The Effect of Presentation Format on Investor Judgments and Decisions: Does the Effect Differ for Varying Task Demands?

by

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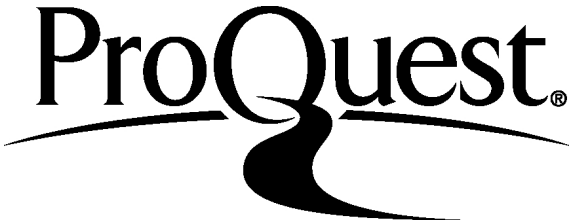

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ABSTRACT

This study examines the efficacy of presenting footnotes information in alternative display formats on investors' judgments and decisions. Non-professional investors play a significant role in the capital markets yet they do not always attend to information contained in footnote disclosures. As a result, non-professional investors systematically misprice firms and misallocate resources. Recognizing that increased mandatory and voluntary disclosures create additional challenges for non-professional investors, both the FASB and SEC have actively sought ways to increase the effectiveness of disclosures. I hypothesize that high display proximity, low signal-to-noise presentation formats can increase investors' attention to and processing of footnote disclosures and hence performance on an investing task. Further I hypothesize that low display proximity, low signal-to-noise presentation formats can improve investor performance on a recognition task. Lastly, I hypothesize that non-professional investors viewing high display proximity, low signal-to-noise footnote disclosures will rate usability higher than non-professional investors viewing footnote disclosures in the other three display formats.

Amazon Mechanical Turk workers are used as participants in a 2 x 2 between-participants experiment using two task types: an integrative (investing) task and a non-integrative (recognition) task. I manipulate display proximity (inline or side-by-side) and signal-to-noise ratio (footnotes presented simultaneously or individually). Contrary to my hypotheses, I find that low signal-to-noise ratio increases non-professional investors' performance on both the integrative (investing) and non-integrative (recognition) tasks. Further, although task performance increased under the low signal-to-noise presentation format, participants did not evaluate either signal-to-noise presentation format easier to use or more useful. Instead, participants found the high display proximity (side-by-side) presentation format easier to use, although it did not yield performance increases.

1.0 INTRODUCTION

1.1 Research Question and Motivation

The purpose of this study is to examine whether specific presentation format characteristics of financial statement footnote disclosures influence non-professional investors' performance and ease of use perceptions in two types of tasks. Academic researchers and regulators recognize the importance of footnote disclosures in providing contextually relevant information about the financial statements to investors (Schipper 2007; FASB 2012). However, non-professional investors anchor on specific aspects of the financial statements and do not fully incorporate information contained within the footnote disclosures into their assessments about the performance of the company (Hodge 2001; Dull et al. 2003; Hirst et al. 2004; Hodge et al. 2010). Although prior studies have found that applying technology-based presentation format attributes to financial statement and footnote disclosure information alters the way in which non-professional investors acquire, store, and evaluate information about firm performance (Hodge 2001; Dull et al. 2003; Hirst et al. 2004; Hodge et al. 2010), research on footnote disclosures has primarily focused on manipulating information content or presentation of the content contained within the disclosure itself. In this study I examine whether location characteristics of the presentation format influence investors' information processing.

This topic is timely and relevant as the Financial Accounting Standards Board (FASB) employs continuous efforts to improve the effectiveness of disclosures in notes to the financial statements. In 2012 the FASB released its Disclosure Framework for comment. One of the frequent criticisms highlighted about format and organization of the footnote disclosures was that "the relationships between the disclosures and financial statements are difficult to understand" (FASB 2012, p52). The FASB elaborated by stating that sometimes information about a particular line item is sometimes included in different footnote disclosures or irrelevant information is included in the same footnote because it discusses the

same accounting topic. Commenters have also criticized the order of the footnote disclosures indicating that the order is not always logical or does not indicate the relevance of the information contained within the footnote disclosure.

Furthermore, the discussion of increased readability and communication of financial disclosures in print and online is not new to standard setters. In 1998, the Securities and Exchange Commission (SEC) released *A Plain English Handbook* for the purpose of providing "well-established techniques for writing in plain English to create clearer and more informative disclosure documents" (SEC 1998, p. ii). More recently the SEC issued Interpretive Release 34-58288 Commission Guidance on the Use of Company Websites to provide guidance on information presented on company websites (SEC 2008). This release discusses several topics ranging from "whether and when information is 'public'" with regards to Regulation FD, hyperlinks to third-party information, and interactive web site features, among other topics. Although the SEC sought public comment on the matter, for the most part academics were relatively quiet. In SEC Interpretive Release 34-58288 the SEC states (SEC 2008, p. 40):

> "We believe that it is important to provide guidance that will promote robust use by companies of their web sites. One example of such robust use is making the company web site interactive. We note that companies are increasingly using their web sites to take advantage of the latest interactive technologies for communicating over the internet with various stakeholders, from customers to vendors and investors."

Since its release in 2008 there has been little research devoted to exploring technological innovations that can make financial statements more useful for investors. In this study, I examine the effect of alternative presentation formats on non-professional investors' judgments and decision-making. More specifically, I investigate the efficacy of alternative techniques of presenting footnote disclosures using Web technology to potentially overcome investors' cognitive and memory limitations that may hinder the utility of the standard footnote disclosure method.

Understanding the effects of alternative display formats is important because non-professional investors do not always attend to information contained in footnote disclosures (Hodge 2001; Dull et al. 2003; Hirst et al. 2004; Hodge et al. 2010). Investors have been shown to weigh information differently

depending on how and where the information is presented and such weighting can lead to biased decisions (Maines and McDaniel 2000). Financial statements and footnote disclosures are used to predict future operating cash flows and firm value (Dechow 1994; Barth et al. 2001; Ohlson 2001). Investors are assumed to make rational decisions based on the information presented in the financial statements and related footnote disclosures; however, if the presentation format of accounting information results in discrepancies in the perceived future cash flows and value of the company by non-professional investors then greater variation of the price of a firm's stock will result. Prior research has also shown that certain technologies can aid financial statement users' decision making (Hodge 2001; Dull et al. 2003; Hodge et al. 2004); however, the improvement does not always come without a cost.

1.2 Research Design

Using data from non-professional investors, as proxied by Amazon Mechanical Turkers with investing experience, I examine the information processing effects of two footnote disclosure presentation format attributes – display proximity and signal-to-noise ratio - while controlling for information content using a 2 x 2 between-participants experimental design. Display proximity is defined as "how close together two display channels conveying task-related information lie in the user's multidimensional perceptual space" (Wickens and Carswell 1995, 1) and is manipulated at high and low levels. Signal-to-noise ratio is the rate at which observers distinguish diagnostic information (signal) from non-diagnostic information (noise) and is manipulated using a high signal-to-noise ratio and a low signal-to-noise ratio. Information processing effects are measured both as performance on the task as well as the investors' perceptions of ease of use and usefulness of the format.

Using a computerized presentation, the four experimental condition comprise: (1) low display proximity, low signal-to-noise, which is similar to the current portable document format (PDF); (2) high display proximity, low signal-to-noise, which presents the full financial statements to the left of the screen and the full footnote disclosures to the right of the screen; (3) low display proximity, high signal-to-noise,

which presents one note at a time below the full financial statements; and (4) high display proximity, high signal-to-noise ratio, which presents one footnote at a time to the right of the full financial statements.[1]

Information contained within the disclosures are not able to be recognized in the financial statements themselves such as the case with accounting policies, while others expound upon information already contained in the body of the financial statements (Schipper 2007)

An integrative (investing) task and a non-integrative (recognition) task are used to examine whether the effect of presentation format on investor information processing differs depending on task type. The integrative task requires participants to acquire and process information from multiple information sources to perform a single task. Operationalized as a stock investing decision, participants are asked to read financial statements and related footnotes and decide whether and how much to invest in the hypothetical company. Information acquisition and processing from a single information source is required for the non-integrative (recognition) task. Participants are asked a series of questions designed to test their recognition of specific information about each of the footnotes. Each task has different primary dependent variables, as the nature of the tasks is different.

Participants are first asked questions regarding their demographics prior to being assigned to one of the four conditions and one of the two task types.[2] After providing demographic information participants are provided the balance sheet, income statement, and footnote disclosures of a hypothetical pharmaceutical company. The information content of both the financial statements and the footnotes is the same for all participants. The proximity of the footnotes to the financial statements and the number of footnotes presented simultaneously is the only difference between conditions (in addition to the task type). Although the balance sheet and income statement provide an optimistic outlook on the company,

[1] See Figure 2 for a visual depiction of the four conditions and see the Method section for a discussion of Figure 2.

[2] Reips (2002) provide evidence that participants who provide demographic information at the beginning of an Internet study are less likely to drop out and also found to provide more complete responses. Although the experimental design manipulates three variables – display proximity, signal-to-noise ratio, and task type, the dependent variables of two task types are different. Thus direct analysis of participants' performance on the task is difficult. As a result, differences in outcomes of the task types are discussed but direct statistical comparison is not used and results in a 2 (display proximity) x 2 (signal-to-noise) experimental design.

the footnote disclosures reveal that the increasing income and strong balance sheet may be short lived. Investors that rely more heavily on the financial statements will perceive the company to be a stronger investment than investors that incorporate more information contained in the footnote disclosures. After viewing the financial statements and footnotes, participants are asked two anchoring questions about the financial statement information. Participants in the integrative/investing decision task are then asked to respond about the likelihood they would invest in the company. Participants in the non-integrative/recognition task are asked a series of eight multiple-choice questions about the eight footnotes they viewed. After these primary dependent variables are completed, all participants are asked a series of questions regarding their perceptions current year and future performance of the company as well as perceptions of ease of use and usefulness of the presentation format.

The primary dependent variable in the integrative/investing task is participants' willingness to invest the company. This variable is measured using two related, but separate, questions. First they are asked whether they would invest an entire $5,000 in the company and their confidence in that decision. They are then asked the percentage of $5,000 they would invest in the hypothetical company and their confidence in that decision. Given that the information content is the same for all participants, differences in the likelihood of investing the entire sum and the portion of a sum they are willing to invest are due solely to information processing differences caused by presentation format variation. The primary dependent variable in the recognition task is the number of footnote details recognized out of the eight footnotes. This count variable is expected to be equal across conditions if presentation format has no effect on non-professional investors' information processing abilities.

Secondary dependent variables are measured after the primary dependent variables. Participants in all conditions and all tasks are asked about the perceptions of the company's current fiscal year earnings. They are then asked about their expectations of the company's earnings in three years. From these two variables a third variable is calculated as the difference between participants' current and future earnings perceptions. This variable measures whether participants' view the company outlook as positive or negative.

Lastly, participants answer twelve questions about the ease of use and usefulness perceptions of the presentation format. Adapted from the Technology Acceptance Model, these questions are designed to assess participants' acceptance and usage of technology (Venkatesh 2000). Libby and Emett (2014) state that performance will not be affected if the underlying information content remains the same. However, users of a technology may find a particular technology easier to use than another technology. This study also examines whether perceived ease of use and perceived usefulness will change separately from performance.

Recall that the hypothetical company's financial statements present increasing income and cash flow but that the footnote disclosures reveal cautionary language about the future earnings of the company. Thus, investors that incorporate more footnote disclosures into their judgments will be less willing to invest in the company than those that integrate less footnote information into their judgments. Using Proximity Compatibility Principle and Signal Detection Theory, I hypothesize that a high display proximity, high signal-to-noise presentation format will cause investors to integrate the footnote information with the financial statement information thereby eliciting lower likelihoods of investing in the hypothetical company. That is, when non-professional investors view footnote disclosures one at a time beside the related financial statement line items they are better able to incorporate that negative information into their judgments and decisions than when footnotes are viewed below or inline with the financial statements. Conversely, simultaneously viewing multiple footnotes located further away from the financial statement line items, similar to the traditional PDF format, causes investors to integrate the least amount of negative information into their judgments.

Furthermore, based on Proximity Compatibility Principle and Signal Detection Theory, non-professional investors are predicted to recognize the greatest number of details from the footnotes using the low display proximity, low signal-to-noise presentation format. Stated differently, when investors use the traditional PDF-type format of the financial statements and footnote disclosures they will recognize more footnote details than non-professional investors using other presentation formats. That is, viewing footnote disclosures one at a time and in close proximity to financial statement information is expected to

decrease non-professional investors' acquisition and retention of footnote information in the recognition task. This expectation is due to the close proximity of the footnote disclosure to the related financial statement line item and the decreased distraction from non-diagnostic information about the line item increasing the participants ability to combine the information in the footnote disclosure with the information in the financial statement line item.

Although the performance on a particular task may be improved by altering the presentation format, if investors find the format difficult to use then they will not use the presentation format. Non-professional investors may also find that a particular format is easy to use although it does not improve performance. I hypothesize that the easiest format to use is the high display proximity, low signal-to-noise variation, as this format presents the most information on the screen and the lowest information access cost to participants. Conversely, participants in the low display proximity, high signal-to-noise condition must scroll to the bottom of the page for every footnote they wish to view. In addition, those participants must scroll up and down the page between the footnote and the financial statement line item to integrate the information. The information access cost associated with this format is expected to result in participants perceiving this format to be the least easy to use and the least useful on their task.

1.3 Results and Contribution

Contrary to my hypothesis, results indicate that non-professional investors do not benefit from viewing single footnote disclosures in close proximity to the related financial statement line items on investing tasks. Instead, non-professional investors benefit most from viewing information about the financial statement line item with all other footnote disclosures displayed simultaneously, even though those additional footnote disclosures are not directly related to each other. I performed an additional test to determine whether participants' outlook on the company is significantly more or less optimistic finding a significant effect only for signal-to-noise ratio but not for display proximity. Participants who viewed the footnotes simultaneously rated their perception of future earnings lower than their perceptions of current earnings whereas participants who viewed footnotes individually rated their perceptions of the

company's future earnings as *higher* than their perceptions of current earnings. In other words, participants viewing notes simultaneously on the screen appropriately believed the company's outlook to be negative but participants viewing notes individually inappropriately perceived the company's outlook as positive, the opposite of my hypothesized directions.

My second hypothesis predicting that participants viewing a low display proximity, low signal-to-noise presentation format would recognize a greater number of footnote details was not supported. Evidence exists to support a main effect for signal-to-noise ratio such that those participants viewing all footnotes simultaneously on the screen recognized more footnote details than those who viewed the footnotes individually. Lastly, my hypotheses predicting differences in perceptions of ease of use and usefulness between conditions are not supported. Controlling for time, no one presentation format was evaluated as more usable than all others and in additional analysis, no main effects or interactive effects were found to be significant.

My results can be useful for both practice and theory. My findings show that non-professional investors make more conservative investing decisions using an online presentation format consistent with a traditional paper format in that the information is displayed in a singular column with all footnotes in the users' field of view. Although some prior research has found benefits to using other web-enabled technologies, this study finds that presenting footnote disclosures beside the related financial statements does not offer an improvement in investor judgments nor is there an improvement in perceptions of ease of use or usefulness – two predictors of acceptance and use of a technology. Thus, regulators seeking to improve investor judgments regarding footnote disclosures should consider that such technological aides may be of limited benefit, although requiring costs to implement.

The remainder of the paper is organized as follows. Section II provides background information on non-profession investors, reviews presentation format literature, and overviews applicable theory. Section III develops the hypotheses. The experimental method is described in Section IV. I discuss the results of my research in Section V. I conclude and discuss implications of my research in Section VI.

2.0 BACKGROUND AND LITERATURE REVIEW

In this section, I provide background information on non-professional investors and their importance to the capital markets as well as errors and biases found among non-professional investors in academic research. Then I discuss the importance of footnote disclosures and the inability of investors to fully incorporate the information contained within those disclosures into their judgements and decisions. I follow that discussion with an overview of the presentation format literature and discuss theory adapted from the human factors literature.

