure for their decision-making, through the mechanism of processing fluency. My results confirm the Rennekamp (2012) findings, which suggest that while changes in readability—which result

in corresponding changes in processing fluency—do not seem to directly alter investor perceptions of management credibility (and thus also the credibility of the financial information), it nevertheless does affect the investors’ willingness to use the information despite not seeming to view it with a differing amount of trust or distrust. More specifically, while highly financially literate investors are only slightly more willing to rely on highly readable disclosures, their less financially literate counterparts show a much greater degree of sensitivity to changes in disclosure readability, with a high degree of reliance on highly readable disclosures and a much lower degree of reliance on not-so-readable disclosures.

This study contributes to the literature on readability by neatly tying together the findings of several recent studies. Rennekamp (2012) found that disclosure readability influences investors’ judgments of future firm performance by influencing feelings of processing fluency in investors, Tan et al. (2015) find that when firm performance is inconsistent investors may be more influenced by their understanding of the financial information than by processing fluency, while Cui (2015) find that the judgment of more financially literate investors is influenced by both processing fluency and understanding while that of less financially literate investors is influenced by processing fluency only. Thus, this study finds further evidence of the differentiation between the processing pathways of

investors of different sophistication levels: those who are more dependent (or rather, solely dependent) on processing fluency would be more sensitive to changes in their willingness to rely upon financial disclosures, which relies upon disclosure readability.

There are however still some limitations to this study. In terms of experimental design, the decision to use one level of financial performance as opposed to differing levels showing positive-trending and negative-trending performance is a departure from existing literature, and may decrease the comparability of results with previous research. Future research can expand upon these results by including the directionality of performance as an independent variable.

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