2.1 Non-professional Investors

Non-professional investors[3] are a significant part of the capital markets. According to ICI/SIFMA (2008), 52.2 million households (45 percent) owned shares of publicly traded stocks in 2008 - of these households, 16.2 million held stock outside of employer-sponsored plans and 28 million (51 percent) of those households holding stocks and/or bonds use the Internet to obtain financial information (ICI/SIFMA 2008). In Australia, over half of individuals own stock – either directly or through funds (Clark-Murphy and Soutar 2004).

Non-professional investors tend to underperform as compared to the market as a whole and exhibit over-reliance on past performance (Barber et al. 2009; Barber and Odean 2011). Barber and Odean (2000) use a dataset of 78,000 investors to analyze trades, positions, and demographic data on the investors, finding that households underperform the market by almost seven percentage points. Further, finance and accounting studies have shown that non-professional investors are subject to several problems: limited

[3] Non-professional investors are defined as any investor that does not primarily earn an income from their investing activities, either through investing for themselves or investing on behalf of other individuals or entities. Specifically in this study, a non-professional investor has traded stocks within the last two years for personal

attention, functional fixation, overconfidence, bias, and under-reaction as well as others (Dietrich et al. 2001; Hirshleifer and Luo 2001; Daniel et al. 2002; Peng and Xiong 2006; Barber and Odean 2008; Kliger and Kudryavtsev 2010; Loh 2010; Louis and Sun 2010; Hirshleifer et al. 2011; Vozlyublennaia 2014). These problems result in systematic mispricing and resource misallocation (Daniel et al. 2002).

Several studies have examined investor inattention using a variety of methods. Given that attention is costly and effortful, investors must choose how much attention and where to allocate that attention. DellaVigna and Pollet (2009) found that an underreaction to Friday earnings announcements is due to investor inattention. Similarly, Hirshleifer et al. (2009) found that investors underreact to earnings news when more same day earnings announcements are made by firms. This effect is stronger with unrelated industry news and large earnings surprises. Hirshleifer et al. (2011) follow their prior study by creating a model that explains under- and overreaction to earnings component due to investor limited attention. These studies taken together show that investor inattention causes the mispricing of assets in the capital markets.

Non-professional investors also tend to be over-confident. Barber and Odean (2002) examined investors who switched from phone-based trading system to an online based trading system. They found that prior to the switch the investors beat the market on average by 2 percent but trailed the market by 3 percent after switching to the online trading system. They attribute this negative swing to overconfidence and not to the characteristics of online trading (e.g., lower trading costs, execution speed, and ease of access).

2.2 Footnote Disclosures

Accounting information is used to predict future operating cash flows and firm value (Dechow 1994; Barth et al. 2001; Holthausen and Watts 2001; Ohlson 2001). Footnote disclosures are a critical

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investing purposes. Non-professional investors have also been referred to as individual investors, retail investors, and novice investors in prior literature.

component in understanding the financial status of a company; however, non-professional investors tend to fail to focus on information contained in footnote disclosures (Hodge and Pronk 2006).

The FASB, concerned with the relevance of footnote disclosures, invited comments for market participants in 2012 (FASB 2012). The feedback requested ranged from reporting entities' decisions about disclosure relevance to disclosures about industry specific accounting policies as well as interim financial statements. Chapter 5 for the Disclosure Framework asked four questions related to the format and organization of footnote disclosures, specifically (FASB 2012, 3):

- Would any of the suggestions for format improve the effectiveness of disclosures in notes? If so, which ones? If not, why not?
- What other possibilities should be considered?
- Do any of the suggested methods of organizing notes to financial statements improve the effectiveness of disclosure?
- Are there different ways in which information should be organized in notes to financial statements?

This study aids the FASB in answering these questions. While prior literature has focused on various categories of presentation independent of technological solutions, this study provides evidence as to whether presentation format technology can aid non-professional investors in improving the effectiveness and organization of footnote disclosures.

2.3 Presentation Format

Accounting researchers have examined the effects of presentation format on investors' perceptions in various ways. Attention to presentation format issues has only recently received regulatory attention (SEC 1998, 2008; Libby and Emett 2014). As a result only a handful of research studies have examined issues related to narrative attributes (Rennekamp 2012). Libby and Emett (2014) classify presentation format effects into three categories: disaggregation (e.g., horizontal presentation of segments, locations, and products or vertical disaggregation as in earnings amounts), location in the financial statements (e.g.,

recognition versus disclosure and if disclosed, in which statement) or narrative attributes (e.g., readability, medium, timing). Libby and Emett (2014) discuss the mechanisms in which presentation format affects security pricing. While disaggregation and location are said to affect information content directly and indirectly, respectively, which in turn affects prices in efficient markets, narrative attributes affect only ease of use. However, Libby and Emett (2014) go on to say that stock price can be influenced by presentation format if the format's ease of use affects the decision of a sufficient number of users.

The current study examines the attributes of the medium through which accounting information is presented. While Libby and Emett (2014) focus on the medium itself in their review of the literature (e.g., text versus video in Elliott et al. (2011b), Wheeler and Arunachalam (2009)), other accounting researchers have focused on the attributes of online delivery (Hodge 2001; Dull et al. 2003; Hodge et al. 2004; Hodge and Pronk 2006). Much of the early presentation format literature examined hypertext linking and search facilitation techniques that had become popular with the use of hypertext markup language (HTML) formatted online statements in the late 1990s.

Hodge (2001) was the first to examine whether linking information from one location to another location in an online reporting environment affects investor judgments. In his experiment using MBA students as participants, he examined whether using hyperlinks to traverse between documents that are audited versus those that are not audited affects investors' ability to classify financial information as being audited or unaudited. He finds that investors judged the earnings potential of the company to be higher when viewing financial statement information online than when viewed in hardcopy (i.e., PDF). In addition to the different judgments about future firm performance, investors tend to misclassify unaudited documents as audited documents when they are hyperlinked to audited financial statements and judged the unaudited information as more credible. In an effort to address this drawback of hyperlinking financial statements, Hodge found that by labeling the financial statement data as audited and unaudited, participants were better able to classify the information, assess the credibility of the information, and assess the firm's future earnings. In this experiment, Hodge found that by linking (reducing display proximity) users integrated the information, though inappropriately.

Dull et al. (2003) examine the effect of hyperlinking financial statement information to the related footnote disclosures on directive and sequential searches in financial statement analysis tasks. Using undergraduate students, they found that for small, not large, companies the participants' judgments about future net income estimations were greater for the unlinked format than when the financial statements were hyperlinked to the related footnote disclosures.[4] Given that the Dull et al. (2003) study was exploratory in nature, the types of companies were not controlled. The large company was more complex and had 29 notes whereas the smaller company had only 15 notes. Another key difference in the outcome of their study was that the notes were not referenced on the face of the financial statements of the unlinked condition related to the smaller company. Thus the only reminder that the notes were available in the smaller company was the hyperlink available to participants in the hyperlink condition. In contrast, the large company had references to notes in the financial statements in both the linked and the unlinked conditions. Not surprising, there was no difference in the number of notes accessed between the linked and unlinked groups viewing the financial statements of the large company but participants viewed significantly more notes in the linked condition of the small company than in the unlinked condition – likely due to the difference in prompting. In addition, participants in the hyperlinked condition used more information and spent longer on their judgments than those in the unlinked condition. This design difference between the large and small companies may explain the difference in perceptions observed between companies. In other words, when users are prompted that footnote disclosures are available, regardless of whether hyperlinking is enabled, the their judgments do not differ between groupsi.e.,.

My research extends the presentation format literature by examining whether the effects of display proximity differ for task type, specifically, integrative and non-integrative tasks. Furthermore, eXtensible Business Reporting Language (XBRL) has expanded the capabilities of online information delivery

[4] Dull et al. (2003) explain that the difference in results for the big and small companies is likely due to several reasons. The size of the companies, number of notes, accounting complexity, and relative stability may influence participants' decisions to some degree. One of the most substantial differences is that the large company referenced the notes on the face of the financial statements in both conditions whereas the small company only referenced the footnotes for the linked condition. Thus the reason the small company produced an effect may well be attributed to the design issue between conditions.

through the use of tagged financial statement data. XBRL allows companies to tag financial data once so that the data can be viewed in many different ways. Currently footnote disclosures are not tagged in such a way that they show any relationship to the related financial statement line items. The current XBRL tagging framework does not allow the opportunity to link directly from the financial statements to the related footnote disclosures under the current standards. However, potential opportunities exist for companies to tag footnote disclosures to allow XBRL viewer vendors to customize the viewers so that end users can select the presentation format of footnotes to their preference. The results of my study will help companies decide whether or not tagging footnotes will be more beneficial than costly.

2.4 Proximity Compatibility Principle

Proximity Compatibility Principle (PCP) addresses "where information sources should be placed with respect to one another" (Wickens and Carswell 1995). PCP states that "the integration demands of the task should always drive the visual configuration chosen by the display designer" (Carswell and Wickens 1996). The visual configuration refers to the display (or perceptual) proximity of the items in the observer's field of view. The integration demands of the task are driven by the processing (or mental) proximity inherent in the task. Thus the compatibility of the display proximity and processing proximity is central to PCP, and is dependent on the task.

Processing proximity is "the extent to which two or more sources are used as part of the same task" (Wickens and Carswell 1995, 474). Two sources that need to be processed independently (i.e., singularly processed) are said to have low processing proximity. Two sources that need to be integrative (i.e. jointly processed) have high processing proximity. Further, PCP decomposes processing proximity into three categories: integrative processing, non-integrative processing of similar tasks, and non-integrative processing of dissimilar tasks.

Integrative processing requires two sources of information to be combined in order to make a judgment or decision. Integrative processing can be divided into computational integration, in which two sources of information are mathematically combined (i.e., net income is a mathematical derivation of

revenue less expenses), or Boolean integration, in which two sources of information must meet Boolean logic (i.e., likelihood of risk [high, medium, low] is combined with monetary impact [i.e., above a specified dollar threshold] to determine risk assessment).

Non-integrative processing of similar tasks describes processing information that shares a particular attribute or set of attributes however the task does not require those two information sources to be integrated to reach an overall judgment or decision. The information sources may share one or many similarities: metric similarity, statistical/covariance similarity, functional similarity, processing similarity, and/or temporal similarity. Table 1 illustrates the features of non-integrative processing of similar tasks.

Table 1. Features of Non-Integrative Processing of Similar Tasks

Feature	Non-accounting example	Accounting Example
Metric Similarity	Two displays of gas pressure	Revenues and Expenses
Statistical similarity	Pitch and bank	Gross revenue and operating income
Functional similarity	Indicators of a specific type	Financial Notes or Financial Statements
Processing similarity	Two tracking tasks sharing identical dynamics	Profitability ratios
Temporal similarity	Driving and looking at a map	Research stock and responding to email

The last category of processing proximity is non-integrative processing of dissimilar tasks. This encompasses tasks in which there is no interaction between information sources or processing mechanisms. These tasks may be performed concurrently or independently. An example is talking while driving. The scope of this paper does not encompass judgments and decisions of dissimilar tasks since such tasks are rare in accounting and no further consideration will be given to this category of tasks.

PCP suggests that the mental proximity of the task should drive the display proximity. Display proximity can be defined on several dimensions (Wickens and Carswell 1995). Spatial proximity, that is, the distance of one information source to the related information source(s), is a large component of display proximity. Connections between two information channels that guide users' attention and tracking increase display proximity. Source similarity refers to the way information is presented. Examples may

include presenting the information using a particular color to represent a variable or information source being communicated or by using the same axis for multiple information sources.

While source similarity addresses the format similarity of the information presented, code homogeneity addresses whether the information being presented communicates different meaning about the information source. Wickens and Carswell (1995) illustrate this difference by stating "a feature of a bar chart, such as its color, may indicate that the bar represents temperature, whereas the height of the bar is the code for the actual temperature value." In addition, creating "objectness" by adding line segments that connect information sources or enclose information channels as one object instead of multiple objects (e.g., the use of connecting lines in graphical displays of statistical results creates greater display proximity) may also increase display proximity. Lastly, configuration of the information sources so as to represent a new pattern in the user's field of view also increases display proximity. Configuration is a combination of both spatial proximity and arrangement of the information. Of relevance to the current study are spatial proximity, object integration, and configuration.

Display proximity increases as spatial proximity increases by allowing resources to focus on the integration task. Often integration of two or more sources of information requires a multi-step process and users are limited by their working memory (Miller 1956). Further, users have a limited amount of time to retrieve and encode the requisite information prior to performing mathematical or Boolean computation using the stored information (Baddeley 2001). Increasing the spatial proximity of the information sources allows users to retrieve and encode the information more effectively because they will not have to use additional cognitive resources to search for the information.

In a marketing context, DelVecchio et al. (2009) examine price estimation judgments of shoppers by manipulating spatial proximity and discount frame (percent off or revised price condition). Spatial proximity was manipulated by placing the discount next to the original price, which was below the product) or placing the discount above the product. Overall their results show that placing a discount in close proximity to regular prices results in participants making more accurate price estimates.

While certain features enhance display proximity, other features decrease display proximity as there is an information access cost associated with visual search and time required. For example, physical movement increases the need to refocus on relevant information; however, refocusing attention has a cost. While the demand of physical movement is somewhat limited in a single computer screen, the information access cost of moving back and forth between screens on the same screen as well as the time required to scroll from one part of the screen to another increases the information access cost. Related to the time needed to access different locations on the screen is the user's need to locate the information within the narrow range of a section of the screen. The visual clutter on the screen disrupts the visual search process and increases information access costs. Visual clutter may be considered to be non-diagnostic information unrelated to the other information sources that must be integrated.

As an example, the user might be aware that the information needed to make a decision is located near the bottom of the screen. The user then must scroll to the area where the information is expected. Once in the approximate location the user must scan the area for the relevant information needed. Different aspects of display proximity can address the different costs associated with information access. Reducing the spacial proximity by placing information closer on the screen can reduce the amount of scrolling required and in turn reduce the information access cost. Similarly, color-coding the information in the requisite part of the screen, a type of source similarity, helps the information become more salient during the user's information search process.

Wickens and Carswell (1995) suggest that information access costs affect integrative tasks more than independent tasks due to the additional load on working memory. In effect, limits to working memory result in competing demands on cognitive resources in which the user must allocate effort both to information processing as well as information acquisition. As an illustration, Barnett and Wickens (1988) examine users' judgments about whether to continue or abort a flight using a specified number of cues. For each cue, participants were given two pieces of information about the cue: the reliability and the diagnosticity. A third construct, information worth, was derived from the multiplicative combination of these two pieces of information. Because the decision to continue or abort the flight is determined by the

participant's ability to weight multiple cues (i.e., multiple information sources), this task is an integrative task.

In addition to the integrative task in Barnett and Wickens (1988), the participants were also asked at random points during the study to recall specific information from the display screen. The participants saw prompts asking for the reliability of weather or the diagnosticity of fuel. While the continue/abort flight task requires this information to be integrated to derive a judgment about whether to continue or abort the flight, the recall task requires non-integrative processing of similar tasks as the reliability and diagnosticity cues contain metric similarity. In other words, Barnett and Wickens (1988) asked their participants to perform an integrative and non-integrative task.

In order to determine whether the display proximity affects processing proximity under different task types, Barnett and Wickens (1988) provided four cues arranged in three different display formats. The first display format was a bar graph containing the reliability and diagnosticity values side by side for each of the four information cues (e.g., fuel, headwinds, engine temperature, and enemy intentions). The second display format was a rectangle that represented diagnosticity along the length of the rectangle and reliability along the height of the rectangle. In essence, more weight should be given to cues that have larger area (height times width). The final display format also used rectangles to represent diagnosticity and reliability; however, the four rectangles (representing the four cues) were combined into one large rectangle. These three formats – bar graph, rectangle format, and integrated rectangle format – illustrate low to high proximity, respectively, as each format becomes more integrated.[5]

In addition, to the variation in spatial proximity, Barnett and Wickens (1988) also varied display proximity by physical location on the screen (either repeated the cues in the same location or varying the location on the screen) and by time (1 second versus 4 seconds).

[5] In this particular case the rectangle represents "objectness". By adding line segments that connect diagnosticity and reliability and by further enclosing information channels as one object instead of multiple objects (i.e., one large rectangle contain the four rectangle cues rather than individual and separate rectangles for each of the four cues), the display proximity is increased.

Barnett and Wickens (1988) find a main effect of display format for the integrative task in which the correlation between participants' responses and the optimal response was greatest for the two rectangle formats when compared with the bar graph. In addition, they find a main effect with display format as the displays that are closer in time and space result in a higher correlation between the actual participant score and the optimal score. For the non-integrative task, they found no association between display format and the proportion of cues recalled.

The use of PCP to explain phenomena in accounting is sparse. The first major experiment was Hodge et al. (2010) who examine the role of proximity and feedback on non-professional investor forecasts. They find that non-professional investors are better able to integrate information from multiple sources and learn patterns when the information is more closely displayed than when the same information is dispersed over multiple pages. In addition, non-professional investors show less absolute forecast errors and forecast dispersion in the high display proximity condition relative to the low display proximity condition.

My study differs from Hodge et al. (2010) in that their study examines high proximity as information contained on the same page and low proximity as information contained on separate pages. My study defines high and low proximity on the basis of spatial proximity, information access cost, and non-diagnostic information. In addition, the task in Hodge et al. (2010) requires the participants to forecast Year 2 cash flows from operations and non-cash, current net operating assets for 16 companies, while my study examines two task types and has task type as a major component. Hodge et al. (2010) have a learning component as they provide either limited or detailed feedback after each of the 16 predictions.

2.5 Task Type

A key component in PCP is the role of the task. Tasks are defined as high processing proximity (e.g., mental proximity) or low processing proximity based on the extent to which two or more sources of information are used as part of the task. Therefore, a high proximity task is a task that requires the

integrative processing of multiple sources of information and conversely a low processing proximity task utilizes dissimilar sources for independent processing.

My study uses both a high processing proximity task and a low processing proximity task. Similar to Barnett and Wickens (1988), my low processing proximity task requires participants to recall specific items about the financial statements and the related footnote disclosures. The information participants are asked to recall contains metric similarity, as they are measured in US dollars; statistical similarity, as many items will covary over time (i.e., there is a statistical relation between net income and revenue); and functional similarity, the information is either part of the financial statements or the related footnotes of the same company. In essence, participants are asked to recall information sources that are similar; however, those information sources have little direct relation with the other information sources in the recall task.

A high processing proximity task requires both computational and Boolean integration. In this study, participants are asked whether they would invest in the hypothetical company presented in the case. The decision to invest in the company requires that the participant read the financial statements and related footnote disclosures. The financial statements are represented in such a way that the company appears to be performing well. However, the footnote disclosures reveal information that should signal to the investor that the company's past performance may not be indicative of future performance. In other words, if the investor fails to incorporate all relevant signals from both the financial statements and the footnotes then the investor will likely make a suboptimal judgment about the company's future financial prospects. Since this task requires the investor to assimilate multiple sources of information it is categorized as an integrative task (i.e., high processing proximity task).

2.6 Signal Detection Theory

Many accounting tasks require a participant to discern whether a piece of information is relevant to the task at hand. Signal Detection Theory (SDT) addresses an observer's ability to discern an information signal from the surrounding background noise in diagnostic tasks (Green and Swets 1966; Swets 1996;

Ramsay and Tubbs 2005). SDT requires two cognitive processes: discrimination and decision. The first process requires the observer to determine the degree to which the information is a signal (versus noise) (Swets 1996). The second process, decision, is the observer's assessment of the strength of the signal.

The Yes-No decision can be visually depicted in a 2 x 2 box. As an illustration, suppose that an investor must determine whether a footnote is relevant to their decision about the future prospects of the company. The investor may ask the question "Is the financial future of the company positive?" To answer this question, the investor may read through the financial statements and accompanying footnote disclosures. The investor must decide whether each piece of information (e.g., footnote disclosures) provides a signal as to the company's future prospects or whether it does not. Table 2 illustrates the investor's choice.

Table 2. Yes / No Decision Matrix

		Actual State	
		Signal	Noise
Observer Judgment	Yes (relevant signal)	Hit	False Alarm
	No (irrelevant signal)	Miss	Correct Rejection

Across the top is the true state of the information about the company: yes, the stimulus signals information about the future state; or no, the stimulus does not signal information about the future state (i.e., the stimulus is noise). The left hand column represents the investor's responses to the stimulus. Just as the case with the top rows, the investor either believes the information to be a signal or the investor believes the stimulus to be noise. A 'hit' represents when the investor accurately detects that the stimulus is a signal about the future state. A 'miss' represents a decision in which the investor fails to detect an accurate signal about the future state of the company. A 'false alarm' is an affirmative response by the investor when, in fact, the stimulus does *not* provide any information about the future state of the

company. Conversely, a 'correct rejection' is when the investor accurately determines the stimulus to be noise; in essence, it is of no value to the investor's decision.

A basic objective of financial statements and the accompanying footnote disclosures is that they be relevant. However, many non-professional investors do not adequately identify more relevant footnote disclosures from less relevant footnote disclosures. In the context of SDT, non-professional investors lack sufficient ability to discriminate the signal of a relevant footnote from the noise of a less relevant footnote as well as decide the weight of that signal.

In the case of an investor performing an investment decision task, the ability of the investor to discern whether a piece of financial information is a valuable signal regarding future financial prospects is dependent not only upon the investor's knowledge but also their ability to distinguish the signal from the noise (i.e., discrimination) and their ability to weight the financial information appropriately (i.e., decision). SDT proposes that a higher signal-to-noise ratio is better able to convey relevant information than a low signal-to-noise ratio (Egan 1975; Swets 1996). In my study, I manipulate the signal-to-noise ratio at two levels: high signal-to-noise ratio and low signal-to-noise ratio. The high signal-to-noise ratio condition presents the footnote disclosure that the participant wishes to view one at a time. The participant must click on the note name next to the line of item of interest and the footnote disclosure will open either beside (in the high display proximity condition) or below (in the low display proximity condition) the financial statements. The low signal-to-noise ratio condition presents all footnote disclosures simultaneously either beside or below the financial statements depending on the display proximity condition. Investors in the high signal-to-noise condition are hypothesized to recognize the signal more frequently than investors in the low signal-to-noise ratio condition.

The investing task requires investors to read footnotes that provide additional information about specific line items in the financial statements. Although the note number is indicated next to the financial statement line item, the investor is required to focus solely on that footnote as they use the information contained within the note to adjust their future expectations of the financial statement line item. If investors become distracted by notes that are unrelated to the line item they are analyzing then the ability

of the investor to integrate the footnote information into their judgments of the future performance of the company is compromised. Therefore, the less non-diagnostic information viewable on the screen at a given time the greater the viewer's ability to integrate the information into their judgments.

2.7 Presentation Format Usability

As discussed in the prior section, alternative presentation formats have the ability to improve non-professional investors' judgements and decisions. However, the adoption of a new technology may be met with resistance – especially if users are accustomed to viewing information in a particular way, such as financial statements and footnotes. Therefore, an important aspect of introducing a new technology is to understand whether users are willing to accept the technology and, in turn, use the technology for the purpose it was designed. The Technology Acceptance Model (TAM) describes the relationship between how well system users perceive the system as easy to use and the extent to which they actually use the system (Davis 1989; Venkatesh et al. 2003). TAM posits two primary constructs influence users decisions in how and when they use a new technology: perceived usefulness and perceived ease of use.

Perceived usefulness "is the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989, 320). This construct provides insight as to whether the user believes that the technology would benefit the user if incorporated into the task. Thus a user with high perceived usefulness about a particular technology believes that the user would benefit greatly in the performance of their job. Perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort" (Davis 1989, 320). The greater a user's belief about whether the system would require less effort on their part, the greater the non-professional investor's willingness to use the system going forward.

It is important to note that TAM does not directly predict that performance increases as perceived usability increases (although an antecedent to perceived usefulness is output quality under (Venkatesh 2000)'s revised TAM 2). TAM does suggest that users' *perception* about whether it will improve performance and reduce effort will affect their intentions about using the system, which in turn predicts

non-professional investors actual use of the system (Davis 1989; Adams et al. 1992; Venkatesh et al. 2003).

Venkatesh and Davis (2000) and Venkatesh (2000) extend TAM to explain the determinants of perceived ease of use and perceived usefulness. Venkatesh (2000) states that anchors, adjustments, and experience influence perceived ease of use. Anchors are composed of constructs regarding control, intrinsic motivation, and emotion. These constructs are computer self-efficacy, perceptions of external control, computer anxiety, and computer playfulness. Although these are not measured directly in my study, extensive literature provides support for these determinants (Jackson et al. 1997; Hackbarth et al. 2003; Oh et al. 2003; Davis and Venkatesh 2004; Sun et al. 2010).

Venkatesh and Davis (2000) explain perceived usefulness in terms of subjective norms, image, job relevance, output quality, result demonstrability. Subjective norms are the individual's perception of those important to them that the activity or behavior should or should not be performed. Subjective norms influence individuals to adopt actions that they the individual themselves may not choose to perform yet they conform to the standards of those around them. A related construct, image, is not focused on whether one should perform an action based on others beliefs but rather the action is performed to enhance one's own standing. These two constructs are driven by an individual's perceptions of others, and while not directly measured, are likely to have little impact in an environment in which the actions and related decisions are performed in isolation from a group.

More pertinent to this study is job relevance, output quality, and result demonstrability. Job relevance refers to the match between the technology and the user's perception of its relevance to their job or task. Job relevance addresses the relation between the task and the technology (e.g., will I use the technology in my job) whereas output quality focuses on the user's perception of performance of the technology in that job or task (e.g., how well does the technology improve my performance on the job). Although output quality and perceived usefulness are related concepts, they have been shown to be distinct from one another in prior studies (Davis et al. 1992; Venkatesh 2000). Lastly, result demonstrability is a measure of whether the user can identify and attribute the positive performance in the job or task to the technology. If

a user's performance on a task increases but the user is not able to directly tie the increase in performance to the technology, then the user will in turn lower the user's perceptions of usefulness. Further, result demonstrability may explain why a technology has a positive effect on performance yet that technology fails to become adopted by users. Conversely, if users perceive a technology to be relevant to their job, important persons in their workplace believe the technology is important yet the individual does not perceive a strong result demonstrability, a technology may be adopted that has little to no effect on actual performance.

A firm that provides an alternative technology that has little or no effect on users' performance may still choose to do so the perceived benefit by the users is high. As perceived ease of use and perceived usefulness predict users' intentions to use the technology and their actual use of technology, additional benefits of implementation may accrue to the firm. With respect to the financial statements and footnote disclosures, users may increase their use of financial information solely due to the ease with which they can access, acquire, and process that information even if their actual performance does not change. Further, firms may have an incentive to increase website traffic for its own internal purposes. For these reasons it is important to understand how changes in presentation formats affect users' perception of ease of use and usefulness in assessing potential trade-offs between increased performance and actual usage.

3.0 HYPOTHESES DEVELOPMENT

3.1 Hypothesis 1a and 1b

Proximity Compatibility Principle (PCP) postulates that the display proximity of the information sources should match the processing (mental) proximity of the task. Processing proximity is defined as the extent to which multiple sources of information are required to be integrated as part of a task such that tasks requiring the integration of two or more sources or information are considered to be high processing proximity task. Thus the display proximity should be high for tasks requiring integration of multiple sources of information, such as the evaluation of an investment opportunity.

Higher display proximity reduces the users' need to store information in working memory. Information access costs decrease as their eyes and head move back and forth from one source to the other more quickly and easily. The closer the two sources are to one another, the less information is necessary to store in working memory since it reduces the search process. As a result of the lower working memory requirements, additional resources are available for higher level processing associated with the integration of information, which in turn results in better performance on integration tasks.

Signal Detection Theory addresses a person's ability to distinguish a signal (i.e., diagnostic or relevant information) that is present with background noise (i.e., nondiagnostic or irrelevant 'information'). This relationship is the signal-to-noise ratio. Thus, stronger signals will be more easily detected than weaker signals given similar noise in the environment. As users integrate information from one information source with information from another information source, they must selectively exclude information that is not relevant to the integration process. Presentation formats that present relevant information in a manner that reduces the irrelevant information and in turn increases the strength of the signal aid the user by removing the need to make the determination about whether the information is a signal.

In this study, signal is the relevance or diagnosticity of the footnote to a particular line item in the financial statements combined with the isolation of the footnote within the user's field of view. Thus a high signal-to-noise ratio is a signal that focuses the relevant footnote to the associated line item with minimal interference of non-diagnostic information from other footnotes. Note that this study focuses on highlighting the signal related to one specific line item for each footnote disclosure. In practice the relevance of the footnote could be emphasized by associating the footnote with multiple line items. As the FASB has noted, there is a weak link between the importance of the footnotes and the manner in which the footnotes are presented. Increasing the signal-to-noise ratio for relevant line items is one way to address this criticism.

Therefore, I predict that for the high processing proximity task (i.e., investing), non-professional investors viewing the financial information using high display proximity (footnotes presented to the right of the financial statements) and high signal-to-noise ratio (footnotes presented one at a time) will better incorporate the footnotes into their judgments and decisions than non-professional investors viewing the financial information using a low display proximity format or a high display proximity format but low signal-to-noise. The first result holds because high display proximity reduces the load on memory and high signal-to-noise ratio increases the overall diagnosticity of the information, thereby improving investment task performance. Given a company whose balance sheet and income statement reveal positive information but whose footnote disclosures reveal negative information, investors who incorporate more information from the footnotes into their judgments will evaluate the investment opportunity lower than those who integrate less footnote information.

H1a: Non-professional investors receiving a high display proximity, high signal-to-noise footnote presentation format will be less willing to invest in a company with footnote disclosures indicating poor future performance than non-professional investors receiving all other presentation formats.

When display proximity decreases, that is, when two sources of information need to be integrated move further from one another, viewers of the information must expend more cognitive resources in the information acquisition stage of information processing. These resources are spent moving between the two sources of information and tracking the location of the relevant information on the screen. The increased allocation of resources devoted to searching, tracking, and storing information in working memory results in less cognitive resources available for higher level processed necessary to integrate multiple sources of information and create new information that will be encoded and stored. As less information is integrated and stored, the performance on the task degrades.

Similarly, as a signal has less relevant and diagnostic information compared to irrelevant/non-diagnostic noise, users may have increased demands on searching for information and subsequently processing and classifying the information as diagnostic or non-diagnostic. The increased resources devoted to the search and classification process result in less cognitive resources available for the primary purpose of the integration task.

It follows that the low display proximity, low signal-to-noise condition will result in the worst performance on the integrative task compared to the other three conditions. Given that there are trade-offs between display proximity and signal-to-noise and that prior literature does not provide a solid foundation by which to determine whether high display proximity, low signal-to-noise presentation is more effective in the integrative task than low display proximity, high signal-to-noise presentation, no predictions are made regarding these two conditions other than they are expected to result in performance between the high display proximity, high signal-to-noise and the low display proximity, low signal-to-noise conditions. Thus I formally hypothesize the effect of the low display proximity, low signal-to-noise as follows:

H1b: Non-professional investors receiving a low display proximity, low signal-to-noise footnote presentation format will be more willing to invest in a company with footnote disclosures indicating poor future performance than non-professional investors receiving all other presentation formats.

3.2 Hypothesis 2

PCP distinguishes between the effects of display proximity under integrative and non-integrative tasks. Since integrative tasks require close mental (or processing) proximity, close display (or perceptual) processing proximity is best suited for integrative tasks. Non-integrative tasks do not required close mental proximity and are best matched with information sources that are not in close proximity to one another. Recall that a non-integrative task does not require the viewer to combine information from multiple sources in order to perform the task. In the context of footnote disclosures, users may recognize information from the footnote disclosures. As information is acquired in the non-integrative task, multiple sources of information presented on the screen do not provide any additional value to the user during execution of the task.

Signal-to-noise ratio is the ability to distinguish diagnostic information from non-diagnostic/irrelevant information. When performing a non-integrative task (e.g., recognition), there is less comparing and distinguishing relevant from irrelevant information. Each piece of information is processed separately and each piece of information has an equal weighting in the performance of the task. Thus comparatively signaling some pieces of information relative to others creates an artificial importance of that 'signal' over other independent information that has an equal amount of importance to the task, resulting in a decline in task performance.

Further, in order for the signal to be displayed the user must place the cursor on the note name and select the note. To remove the note from the screen they must close the footnote box or select a new footnote for display. This process of selecting and deselecting notes increases the information access cost related to the non-integrative task since there is no additional performance increase from the increased effort.

Therefore, a high display proximity format provides no additional value and may decrease the performance on the task. A high signal-to-noise ratio tends to place undue importance on certain notes by increasing effort with no associated increase in performance. As such a low signal-to-noise ratio display would minimize information access cost with an increase in performance. Therefore, I hypothesize that

low display proximity, low signal-to-noise formats will result in better recognition of information from previously viewed footnote disclosures. Formally stated, my hypothesis is as follows:

> **H2: Non-professional investors receiving a low display proximity, low signal-to-noise presentation format will recognize a greater number of details from footnotes than non-professional investors who receive all other presentation formats.**

3.3 Hypothesis 3a and 3b

The prior two hypotheses address whether alternative presentation formats has an effect on performance. Although increased performance is one reason to implement a new system, users of that system must actively use the system to receive the benefit. In order to identify whether users will use the system Davis (1989) formalized the antecedents of technology acceptance and use into the Technology Acceptance Model (TAM).

TAM states that two main constructs influence whether users will accept and use a technology. Perceived ease of use combines experience, anchors, and adjustments into a model that extends that original TAM (Davis 1989; Venkatesh et al. 2003). Anchors are system independent constructs that address users' control, intrinsic motivation, and emotion. Although anchors are an important part of perceived ease of use, they are characteristics of users and not of systems. Adjustments are user perceptions directly resulting from the system characteristics. TAM identifies two adjustments – perceived enjoyment and objective usability – as system driven influences of perceived ease of use. Objective usability is a measure of the usability of the system independent of the user's experience. More directly related to the interaction of the user and the system is perceived enjoyment.

Perceived enjoyment is the extent to which the user derives pleasure from interacting with the system independent of any performance outcomes; e.g., by reducing cognitive effort. Thus, high display proximity creates a more pleasant (less effortful) environment for the user due to the ability to interact with the system in a way that maximizes information available on the screen, minimizes mental effort, and minimizes user frustrations in navigating (moving the cursor, scrolling through windows). Low display proximity requires users to scroll much more frequently to navigate to relevant information. In

addition, the high signal-to-noise format in my study increases the need of navigation (moving the cursor on the screen, opening and closing footnotes, scrolling through windows). The increased need of navigation (effort) results in lower perceived enjoyment in using the technology. Therefore, the highest perceived enjoyment is expected with the high display proximity and low signal-to-noise format. Perceived usefulness describes whether a user believes the system will improve their job or task performance. Several predictors have been identified as precursors to perceived usefulness. Relevant to this study is job relevance, output quality, and result demonstrability.

Users will perceive the display proximity to result in greater output quality. They will be most aware of the difference between the low and high display proximity formats and will believe that their decisions improve because they are able to view more information on the screen, in closer proximity, than that of the low display proximity format. Although users will be most familiar with the low display proximity format, as this is the standard format of PDFs, they will believe that their performance is improved as a result of moving the footnote disclosures closer in space to the related financial statements.

Although Signal Detection Theory predicts that higher signal-to-noise increases the salience of the signal, I hypothesize that this does not correlate with users' perceptions about output quality and result demonstrability. Specifically, users will not be able to associate the specific signal-to-noise presentation format with the outcome. Overshadowing the output of the task will be users' perceptions of ease of use, driven by the need of navigation (moving the cursor on the screen, opening and closing footnotes, scrolling through windows). Therefore I hypothesize that the high display proximity, low signal-to-noise condition will result in users' most favorable usability perceptions – stated formally as follows:

H3a: Non-professional investors using the high display proximity, low signal-to-noise presentation format will perceive the format to be more usable than non-professional investors using all other formats.

The low display proximity, low signal-to-noise condition best replicates the PDF method of financial statement presentation, which is currently used. While users will perceive this format to be relevant to

their task and tied to the output result (e.g., predictors of usability), they have no frame of reference for rating the format significantly different as would users in the other three presentation format conditions. In other words, the low display proximity, low signal-to-noise format becomes the anchor in all participants' judgments of usability and participants in the low display proximity, low signal-to-noise condition will have no reason to move away from this point. Comparatively, users in the high display proximity condition, having had prior investing experience, will recognize not only the relevance to the task but also observe an increase in output quality.

Recall that the high signal-to-noise condition increases effort by increasing cursor movement on the screen, requiring the opening and closing of footnotes, and increases the need to scroll in the navigation window. Thus, participants in the low display proximity, high signal-to-noise, likely having experience the relative usability of both the low display proximity, low signal-to-noise format (e.g., PDF) used in their prior investing decisions, and the low display proximity, high signal-to-noise format used in this study, may become highly sensitive to the increased effort required by the high signal-to-noise presentation format[6]. Therefore, as a result of users in other presentation format conditions perceiving a higher usability, users of the low display proximity, high signal-to-noise condition will have perceptions that fall significantly below the other three conditions. Stated formally:

H3b: Non-professional investors using the low display proximity, high signal-to-noise presentation format will perceive the format to be less usable than non-professional investors using all other formats.

[6] Participants are not asked to directly compare the formats of financial statements and footnotes disclosures they may have used prior to this study.

4.0 METHOD

4.1 Experimental Design

I conduct a 2 x 2 between-participants experiment using two separate tasks manipulated between participants to test my hypotheses. The first between-participants factor is display proximity and is varied at two levels: high display proximity and low display proximity. The second between-participants factor is signal-to-noise ratio and is varied at two levels: high display proximity and low display proximity. These two factors result in four presentation formats: low display proximity, low signal-to-noise; low display proximity, high signal-to-noise; high display proximity, low signal-to-noise; and high display proximity, high signal-to-noise. Both factors are examined under two separate tasks: an integrative processing task and a non-integrative processing task. Although the experimental design manipulates three variables – display proximity, signal-to-noise ratio, and task type, the dependent variables of two task types are different. Thus direct analysis of participants' performance on the task is difficult. As a result, differences in outcomes of the task types are discussed but direct statistical comparison is not used and results in a 2 (display proximity) x 2 (signal-to-noise) experimental design. Participants are randomly assigned first to one of the two tasks and then to one of the four presentation formats.

4.2 Tasks

Proximity Compatibility Principle states that the task should drive the display proximity of the information. Integrative tasks require the decision maker to process information from multiple information sources. Conversely, non-integrative tasks require the decision maker to focus on one information source. This experiment uses both an integrative task and a non-integrative task to assess whether the effect of presentation format on investor judgments and decisions differs based on task type.

The integrative task requires that participants to evaluate financial information from multiple sources: line items and balances from the balance sheet and income statement as well as multiple footnote disclosures in order to evaluate the investment attractiveness of the company. Participants assigned to the integrative task first read through the balance sheet, income statement, and eight accompanying footnote disclosures of a hypothetical pharmaceutical company. As the FASB has acknowledged that footnote disclosures are inconsistently ordered thus increasing the difficulty for investors to consistently locate relevant information (FASB 2012), eight line items on the financial statements have note references to the eight footnote disclosures.

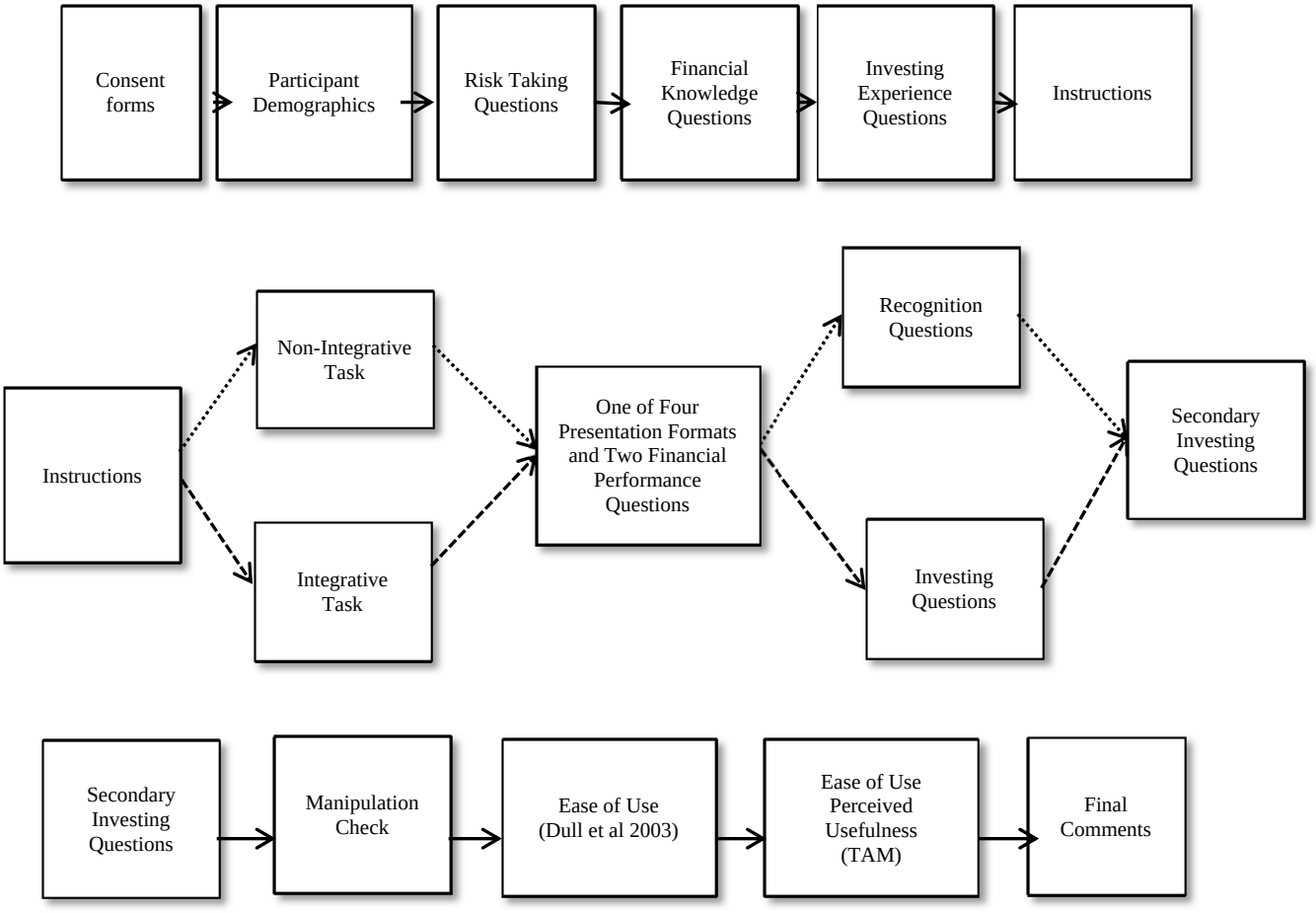

Figure 1. Experimental Procedures

They then answer two questions regarding their perceptions of the company's change in cash and change in net income. These two questions are designed to 1) assess participants' comprehension of the financial position, and 2) provide a common anchor point about the performance of the company.[7] Following these questions, the primary dependent variables are presented. The primary dependent variables in the integrative task assess participants' likelihood of investing in the hypothetical pharmaceutical company. See Figure 1 for the overview of the experimental procedures.[8]

A non-integrative task requires the use of only one information source. In this study the non-integrative task is a footnote disclosure recognition task. A recognition task was selected as information contained in the footnotes is frequently not available elsewhere in the financial statements. Further, footnote disclosures may be viewed by non-professional investors as less relevant than the financial statement information and thus they may be less focused on the information contained within the footnotes. Participants assigned to the non-integrative task follow the same initial procedures as those in the integrative task by reading the financial statements and accompanying footnote disclosures. They are asked the same two questions regarding the change in cash and change in net income. Participants are informed that they will not have an opportunity to review the information about the company once they proceed past the manipulation screen. Following the manipulations and two performance assessment questions, participants answer one multiple choice questions about each of the eight footnote disclosures.

4.3 Independent Variables

Display proximity is varied at two levels: high and low display proximity. The high display proximity condition displays the financial statements and footnote disclosures in close spatial and temporal

[7] During the pretest of the instrument a recency effect was noted in that participants in the low display proximity, low signal-to-noise condition viewed the footnotes more recently than participants in the other three conditions. This resulted in a stronger negative effect on their judgments of the company. Adding these two questions directly following the manipulation but prior to the dependent variables removes the effect and allows participants to respond to the dependent variables from a common mindset, thus relying on the integration of the information and reducing the recency effect inherent in the design of the manipulations. See Section 4.6 for more discussion.

[8] Further discussion of the Experimental Procedures is discussed in Section 4.6

proximity. Both information sources are available to the participant on the screen side by side. This display format allows users to move their eyes very quickly back and forth from one information source (i.e., the financial statements) to the other information source (i.e., the footnote disclosures) and reduces the information access cost. The low display proximity condition displays the financial statements and footnote disclosures in low spatial and temporal proximity. The participants are not able to view the financial statements at the same time as the footnote disclosures. See Figure 2 for a visual depiction of the experimental design.

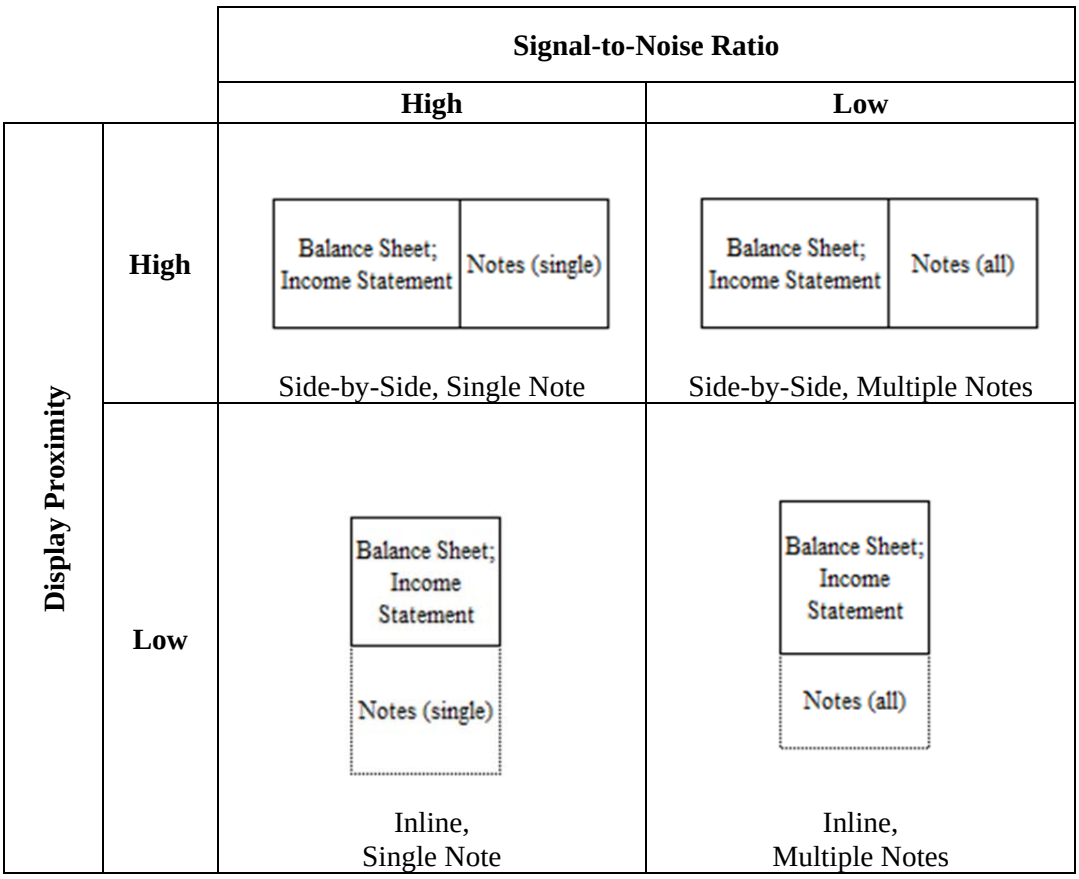

Figure 2. Experimental Design

Signal-to-noise is manipulated at two levels: high signal-to-noise and low signal-to-noise. In the high signal-to-noise condition the footnote disclosures is presented one at a time and the participant controls

when the footnotes are displayed and in what order the view the footnotes. In all conditions the relevant note name is displayed in superscript to the right of the associated financial statement line item. In the high signal-to-noise conditions, clicking the note name with the on-screen cursor the website will display only the selected footnote with no additional footnotes showing. The footnote remains open and viewable until the participant either closes that screen or opens a new footnote (additional, the participant is not able to view the footnote in the low display proximity if they scroll upwards to the balance sheet and income statements). By limiting the number of footnotes on the screen, the participant is not distracted by the noise of adjacent information. The combination of the two independent variables - display proximity and signal-to-noise ratio - results in four possible display formats.

The low display proximity and low signal-to-noise ratio are combined such that all financial information, both financial statements and footnote disclosures, are displayed in a continuous format on the screen. This format allows the users to view roughly one section of the package of financial data at a time. Users must scroll through each section of the financial statement in order to view the information contained with each section. Additionally, users are not able to view multiple sections of the financial statements at one time. This condition can best be thought of as the current standard as it is the format used for annual reports distributed in portable document format (PDF).

The high display proximity combined with the low signal-to-noise ratio results in a side-by-side condition in which the footnotes and financial statements are presented in close spatial proximity and all footnote disclosures are displayed on the right hand side of the display simultaneously. Users are able to scroll the financial statements independently of the financial statements in this condition. This presentation format maximizes the amount of information displayed on the screen at any given time. Users may track quickly between the financial statement and footnote panels in order to search for and acquire relevant information needing integration.

The low display proximity and high signal-to-noise ratio condition yields a presentation format in which all information is presented in a single column; however, users must click the footnote references to the right of the related financial statement line item located in the body of the financial statements to

open the footnote. The footnote is then displayed below the financial statements. This condition requires users to scroll to the end of the panel in order to view the footnotes. This creates additional effort and time to navigate to the footnote location. Should the user desire to navigate back and forth between the footnote and the financial statement line item, additional scrolling is required thus increasing the navigation time as well as the increasing the mental resources to encode and store relevant information in memory.

The final condition is the high display proximity and high signal-to-noise ratio condition. This presentation format is operationalized by presenting a single relevant footnote to the right of the financial statement line item at the user's request. The single footnote is more salient than multiple, simultaneously presented footnotes as there are no irrelevant information that would distract the user from determining acquiring and integrating the information from both information sources – the financial statement line item and the related footnote disclosure. In addition, the additional time required of the user to open the footnote, track the relevant footnote in their field of view, and return to the financial statements is minimal and thus reduces the overall information access cost.

4.4 Dependent Variables

As two tasks are used in the experiment, each task has its own set of primary dependent variables. The integrative task requires participants to read the financial statements and related footnotes in order to assess whether they would invest in the stock and if so, how much they would invest. The dependent variables for this task are adopted from Elliott (2003). The first dependent variable states the participant has $5,000 to invest in the hypothetical company's stock, which is trading at $2 per share. The participant is asked how likely they would invest the entire amount in the company. The second dependent variable presents the same scenario but asks how much of the $5,000 they would invest. For each of those dependent variables the participants are also asked how confident they are in their decision. These variables are measured on a sliding scale from zero being 'not at all likely' and 100 being 'very likely' for the former question and zero meaning 'nothing at all' to 100 meaning the 'entire amount' for the latter

question. Thus, a higher likelihood of investing the entire $5,000, and a greater portion of $5,000 invested, are both representative of a more positive future outlook for the company.

The non-integrative task's primary dependent variable measures participants' ability to recognize specific information about each of the eight footnotes viewed in conjunction with the company's financial statements. Participants are presented with a question about a specific aspect of the each footnote and are asked to choose the correct statement from one of four answers listed. The dependent variable for the non-integrative task is a count variable of a participant's total number of footnote details recognized.

Secondary dependent variables are used across both the integrative and non-integrative tasks. The secondary variables measure participants' judgments of company performance in the current year as well as their prediction for the company's performance in three years. Specifically the participants' are asked to "indicate on the scale below your judgment of the company's earnings for the fiscal year ending 12/31/2014" to assess their perceptions of the company's current year performance. They are subsequently asked "what do you believe is the company's earnings potential over the next three years?" to assess their perceptions of the company's future performance. A third variable is then calculated from the difference of their current year earnings perceptions and their future earnings perceptions to capture the direction and strength of the expectation of the future performance. Thus, a participant that rates their current performance as a '10' (very weak) and their future performance as an '80' would have a strong positive outlook on the company as compared to a participant that rates the current performance a '40' and the future performance a '60'.

Libby and Emett (2014) state that narrative presentation attributes affect ease of processing; however, they present competing evidence about whether narrative attributes will affect valuation of accounting information. As this study aims to provide additional evidence as to whether alternative technology-driven footnote disclosure presentation formats merely alter cognitive load or whether they result in tangible valuation differences among investors, measures of perceived ease of use and perceived usefulness are adapted from Davis (1989). Six questions are asked and form the construct 'perceived ease of use' and an additional six questions form the construct 'perceived usefulness. In addition, seven

statements adapted from Hodge (2001) and Dull et al. (2003) are used to measure participants' perceptions of ease use as an alternative measure of ease of use.

4.5 Covariates

I ask participants several sets of questions to identify potential covariates prior to presenting the manipulation. The first set of questions is aimed at assessing participants' risk-taking propensity. The first question poses an investment scenario in which the participant has $1,000 to invest. They are given two funds to choose between. The first fund has a 10 percent chance of earning $200 and a 90 percent chance of earning $1,200. The expected value of the fund is $1,100. The second fund has a 40 percent chance of $920 and 60 percent chance of earning $1200 with an expected value of $1,088. Participants may also respond that both options are equally attractive or that they do not understand the question. The second question is similar to first with the exception that each fund has three separate probabilities of earnings. The first fund has a 10 percent chance of earning $680, 5 percent chance of $1,050, and an 85 percent chance of earning $1150. The second fund has a 5 percent chance of earning $730, a 70 percent chance of earning $1,050, and a 25 percent chance of earning $1310. Both funds have an expected value of $1,098. Again, participants are given the option of responding that both questions are equally as attractive or they do not understand the question. From their answers to the two risk taking questions, I create a composite variable to capture risk-taking propensity.

The next set of questions is designed to gauge participants' financial knowledge. These eleven questions are taken from Van Rooij et al. (2011)'s advanced literacy questions. See Appendix B for the list of financial literacy questions used in this experiment. Lastly, participants are asked four questions about their investing experience. The first two questions ask whether participants have bought or sold stocks or bond through a broker within the last four (two) years. The second two questions ask whether participants have bought or sold stocks or bonds directly in the market in the past four (two) years. Although these same four questions were included as part of the qualification test in AMT, due to limitations in AMT they are not recorded as part of the qualification test. Further, participants have an

additional opportunity to answer the questions without being concerned about being disqualified for incorrect response.

Additional questions are included in the demographic section of the instrument. These questions include age, years of professional work experience, years of personal and professional investing experience, number of accounting and finance courses completed, the highest level of education completed, the highest level of education in progress, and their familiarity with financials statements, financial statements in the pharmaceutical industry, and using financial statements on the internet.

4.6 Participants

Three hundred eighty three workers from Amazon's Mechanical Turk who have prior investing experience completed the experiment over the course of two months. A Human Intelligence Task (HIT) was advertised using Amazon's Mechanical Turk (AMT), an online labor market that has gained acceptance and use among researchers (Buhrmester et al. 2011; Berinsky et al. 2012; Rennekamp 2012; Brandon et al. 2013; van der Heijden 2013). AMT workers were compensated $1.75 in exchange for participating in an investing survey. Participants were qualified on the basis of whether they have bought or sold any stocks or bonds outside of a mutual fund within the prior four years and whether they reside in the United States as the experiment is focused on investor decisions in a U.S. setting and uses U.S. based currency. Once participants are qualified they are redirected to the study website, a custom made experimental website hosted on a third party location. Participants completed the experiment on their own time, at their own pace, and used their own computers. Upon conclusion of the study, participants are provided a unique code that is input into the HIT and submit the HIT for payment.

Participants were randomly assigned to first to one of the two tasks and then to one of the four presentation format conditions. Ten participants are excluded from the analysis as they completed the experiment using a mobile device, which was identified using the user agent string from their browser. Two additional participants were excluded from the analysis due to an error in recording their data. Thus a total of three hundred seventy-one participants are used in the analysis. Participants completed the

experiment in an average of 23 minutes and 2 seconds resulting in an effective pay rate of $4.57 per hour.[9]

Prior studies examining the characteristics of AMT workers have shown that realistic compensation rates do not affect data quality and that the workers are representative of the general United States population, though AMT workers are less representative of Internet panels and national probability samples (Buhrmester et al. 2011; Berinsky et al. 2012; Brandon et al. 2013). In addition, Horton et al. (2011) find that studies using AMT workers replicate findings across a wide range of judgment and decision-making experiments.

AMT workers have also gained wider acceptance within the accounting domain (Rasso 2013; van der Heijden 2013; Brink and Lee 2014; Farkas and Murthy 2014; Grenier et al. 2015a; Grenier et al. 2015b). van der Heijden (2013) recruits AMT workers to participate in an experiment examining the effect of charitable organization program-spending ratios on charitable giving. Although their study did not examine non-professional investors, their participants were required to interpret accounting information and make donation decisions on the basis of that information. In an examination of the effect of accounting firm apologies for deficient audits on jurors' assessments of punishment and perceptions of accounting firm reputation, Rasso (2013) recruited 179 participants from AMT to proxy for jurors. From this sample 7.3 percent of the responded as having work experience in the accounting profession and 6.1 percent having work experience in the legal profession. In a similar legal context, Grenier et al. (2015a) obtain jury-eligible participants from AMT to examine the effects of independent experts' recommendations on jurors' judgements.

AMT workers are considered to be appropriate proxies for non-professional investors (Rennekamp 2012; Farkas and Murthy 2014; Trinkle et al. 2015). Rennekamp (2012) utilized AMT workers in an experiment examining the impact of disclosure readability on nonprofessional investors. The AMT workers in her study are demographically similar to those of other studies using MBA students as proxies

[9] The effective rate of $4.57 per hour is above the reservation wage of $1.38 per hour on AMT (Horton and Chilton 2010). In addition, the effective rate in my study is above other recent studies in accounting: $1.81 (Grenier

for nonprofessional investors. Trinkle et al. (2015) obtained AMT workers to proxy for non-professional investors in examining how disclosures and comments made via social media affect nonprofessional investors' perceptions of news, valuation judgments, and perceptions of management's credibility.

Farkas and Murthy (2014) perform two experiments to examine non-professional investors' perceptions regarding continuous controls monitoring and continuous auditing. Participants in the first experiment were recruited using a national research company, whereas participants in the second experiment were obtained using AMT. Although the AMT participants were significantly younger than the national research company participants (35.36 years versus 56.89 years, respectively) and have less work and investing experience, the AMT participants have similar demographics as the first-year MBA students used in Elliott et al. (2007) and the AMT participants in Rennekamp (2012). Moreover, experiment two replicates the findings in experiment one providing support that AMT workers are an appropriate proxy for non-professional investors.

4.6 Case Materials

4.6.1 Overview

Participants are instructed to assume the role of an investor evaluating whether to increase or decrease their financial investment in the company in both tasks. Figure 1 depicts the experimental procedures for the study. The experimental method is included in Appendix B. Participants are first asked to provide individual demographics and answer questions about their risk taking preferences, financial knowledge, and investing experience. Reips (2002) provide evidence that participants who provide demographic information at the beginning of an Internet study are less likely to drop out and also found to provide more complete responses. They are then told to allocate 20 minutes of uninterrupted time to complete the remainder of the experiment. On the subsequent screen participants view the instructions, financial statements, footnotes, and two questions about the change in cash and the change in net income. Contained within the instructions is an attention check question, which states, "Once you have read these

et al. 2015b), $2.40 (Grenier et al. 2015a), $3.00 (Rennekamp et al. 2013), $3.75 (Rennekamp 2012).

instructions, please click inside this darker beige instructions box". In addition, the instructions specify that the participants should review all information available and explicitly state how the footnotes can be accessed (e.g., "footnotes are available below the financial statements by clicking on the note number).

The manipulation screen contains a balance sheet, income statement, and footnote disclosures. The balance sheet and income statement were primarily adapted from Fortune 500 companies and is designed to present the company in an overall positive light. Total, current, and intangible and other assets increase by 7.5 percent, 83.1 percent, and 58 percent, respectively, from the prior year to the current year. Current liabilities increase and noncurrent liabilities decrease which net to an overall increase in total liabilities of 4.9 percent over the prior year. Stockholders' equity increased 11.7 percent - nearly doubling that of the increase in total liabilities during the same period. Similarly, the income statement is designed to provide a positive outlook on the company. Total revenues have a modest increase of 6.1 percent over the prior year, whereas total operating expenses has a slight decrease of 1.8 percent. Net income for the company is a 31.7 percent increase from $2.27 million to $2.99 million. While participants were not expected to calculate ratios for the hypothetical company, nor were ratios provided, common liquidity and profitability ratios are neutral to positive from the prior fiscal year to the current fiscal year. See Appendix C for the balance sheet and income statement as provided to the participants.

Eight footnotes were included in the instrument. Four related to balance sheet line items and four related to income statement line items. The language of the footnotes was adapted from both a Fortune 500 pharmaceutical company and as well as other Fortune 500 companies to increase external validity. See Appendix D for the footnote disclosures used in the instrument. Although the footnotes are designed to provide neutral to negative commentary on the future outlook of the company, the perceptions of non-professional investors regarding the footnotes was not known and a footnote pre-test was designed to assess the valence of each footnote.

4.6.2 Footnote Pre-Test

To pre-test the individual footnotes included in the experiment, one hundred and thirty four AMT workers viewed variations of twelve individual footnote disclosures and responded to four questions.[10] The first two questions ask whether the footnote provided positive or negative cash flows and to what extent does the information help the user to make a decision about the cash flows of the company. The second two questions ask whether the footnote indicates an increase or decrease in future earnings and to what extent to the information helps the user make a decision about the future earnings. Means of the four questions were used to judgmentally select the final combination of footnotes to be included in the instrument. Footnotes were selected on whether they provided neutral to negative information about the future cash flows and earnings. Thus, a user who relies more heavily on the relatively positive (or neutral) balance sheet and income statement will have a more optimistic outlook on the company than a user who relies more heavily on the relatively negative (or neutral) footnote disclosures.

4.6.3 Instrument Pilot Test

Once the individual footnotes were selected a pilot test of the instrument was conducted. One hundred and ninety four AMT workers participated in the pilot test. Participants were paid $2.15 in exchange for completed the HIT. The pilot version of the experiment is substantially similar to the final version with the exception of the two questions immediately following the balance sheet, income statement, and footnote disclosures that ask about the change in cash and the change in net income from the prior period to the current period. The recognition task was tested using a Poisson regression and the untabulated results show that the omnibus test failed to detect a significant difference between conditions. The investing task was tested using a multivariable analysis of variance (MANOVA). Although the

[10] Consideration was given as to whether professional investors should rate each footnote on the basis of the note's positive or negative valence and diagnosticity as the basis for inclusion in the final instrument. Using the ratings of professional investors, rather than nonprofessional investors, potentially introduces a confound such that the lack of an effect could be due to a difference in perceptions about the valence of footnotes between professional and nonprofessional investors or that the presentation format does not influence non-professional investors decision-making. Given that the research question asks whether the presentation format makes a difference in investor judgments and does not consider whether the judgments of non-professionals are more or less similar to those of professional investors, the use of non-professional investors to pre-test the valence and diagnosticity of the footnotes was deemed more appropriate.

untabulated results show model is significant, neither display proximity nor signal-to-noise ratio (nor the interaction) are significant.

In examining the instrument, it was noted that participants in the low display proximity, low signal-to-noise condition would view the negative valence footnote disclosures just prior to evaluating their investment opportunity in the company. In order to test whether this recency effect may be the reason for the lack of results during the pilot test, a second pre-test was conducted to determine whether the order of the financial statements and footnotes is overly negative thus leading participants who view the footnotes in sequence (low signal-to-noise conditions) to have a stronger negative impression of the company.

Three hundred and six AMT workers were presented one of 16 versions of the footnote disclosures. Eight of the footnote disclosure versions reordered the existing footnotes to determine whether a recency effect existed. For example, one condition alternated relatively negative valence footnotes with relatively neutral valence footnotes while another condition loaded more negatively valence footnotes toward the beginning of the list of footnotes and more neutrally valence footnotes toward the end of the list. In addition, those same eight versions were tested using the two questions included in the final instrument that assess participants' perceptions of the change in cash and the change in net income to determine whether these questions would reduce the recency effect thus providing a common frame for all participants as they then respond to the primary dependent variables. Prior literature has found some evidence that non-professional investors fixate on earnings (Sloan 1996; Elliott et al. 2011a). If investors indeed fixate on the earnings rather than the components of earnings as Sloan (1996) suggests, then the addition of the two questions is relevant starting point for investors and bias against significant findings.

The untabulated results of the ANOVA show that the original footnote disclosure order yields the second least favorable mean investing perceptions of the eight formats tested. The two questions regarding cash and net income act to temper extreme means such that the low mean of the original footnote disclosure order becomes the highest mean in the revised order and the higher original means tend to become lower. In other words, there is a strong attenuation effect of the change in cash and net income questions that inverse extreme ends of mean user perceptions. Given these results, it is likely the

lack of results found in the pilot test is confounded with a recency effect inherent in the design of the instrument. Further, the order of the footnotes cannot be altered and as such, adding two questions to create a common starting point is the best option to reduce the influence of this recency effect.

5.0 RESULTS

5.1 Analysis of Participant Demographic Information

Three hundred eighty-one Mechanical Turk workers participated in the main study. Ten participants completed the survey on a mobile device and were subsequently eliminated from the analysis.[11] Two additional participants were excluded due to an error recording their data. Thus a total of three hundred seventy-one participants are included in the analysis – one hundred seventy-two in the non-integrative task and the one hundred ninety-nine participants in the integrative task. Table 3 displays the demographic information across conditions and in aggregate. The participants averaged 33.88 years of age (33.01 in the recognition condition and 34.63 in the investing condition, p-value 0.204)[12] and have an average reported professional experience of 12.16 years (11.38 in the recognition condition and 12.84 in the investing condition, p-value of 0.158). Participants reported an average of 1.60 accounting classes and 1.45 finance classes.[13] Professional and personal investing experience was reported to be, on average, 0.657 years and 7.95 years. There is no statistical difference between groups for professional investing experience; however, the mean of 10.10 for high display proximity; low signal-to-noise (recognition task) is significantly different from the mean of high display proximity; high signal-to-noise (recognition task) and low display proximity; high signal-to-noise (investing task) (5.30 and 5.98, p-values 0.68 and 0.09, respectively).

[11] Participants using a mobile device were identified using the user agent string captured directly from their internet browser. Six participants used Android devices, three participants used iPhones, and one participant used an iPad. Participants using Windows based tablets cannot be identified using the user agent string and/or screen resolution.

[12] No significant differences between the eight conditions were noted for professional experience.

[13] Tukey post-hoc comparisons reveal that the high display proximity, low signal-to-noise (recognition task) mean of 2.74 is significantly different than the low display proximity, low signal-to-noise (recognition task) mean of 0.83 and the high display proximity, low signal-to-noise (investing) mean of 0.96, p-value of 0.029 and 0.059, respectively. Although the number of accounting and finance classes differ between conditions, there is no difference between groups for financial knowledge, familiarity with financial statements, familiarity with the pharmaceutical industry, and familiarity with using financial statements on the Internet.

Table 3 Participant Demographic Statistics										
	Recognition				Investing				p-value	Total
	Inline	SBS	SBS	Inline	Inline	SBS	SBS	Inline		
	All	All	Single	Single	All	All	Single	Single		
	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)		
	(n = 53)	*(n = 50)*	*(n = 37)*	*(n = 32)*	*(n = 50)*	*(n = 52)*	*(n = 39)*	*(n = 58)*		*(n = 371)*
General										
Age	35.25 (12.003)	32.72 (9.320)	30.76 (9.648)	32.34 (9.950)	35.36 (9.995)	36.08 (11.353)	35.28 (11.119)	32.26 (9.904)	0.150	33.88 (10.542)
Professional Work Experience	13.11 (10.072)	11.52 (8.784)	9.30 (7.820)	10.69 (9.849(	13.52 (10.248)	14.60 (11.000)	13.31 (10.682)	10.36 (9.906)	0.140	12.16 (9.945)
Number of Accounting Classes	.83 (1.189)	2.74 (4.198)	2.03 (3.876)	2.31 (4.200)	1.70 (2.659)	.96 (2.086)	1.13 (1.989)	1.45 (3.045)	0.021	1.60 (3.042)
Number of Finance Classes	.68 (0.956)	2.64 (3.652)	1.00 (1.581)	2.66 (4.029)	0.90 (1.763)	1.13 (1.673)	1.31 (2.415)	1.31 (2.415)	0.000	1.45 (2.504)
Professional Investing Experience	0.40 (1.335)	0.96 (3.239)	0.43 (1.191)	0.72 (2.036)	0.54 (1.474)	.33 (1.061)	.51 (1.295)	.38 (1.182)	0.657	.52 (1.731)
Personal Investing Experience	8.26 (7.781)	10.10 (8.853)	5.30 (5.190)	7.63 (8.769)	8.94 (7.660)	8.10 (6.792)	9.03 (8.827)	5.98 (5.993)	0.046	7.95 (7.605)
Financial Knowledge	9.13 (1.256)	9.04 (2.147)	9.38 (1.299)	9.03 (1.959)	9.36 (1.083)	9.33 (1.184)	8.92 (1.528)	9.47 (1.158)	0.558	9.22 (1.465)
Invested using a Broker in the past 4 years?	58% (0.497)	78% (0.418)	62% (0.492)	56% (0.504)	68% (0.471)	63% (0.486)	69% (0.468)	59% (0.497)	0.392	64% (.479)

Table 3 Participant Demographic Statistics (continued)										
	Recognition				Investing				p-value	Total
	Inline	SBS	SBS	Inline	Inline	SBS	SBS	Inline		
	All	All	Single	Single	All	All	Single	Single		
	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)	Mean (s.d. or percent of sample)		
Invested using a Broker in the past 2 years?	53% (0.504)	74% (0.443)	65% (0.484)	53% (0.507)	70% (0.463)	54% (0.503)	59% (0.498)	50% (.504)	0.119	60% (0.491)
Invested directly in the market in the past 4 years?	68% (0.471)	66% (0.479)	57% (0.502)	59% (0.499)	64% (0.485)	73% (0.448)	72% (0.456)	74% (0.442)	0.609	67% (0.469)
Invested directly in the market in the past 2 years?	72% (0.455)	68% (0.471)	57% (0.502)	56% (0.504)	60% (0.495)	60% (0.495)	72% (0.456)	69% 0.467)	0.569	65% (0.479)
Any investing experience (broker or self-directed) in the past 2 or 4 years?	94% (.233)	98% (.141)	86% (.347)	88% (.336)	88% (.328)	96% (.194)	95% (.223)	93% (.256)	0.290	93% (.260)

Participants were given a set of questions based on van Rooij et al (2011) to determine their level of financial investing knowledge. The maximum score is 11 and participants scored a mean of 9.22 (s.d. 1.465) and no differences were noted between groups.

As a Mechanical Turk qualification filter, I required that participants had bought or sold stock in the past four years. The qualification test screened participants by asking four investment related questions

Table 4: Participants' Use of Internet Browsers

Panel A: Non-integrative (Recognition) Task

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	IE: 3 (8.1%) FF: 7 (18.9%) CH: 26 (70.3%) SA: 1 (2.7%) OP: 0 (0.0%) *n = 37*	IE: 2 (4.0%) FF: 9 (18.0%) CH: 37 (74.0%) SA: 2 (4.0%) OP: 0 (0.0%) *n = 50*	IE: 5 (5.7%) FF: 16 (18.4%) CH: 63 (72.4%) SA: 3 (3.4%) OP: 0 (0.0%) *n = 87*
	Low (Inline)	IE: 1 (3.1%) FF: 8 (25.0%) CH: 23 (71.9%) SA: 0 (0.0%) OP: 0 (0.0%) *n = 32*	IE: 3 (5.7%) FF: 13 (25.0%) CH: 35 (66.0%) SA: 1 (18.9%) OP: 1 (18.9%) *n = 53*	IE: 4 (4.7%) FF: 21 (24.7%) CH: 58 (68.2%) SA: 1 (1.2%) OP: 1 (1.2%) *n = 85*
		IE: 4 (5.8%) FF: 15 (21.7%) CH: 49 (71.0%) SA: 1 (1.4%) OP: 0 (0.0%) *n = 69*	IE: 5 (4.9%) FF: 22 (21.4%) CH: 72 (41.9%) SA: 3 (2.9%) OP: 1 (0.6%) *n = 103*	IE: 9 (5.2%) FF: 37 (21.5%) CH: 121 (70.3%) SA: 4 (2.3%) OP: 1 (0.6%) *n = 172*

after a set of 11 financial knowledge questions designed to mask the intent of the survey (and thus elicit honest investment response). Although all participants passed the Mechanical Turk qualification test by

responding that they have bought or sold stock in the past four years, only 93 percent of participants responded that they had bought or sold stock using an investor or self-directed.[14]

Table 4: Participants' Use of Internet Browsers (continued)

Panel B: Integrative (Investing) Task

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	IE: 3 (7.7%) FF: 6 (15.4%) CH: 28 (71.8%) SA: 1 (2.6%) OP: 1 (2.6%) *n = 39*	IE: 2 (3.4%) FF: 16 (30.8%) CH: 32 (61.5%) SA: 2 (3.4%) OP: 0 (0.0%) *n = 52*	IE: 5 (5.5%) FF: 22 (24.2%) CH: 60 (65.9%) SA: 3 (3.3%) OP: 1 (1.1%) *n = 91*
	Low (Inline)	IE: 1 (1.7%) FF: 14 (24.1%) CH: 41 (70.7%) SA: 0 (0.0%) OP: 2 (3.4%) *n = 58*	IE: 3 (6.0%) FF 13 (26.0%) CH: 32 (64.0%) SA: 1 (2.0%) OP: 1 (2.0%) *n = 50*	IE: 4 (3.7%) FF: 27 (25.0%) CH: 73 (67.6%) SA: 1 (0.9%) OP: 3 (2.8%) *n = 108*
		IE: 4 (4.1%) FF: 20 (20.6%) CH: 69 (71.1%) SA: 1 (1.0%) OP: 3 (3.1%) *n = 97*	IE: 5 (4.9%) FF: 29 (28.4%) CH: 64 (62.7%) SA: 3 (2.9%) OP: 1 (1.0%) *n = 102*	IE: 9 (4.5%) FF: 49 (24.6%) CH: 133 (66.8%) SA: 4 (2.0%) OP: 4 (2.0%) *n = 199*

Table 4 presents participants' browsers and operating system statistics. The dominant browser used in the survey is Google Chrome (68.5 percent) followed by Firefox, Internet Explorer, Safari, and Opera.

[14] The Mechanical Turk qualification test consists of 15 questions. The first 11 questions are financial knowledge questions. Question 12 asks whether they have purchased or sold any stocks in the last four years within their retirement plan. Question 13 asks whether they bought or sold any stocks in the last four years outside of a retirement plan. Question 14 asks whether they have bought or sold any mutual funds in the last four years within their retirement plan. Question 15 asks whether they have bought or sold any mutual funds outside their retirement plan. A minimum score of 12 is required to earn the qualification test. Only answer yes to question 12 or 13 yields the required score to earn the qualification test (12 or 13 points). It is possible that the demographics are less than 20

The majority of participants used a Windows operating system (76.0 percent) followed by iOS (18.6 percent), Linux (3.0 percent), and 9 participants used an operating system that could not be detected (2.4 percent). To assess whether any differences were noted between operating systems and browsers, all analyses included these variables as covariates. Unless otherwise specified, no significant differences are noted.

Table 5: Participants' Use of Operating Systems

Panel A: Non-integrative (Recognition) Task

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	WIN: 27 (73.0%) MAC: 9 (24.3%) LIN: 1 (2.7%) UNK: 0 (0.0%) *n = 37*	WIN: 42 (84.0%) MAC: 7 (14.0%) LIN: 0 (0.0%) UNK: 1 (2.0%) n = 50	WIN: 21.6% MAC: 43.2% LIN: 62.2% UNK: % n = 87
	Low (Inline)	WIN: 23 (71.9%) MAC: 7 (21.9%) LIN: 1 (3.1%) UNK: 1 (3.1%) n = 32	WIN: 42 (79.2%) MAC: 9 (17.0%) LIN: 2 (3.8%) UNK: 0 (0.0%) n = 53	WIN: 21.6% MAC: 43.2% LIN: 62.2% UNK: % n = 85
		WIN: 50 (72.5%) MAC: 16 (23.2%) LIN: 2 (2.9%) UNK: 1 (1.4%) n = 69	WIN: 84 (81.6%) MAC: 16 (15.5%) LIN: 2 (1.2%) UNK: 1 (1.0%) n = 103	WIN: 134 (77.9%) MAC: 32 (18.6%) LIN: 4 (2.3%) UNK: 2 (1.2%) n = 172

Participants respond to three questions that assess their familiarity with different aspects of the experiment: familiarity with financial statements, familiarity with the pharmaceutical industry, and familiarity with using financial statements on the Internet. Chi squared results note no significant differences in proportions between conditions.

5.2 Attention Check

Mechanical Turk is a crowdsourcing marketplace that allows workers to complete Human Intelligence Tasks (HITs) in exchange for money. As a result, workers are incentivized to complete tasks as quickly as possible to yield a higher rate per hour. Researchers use Mechanical Turk to administer

Table 5: Participants' Use of Operating Systems (continued)
Panel B: Integrative (Investing) Task

		Signal-to-Noise Ratio: High (Single)	Signal-to-Noise Ratio: Low (Simultaneous)	
Display Proximity	High (Side-by-side)	WIN: 30(%) MAC: 7%) LIN: 0 (0.0%) UNK: 2 (%) n = 39	WIN: 38 (%) MAC: 10 (%) LIN: 2 (%) UNK: 2 (%) n = 52	WIN: 5 (5.5%) MAC: 22 (24.2%) LIN: 60 (65.9%) UNK: 3 (3.3%) OP: 1 (1.1%) n = 91
	Low (Inline)	WIN: 42 (%) MAC: 9 (%) LIN: 4 (%) UNK: 3 (%) n = 58	WIN: 38 (%) MAC: 11 (%) LIN: 1 (%) UNK: 0 (0.0%) n = 50	WIN: 4 (3.7%) MAC: 27 (25.0%) LIN: 73 (67.6%) UNK: 1 (0.9%) OP: 3 (2.8%) n = 108
		WIN: 50 (72.5%) MAC: 16 (23.2%) LIN: 2 (2.9%) UNK: 1 (1.4%) n = 97	WIN: 84 (81.6%) MAC: 16 (15.5%) LIN: 2 (1.2%) UNK: 1 (1.0%) n = 102	WIN: 134 (77.9%) MAC: 32 (18.6%) LIN: 4 (2.3%) UNK: 2 (1.2%) n = 199

surveys and workers are familiar with methods used to identify whether (and subsequently disqualify) participants read questions thoroughly. The current study uses an attention check question embedded

within the instructions to gauge whether participants read the instructions provided.[15] Table 5 details the attention check pass rate by condition. Of the 371 participants that completed the survey, 73 (19.7 percent) responded appropriately to the attention check question leaving the remaining 298 (80.3 percent) failing to respond to the attention check question. There are no significant differences in attention check failure rate between treatment conditions (Pearson chi squared, p=0.849). Though the rate of failure for the attention check question is large, prior research supports the use of AMT workers in experimental research (Buhrmester et al. 2011; Berinsky et al. 2012; Rennekamp 2012; Brandon et al. 2013; van der Heijden 2013).

5.3 Manipulation Check

Participants were asked two questions with regard to the placement and number of footnotes. The first question asked whether the footnotes were displayed to the right or below the financial statements. Table 5 reports the pass rate for each condition. In total, 37.2 percent of the participants responded correctly to the location of the footnotes in relation to the financial statements. There is a significant difference in the pass rate between treatment groups (Pearson χ^2 = 190.244, *p*-value=0.000). A greater proportion of participants in the side-by-side conditions correctly recalled the location of the footnotes than participants in the inline conditions (70.8 percent in the side-by-side conditions vs. 6.2 percent in the inline conditions, Pearson χ^2 = 165.258, asymp. *p*-value=0.000, untabulated). This difference could be due to the location of the footnotes being more novel in the side-by-side conditions and thus more salient to participants. The second question asked whether one footnote or multiple footnotes were visible at one time. Of the 371 participants, 26.7 percent correctly recalled whether there were multiple footnotes

[15] Typically researchers use attention check questions embedded within the dependent variable questions. As an example a research might include a question that states, "Click "somewhat helpful" for this response" in a list of questions about the helpfulness of the manipulation shown with the expectation that if the participant was not reading the questions they would miss that particular instruction. However, Mechanical Turk forums identify these attention check questions making them less useful for researchers using professional survey taker populations like Mechanical Turk.

Table 6: Attention and Manipulation Check Questions

Panel A: Non-integrative (Recognition) Task

		Signal-to-Noise Ratio: High (Single)	Signal-to-Noise Ratio: Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Att[1]: 21.6% DP: 43.2% SN: 62.2% Both: 40.5% *n = 37*	Att: 18.0% DP: 84.0% SN: 2.0% Both: 2.0% *n = 50*	Att: 19.5% DP: 66.7% SN: 27.6% Both: 18.4% *n = 87*
	Low (Inline)	Att: 12.5% DP: 6.3% SN: 56.3% Both: 0.0% *n = 32*	Att: 18.9% DP: 1.9% SN: 7.5% Both: 0.0% *n = 53*	Att: 16.5% DP: 3.5% SN: 25.9% Both: 0.0% *n = 85*
		Att: 17.4% DP: 26.1% SN: 59.4% Both: 21.7% *n = 69*	Att: 18.4% DP: 41.7% SN: 4.9% Both: 1.0% *n = 103*	Att: 18.0% DP: 35.5% SN: 26.5% Both: 9.3% *n = 172*

Panel B: Integrative (Investing) Task

		Signal-to-Noise Ratio: High (Single)	Signal-to-Noise Ratio: Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Att: 17.9% DP: 59.0% SN: 53.8% Both: 46.2% *n = 39*	Att: 23.1% DP: 4.0% SN: 8.0% Both: 4.0% *n = 52*	Att: 20.9% DP: 74.7% SN: 24.2% Both: 19.8% *n = 91*
	Low (Inline)	Att: 24.1% DP: 12.1% SN: 46.6% Both: 3.4% *n = 58*	Att: 18.0% DP: 86.5% SN: 1.9% Both: 0.0% *n = 50*	Att: 11.6% DP: 8.3% SN: 28.7% Both: 3.7% *n = 108*
		Att: 21.6% DP: 30.9% SN: 49.5% Both: 20.6% *n = 97*	Att: 20.6% DP: 46.1% SN: 4.9% Both: 2.0% *n = 102*	Att: 21.1% DP: 38.7% SN: 26.6% Both: 11.1% *n = 199*

displayed at one time. There is a significant difference between treatments such that a greater proportion of the participants in the single footnote condition than the multiple footnote condition correctly recalled the number of footnotes displayed at a time (53.6 percent versus 4.9 percent, Pearson χ^2 = 111.362,asymp. *p*-value=0.000, untabulated). As with the difference in proportions with the display proximity manipulation check, the difference in proportions with the signal-to-noise manipulation check question could also be due to the novelty of the singular footnote presentation being more salient to participants.

5.4 Correlation Analyses

5.4.1 Correlations between Dependent Variables

Table 7 shows the correlations between the dependent variables. The likelihood of investing all $5,000 and the portion of $5,000 to invest are highly correlated (Pearson correlation coefficient = 0.80). The perception of current year earnings is significantly correlated, albeit moderately, with the decision to invest all $5,000 and a portion of $5,000 (Pearson correlation coefficient = 0.34 and 0.37, respectively). The perception of earnings in three years is highly correlated with both the decision to invest all $5,000 and a portion of $5,000 (Pearson correlation coefficient = 0.51 and 0.56, respectively). Lastly, participants' current year earnings perceptions are highly correlated with their perceptions of earnings in three years (Pearson correlation coefficient = 0.68). Given the high correlations between each of the four primary and secondary dependent variables related to their investing judgments, multivariate analysis of covariance (MANCOVA) is used to test the investing hypotheses. An unexpected weakly negative correlation between recognition of footnotes and perceptions of current and future earnings performance is observed (Pearson correlation coefficient = -0.22 and -0.24). Usefulness is weakly correlated with perceptions of current year earnings performance and perceptions of future earnings performance (Pearson correlation coefficient = -0.11 and -0.12, respectively). As expected, ease of use is highly

correlated with usefulness (Pearson correlation coefficient = 0.77) and thus the usefulness and ease of use hypotheses are examined using MANCOVA.

5.4.2 Correlations between Dependent Variables and Possible Covariates

Table 8 shows the correlations between dependent variables and possible covariates. A moderate correlation exists between participants' perceptions in the change in net income and all four investing judgment and decision variables. A moderate correlation exists between the two secondary dependent variables and participants' perceptions about the change in cash. The time participants spent on the total experiment and more importantly, the manipulation page is moderately correlated with their perceptions of ease of use and usefulness. As one would expect, participants' performance on the recognition task is strongly correlated with the time they spent on the experiment, time spent on the manipulation page, and time spent answering the recognition questions.

A moderate positive correlation exists between investing all $5,000 and financial statement familiarity, pharmaceutical industry familiarity, and familiarity in using financial statements on the internet (Pearson correlation coefficient = 0.210, 0.207, and 0.151, respectively). Similar correlations are found between the decision to invest a portion of the $5,000 and the familiarity variables. An interesting negative correlation exists between three familiarity variables and ease of use and usefulness variables such that as participants have greater familiarity with the use of financial statements and the industry, their perceptions of ease of use and usefulness decrease.

A small correlation exists between perceptions of current and future earnings and the importance of the balance sheet and income statement. A small negative correlation exists between usefulness and ease of use and the importance of the balance sheet, income statement, and footnote disclosures. Although a moderate correlation exists between the number of details recognized by participants and the importance of the notes, this correlation is likely biased by the fact that the dependent variable preceded the question regarding the importance of the notes.

Table 7 Correlations Between Dependent Variables								
	Invest all $5,000	Invest part of $5,000	Perception of Current Year Earnings	Prediction of Earnings in Three Years	Difference in Earnings Predictions	Total Recognition	Average Usability	Average Ease of Use
Invest all $5,000	1	**0.797 (0.000)**	**0.344 (0.000)**	**0.515 (0.000)**	**0.237 (0.001)**	N/A	-0.103 (0.165)	0.079 (0.289)
Invest part of $5,000	**0.760 (0.000)**	1	**0.368 (0.000)**	**0.557 (0.000)**	**0.256 (0.000)**	N/A	-0.105 (0.145)	0.010 (0.887)
Perception of Current Year Earnings	**0.280 (0.000)**	**0.318 (0.000)**	1	**0.682 (0.000)**	**-0.278 (0.000)**	**-0.217 (0.004)**	**-0.112 (0.031)**	-0.099 (0.057)
Prediction of Earnings in Three Years	**0.454 (0.000)**	**0.538 (0.000)**	**0.669 (0.000)**	1	**0.513 (0.000)**	**-0.224 (0.001)**	**-0.121 (0.020)**	-0.021 (0.694)
Difference in Earnings Predictions	**0.203 (0.006)**	**0.246 (0.001)**	**-0.241 (0.000)**	**0.476 (0.000)**	1	-0.084 (0.274)	-0.036 (0.488)	0.073 (0.161)
Total Recognition	N/A	N/A	**-0.217 (0.004)**	**-0.264 (0.000)**	-0.107 (0.161)	1	-0.102 (0.184)	**-0.240 (0.001)**
Average Usability	-0.087 (0.244)	-0.090 (0.211)	**-0.136 (0.009)**	**-0.171 (0.001)**	-0.064 (0.223)	-0.086 (0.260)	1	**0.771 (0.000)**
Average Ease of Use	0.102 (0.172)	0.007 (0.920)	**-0.131 (0.012)**	-0.073 (0.158)	0.049 (0.349)	**-0.220 (0.004)**	**0.742 (0.000)**	1

Values above the diagonal are Pearson correlation coefficients (p-values). The values below the diagonal are Spearman's rho coefficients (p-values). Boldface values are significant at the 0.05 level.

As shown in Table 9 there are few strong correlations between independent variables and possible covariates. The strongest correlations are found in between the independent variables and the manipulation check questions. Display proximity has a strong positive correlation with the manipulation check associated with the location of the notes indicating that the high display proximity condition is highly correlated with a correct answer on the manipulation check question. Similarly, the signal-to-noise condition has a strong, positive correlation with the manipulation check regarding the number of footnotes displayed at a time. As noted in section 5.3, these correlations are likely due to the salience in the manipulations that are unfamiliar such as the high display proximity and high signal-to-noise manipulations. Beyond these variables a moderate correlation exists between signal-to-noise variable and participants'' perceptions of the importance of the footnotes (Pearson correlation coefficient = -0.241).

Given that change in net cash, change in net income, time on the manipulation, familiarity with financial statements, familiarity with the pharmaceutical industry, familiarity in using financial statements on the internet are significantly correlated with dependent variables and are not correlated with independent variables they are included as covariates in the analysis. Also, included as covariates are importance of the balance sheet, income statement, and footnotes. Results with covariates are discussed below.

5.4.3 Correlations between Ease of Use and Usefulness Variables

I performed a factor analysis on the six measures of perceived ease of use and the six measures of perceived usefulness to determine whether these measures load onto the same factor. The results of the factor analysis are shown in Table 9. The six measures of perceived ease of use loaded to form one variable with a Cronbach's alpha of 0.942. I averaged these six measures to create a composite score for perceived ease of use. The six measures of perceived usefulness have a Cronbach's alpha of 0.958 and are averaged together to form a composite score for perceived usefulness.

Table 8 Correlations Between Dependent Variables and Covariates								
Panel A								
	Change in Cash	Change in Net Income	Time on Manipulation	Total Time on Experiment	Time on Recognition Questions	Number of Accounting Classes	Number of Finance Classes	Years of Professional Investing
Invest all $5,000	0.096 (0.005)	**0.227** **(0.232)**	-0.072 **(-0.182)**	0.104 (-0.035)	N/A	0.013 (0.107)	0.118 (0.091)	0.051 (0.125)
Invest part of $5,000	**0.147** (0.072)	**0.296** **(0.284)**	-0.096 (-0.133)	0.033 (-0.022)	N/A	0.052 (0.123)	0.138 (0.137)	0.038 (0.115)
Perception of Current Year Earnings	**0.493** **(0.434)**	**0.464** **(0.452)**	0.05 (0.051)	0.035 (0.045)	-0.045 (-0.084)	0.063 (0.058)	-0.019 (0.007)	0.052 (0.028)
Prediction of Earnings in Three Years	**0.31** **(0.264)**	**0.339** **(0.344)**	-0.067 (-0.049)	0.023 (0.02)	0.012 (-0.039)	0.035 (0.084)	0.036 (0.048)	-0.003 (0.02)
Total Recognition	0.129 **(0.153)**	-0.09 (-0.052)	**0.376** **(0.376)**	**0.465** **(0.483)**	**0.579** **(0.453)**	-0.084 (0.012)	-0.016 (0.082)	-0.148 **(-0.164)**
Average Usability	0.002 (-0.032)	0.027 (-0.018)	**-0.197** **(-0.189)**	**-0.191** **(-0.172)**	-0.068 (-0.001)	-0.076 (-0.074)	0.025 (-0.068)	0.004 (-0.023)
Average Ease of Use	-0.089 **(-0.119)**	0.018 (-0.041)	**-0.268** **(-0.304)**	**-0.229** **(-0.237)**	-0.085 (0.016)	**-0.103** (-0.099)	0.016 (-0.078)	0.016 (-0.015)
Treatment	0.058 (0.064)	-0.001 (0.015)	0.032 **(0.155)**	**-0.108** (-0.062)	**-0.47** **(-0.823)**	-0.059 (-0.082)	-0.044 (-0.044)	-0.048 (-0.022)
The figures displayed are Pearson correlation coefficients (Spearman's rho coefficients). Boldface indicates that the correlation is significant at the 0.05 level.								

Table 8 Correlations Between Dependent Variables and Covariates (continued)								
Panel B								
	Years of Personal Investing	Financial Statement Familiarity	Pharmaceutical Industry Familiarity	Familiarity Using FS on Internet	Risk Total	Financial Knowledge	Self directed investing in last 4 years?	Self directed investing in last 2 years?
Invest all $5,000	0.062 (0.041)	**0.21** **(0.227)**	**0.207** **(0.205)**	**0.151** **(0.175)**	**0.188** **(0.179)**	-0.084 (-0.08)	0.088 (0.085)	0.125 (0.106)
Invest part of $5,000	0.029 (0.01)	**0.205** **(0.214)**	**0.201** **(0.238)**	**0.173** **(0.164)**	0.125 (0.097)	-0.068 (-0.066)	0.073 (0.081)	0.086 (0.087)
Perception of Current Year Earnings	0.03 (0.006)	**0.123** **(0.128)**	0.093 (0.073)	0.06 (0.08)	-0.034 (-0.002)	0.044 (0.072)	0.034 (0.025)	0.011 (0.008)
Prediction of Earnings in Three Years	-0.009 (-0.048)	**0.168** **(0.162)**	**0.107** **(0.114)**	0.095 **(0.118)**	0.01 (0.022)	-0.022 (-0.008)	0.043 (0.033)	0.008 (0.013)
Total Recognition	0.031 (0.089)	0.007 (-0.014)	-0.024 (-0.037)	0.07 (0.035)	-0.076 (-0.071)	0.063 (0.062)	-0.036 (-0.049)	0.033 (-0.004)
Average Usability	0.012 (0.051)	**-0.196** **(-0.182)**	**-0.13** **(-0.129)**	**-0.126** **(-0.116)**	-0.002 (-0.009)	0.102 **(0.121)**	-0.051 (-0.033)	-0.03 (-0.014)
Average Ease of Use	0.043 (0.089)	**-0.119** **(-0.143)**	-0.051 (-0.07)	**-0.113** **(-0.133)**	0.055 (0.04)	0.001 (-0.014)	-0.005 (-0.013)	0.001 (-0.018)
Treatment	-0.064 (-0.052)	-0.065 (-0.048)	-0.088 (-0.096)	-0.041 (-0.039)	0.01 (0.01)	0.05 (0.022)	0.071 (0.072)	-0.002 (0)
The figures displayed are Pearson correlation coefficients (Spearman's rho coefficients). Boldface indicates that the correlation is significant at the 0.05 level.								

Table 8 Correlations Between Dependent Variables and Covariates (continued)								
Panel C								
	Importance of Balance Sheet	Importance of Income Statement	Importance of Notes	Age	Attention Check	MC - Location of Notes	MC - Number Displayed	MC - Both
Invest all $5,000	0.043 (-0.031)	0.098 (0.022)	0.045 (0.045)	-0.033 (-0.113)	-0.03 (-0.041)	-0.067 (-0.07)	0.069 (0.077)	0.033 (0.048)
Invest part of $5,000	0.021 (-0.028)	0.018 (-0.046)	0.026 (0.036)	-0.078 (-0.141)	0.032 (0.033)	0.035 (0.068)	0.055 (0.093)	0.038 (0.077)
Perception of Current Year Earnings	**0.164** **(0.175)**	**0.129** **(0.136)**	0.041 (0.033)	0.023 (0.055)	0.022 (0.013)	**0.126** **(0.111)**	0.048 (0.023)	0.076 (0.052)
Prediction of Earnings in Three Years	**0.216** **(0.223)**	**0.143** **(0.164)**	-0.068 (-0.044)	-0.028 (-0.022)	0.043 (0.021)	0.028 (0.01)	0.077 (0.076)	0.091 (0.079)
Total Recognition	0.109 (0.074)	0.115 (0.086)	**0.398** **(0.417)**	0.086 (0.099)	0.148 (0.136)	0.038 (0.047)	0.014 (0.034)	0.028 (0.058)
Average Usability	**-0.17** **(-0.177)**	**-0.13** **(-0.143)**	**-0.243** **(-0.255)**	-0.004 (-0.012)	-0.007 (-0.003)	**-0.072** **(-0.073)**	**0.148** **(0.13)**	0.021 (0.009)
Average Ease of Use	**-0.213** **(-0.216)**	**-0.167** **(-0.175)**	**-0.29** **(-0.29)**	0.04 (0.015)	**-0.113** **(-0.121)**	**-0.171** **(-0.181)**	**0.112** **(0.09)**	-0.064 (-0.08)
Treatment	0.07 (0.047)	**0.11** **(0.095)**	**-0.159** **(-0.157)**	0.011 (0.015)	0.037 (0.039)	0.021 (0.035)	**0.215** **(0.221)**	0.096 (0.102)
The figures displayed are Pearson correlation coefficients (Spearman's rho coefficients). Boldface indicates that the correlation is significant at the 0.05 level.								

Table 9 Correlations Between Independent Variables and Covariates								
Panel A								
	Change in Cash	Change in Net Income	Time on Manipulation	Total Time on Experiment	Time on Recognition Questions	Number of Accounting Classes	Number of Finance Classes	Years of Professional Investing
All Conditions	0.058 (0.064)	-0.001 (0.015)	0.032 **(0.155)**	**-0.108** (-0.062)	**-0.47** **(-0.823)**	-0.059 (-0.082)	-0.044 (-0.044)	-0.048 (-0.022)
Treatment Condition	-0.069 (-0.065)	**-0.109** (-0.098)	-0.034 (-0.037)	-0.034 (-0.04)	-0.043 **(-0.111)**	0.048 (0.001)	0.062 (0.017)	-0.003 (0.008)
Display Proximity	0.03 (0.039)	-0.012 (0.022)	-0.052 (-0.074)	-0.072 (-0.053)	0.064 (0.043)	0.038 (0.012)	0.005 (-0.002)	0.025 (0.028)
Signal to Noise	-0.027 (-0.043)	-0.059 (-0.06)	-0.075 (-0.067)	-0.052 (-0.044)	-0.014 (-0.092)	0.021 (-0.014)	0.004 (-0.009)	-0.018 (0.001)
Task	**0.109** **(0.117)**	0.061 (0.075)	0.058 **(0.213)**	**-0.111** (-0.051)	**-0.541** **(-0.939)**	-0.098 (-0.101)	-0.089 (-0.061)	-0.056 (-0.03)
Investing Task								
Display Proximity	0.106 (0.116)	-0.023 (0.002)	0.005 (-0.013)	-0.018 (-0.012)	N/A	-0.105 (-0.117)	-0.106 (-0.09)	-0.019 (0.001)
Signal to Noise	-0.03 (-0.041)	-0.089 (-0.088)	-0.104 (-0.12)	-0.049 (-0.076)	N/A	-0.001 (-0.003)	-0.002 (-0.013)	0.001 **(-0.015)**
Recognition Task								
Display Proximity	-0.042 (-0.04)	0.006 (0.045)	-0.098 (-0.115)	-0.128 (-0.103)	0.066 (-0.009)	0.149 (0.146)	0.09 (0.09)	0.051 (0.053)
Signal to Noise	-0.045 (-0.064)	-0.035 (-0.039)	-0.061 (-0.054)	-0.039 (-0.007)	0.058 (-0.048)	0.056 (-0.004)	0.023 (0.006)	-0.024 (0.024)

Table 9 Correlations Between Independent Variables and Covariates (continued)								
Panel B								
	Years of Personal Investing	Financial Statement Familiarity	Pharmaceutical Industry Familiarity	Familiarity Using FS on Internet	Risk Total	Financial Knowledge	Self directed investing in last 4 years?	Self directed investing in last 2 years?
All Conditions	-0.064 (-0.052)	-0.065 (-0.048)	-0.088 (-0.096)	-0.041 (-0.039)	0.01 (0.01)	0.05 (0.022)	0.071 (0.072)	-0.002 (0)
Treatment Condition	**-0.116** **(-0.134)**	0.002 (0.019)	-0.011 (-0.02)	0.07 (0.063)	-0.014 (-0.01)	0.013 (0.034)	0.01 (0.01)	-0.01 (-0.011)
Display Proximity	0.042 (0.051)	-0.012 (-0.018)	0.067 (0.068)	-0.025 (-0.041)	-0.024 (-0.02)	-0.036 (-0.01)	0.001 (0.001)	-0.013 (-0.013)
Signal to Noise	**-0.129** **(-0.163)**	0.007 (0.022)	0.021 (0.012)	0.053 (0.052)	-0.027 (-0.029)	0.007 (0.009)	-0.01 (-0.01)	-0.004 (-0.004)
Task	-0.011 (0.018)	-0.079 (-0.069)	-0.099 **(-0.103)**	-0.089 (-0.087)	0.02 (0.019)	0.053 (0.005)	0.08 (0.08)	0.003 (0.003)
Investing Task								
Display Proximity	0.078 (0.085)	-0.053 (-0.071)	0.076 (0.081)	-0.079 (-0.103)	**-0.146** **(-0.144)**	-0.106 (-0.088)	0.034 (0.034)	0 (0)
Signal to Noise	-0.089 (-0.15)	0.019 (0.033)	0.033 (0.028)	0.126 (0.117)	**-0.162** **(-0.163)**	-0.039 (-0.014)	0.05 (0.05)	0.108 (0.108)
Recognition Task								
Display Proximity	0.002 (0.016)	0.027 (0.031)	0.048 (0.047)	0.031 (0.025)	0.124 (0.13)	0.027 (0.071)	-0.027 (-0.027)	-0.028 (-0.028)
Signal to Noise	**-0.172** **(-0.186)**	0.009 (0.021)	0.027 (0.012)	-0.018 (-0.007)	0.133 (0.127)	0.038 (0.034)	-0.092 (-0.092)	-0.137 (-0.137)

Table 9 Correlations Between Independent Variables and Covariates (continued)								
Panel C								
	Importance of Balance Sheet	Importance of Income Statement	Importance of Notes	Age	Attention Check	MC - Location of Notes	MC - Number Displayed	MC - Both
All Conditions	0.07 (0.047)	**0.11** (0.095)	**-0.159** **(-0.157)**	0.011 (0.015)	0.037 (0.039)	0.021 (0.035)	**0.215** **(0.221)**	0.096 (0.102)
Treatment Condition	-0.021 (-0.04)	0.001 (-0.016)	**-0.179** **(-0.154)**	**-0.111** **(-0.132)**	0.011 (0.012)	-0.014 (0.02)	**0.458** **(0.454)**	**0.152** **(0.161)**
Display Proximity	0.05 (0.051)	0.008 (0.009)	-0.018 (-0.027)	-0.002 (-0.008)	0.013 (0.013)	**0.667** **(0.667)**	-0.018 (-0.018)	**0.281** **(0.281)**
Signal to Noise	0.001 (-0.02)	-0.008 (-0.021)	**-0.205** **(-0.181)**	**-0.105** **(-0.131)**	0.005 (0.005)	**-0.154** **(-0.154)**	**0.548** **(0.548)**	**0.322** **(0.322)**
Task	0.096 (0.081)	**0.131** **(0.126)**	-0.089 (-0.095)	0.077 (0.099)	0.039 (0.039)	0.033 (0.033)	-0.001 (-0.001)	0.029 (0.029)
Investing Task								
Display Proximity	0.026 (0.048)	0.007 (0.018)	0.039 (0.048)	0.096 (0.085)	-0.005 (-0.005)	**0.679** **(0.679)**	-0.051 (-0.051)	**0.255** **(0.255)**
Signal to Noise	0.051 (0.022)	0.04 (0.01)	**-0.241** **(-0.219)**	-0.106 (-0.137)	0.013 (0.013)	**-0.155** **(-0.155)**	**0.504** **(0.504)**	**0.297** **(0.297)**
Recognition Task								
Display Proximity	0.083 (0.064)	0.021 (0.013)	-0.096 (-0.13)	-0.109 (-0.107)	0.04 (0.04)	**0.660** **(0.660)**	0.019 (0.019)	**0.317** **(0.317)**
Signal to Noise	-0.066 (-0.088)	-0.081 (-0.089)	-0.147 (-0.124)	-.119 **(-0.155)**	-0.013 (-0.013)	**-0.160** **(-0.160)**	**0.604** **(0.604)**	**0.350** **(0.350)**

5.5 Tests of Hypotheses

This study elicits participant's judgments and decisions regarding investment decisions across two tasks: an investing task and a recognition task. Two primary dependent variables are used in the investing task. The variables measure the participant's willingness to invest a specified amount of money in the

Table 10: Factor Loading and Cronbach's Alpha for Factors with Multiple Questions		
	Factor Load	Cronbach's Alpha
Perceived Ease of Use		0.942
Interaction with this format would be clear and understandable.	0.901	
Learning to operate this format would be easy for me.	0.898	
Become skillful at using this format.	0.866	
Easy to get this formation to do what I want it to do.	0.82	
Format easy to use.	0.771	
Flexible to interact with.	0.593	
Perceived Usefulness		0.958
Enhance my investing effectiveness.	0.964	
Improve my investing performance.	0.942	
Easier to make investing decisions.	0.906	
Increase my productivity.	0.856	
Format useful in my investing decisions.	0.746	
Accomplish tasks more quickly.	0.693	

company whose financial statements are presented. One primary dependent variable is used in the recognition task. This variable measures participants' recognition of footnote disclosure information from four choices. Two secondary dependent variables are used in the both the investing and the recognition task. These variables measure participants' perceptions of the company's current and projected earnings.

5.5.1 Tests of Hypotheses 1a and 1b

Hypothesis 1a predicts that investors using a high display proximity, high signal-to-noise format will be less likely to invest in a company with footnotes disclosures indicating poor future performance than non-professional investors receiving all other presentation formats. Hypothesis H1b predicts that non-professional investors receiving a low display proximity, low signal-to-noise format will be most

Table 11: Effect of Display Proximity and Signal-to-Noise Ratio on Investing Decisions in an Integrative Task

Panel A: Investing all $5,000 Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 45.9 (4.5) n = 38	Cell 3 30.8 (3.6) n = 48	38.3 (2.9) n = 86
	Low (Inline)	Cell 2 41.3 (3.8) n = 51	Cell 4 34.6 (3.8) n = 46	38.0 (2.7) n = 97
		43.6 (2.8) n = 89	32.7 (2.7) n = 94	38.1 (2.0) n = 183

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 2	(4.535 [5.643])	-10.10, 19.17	H1a	0.853
Cell 1 vs. Cell 3	(15.098 [5.718]	0.27, 29.93	H1a	0.044
Cell 1 vs. Cell 4	(11.260 [5.773])	-3.71, 26.23	H1a/H1b	0.211
Cell 4 vs. Cell 2	(-6.725 [5.355])	-20.61, 7.16	H1b	0.592
Cell 4 vs. Cell 3	(3.838 [5.434])	-10.25, 17.93	H1b	0.894
Cell 2 vs. Cell 3	(10.563 [5.296])	-3.17, 24.30		0.194

A total of 199 participants completed the experiment; however, 16 observations were eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

likely to invest in a company with footnote disclosure indicating poor future performance than non-professional investors who receive other presentation formats.

Said differently, H1a predicts that non-professional investors viewing one note at a time to the right of the financial statements will be least likely to invest all $5,000 as well as invest the least amount of $5,000 in the company. Conversely, hypothesis H1b predicts that non-professional investors viewing multiple footnote disclosures simultaneously beneath the financial statements will be most willing to invest in a company with indications of weak financial performance in the footnotes. As multiple measures are used to test these hypotheses, each dependent variable will be discussed in turn.

The first dependent variable is the participants' likelihood to invest an entire $5,000 in the hypothetical company. Participant responses are measured on a scale of 0 to 100 where 0 indicates "Not at all likely" and 100 indicates "Very likely". As shown in Table 11 Panel A, the mean likelihood of participants willing to invest the full $5,000 in the hypothetical company is 38.1. Participants were also asked how confident they are in their response and no significant differences are observed between conditions (*p*-value = 0.204, untabulated). To test Hypothesis 1a, I compared Cell 1 (high display proximity, high signal-to-noise) with each of the three conditions as detailed in Panel B of Table 11. There are no significant differences between Cell 1 and Cell 2 or Cell 1 and Cell 4 (p-value of 0.853 and p-value = 0.211, respectively). Only the mean of Cell 1 ($\bar{x}$ = 45.9) and the mean of Cell 3 ($\bar{x}$ = 30.8) are significantly different (*p*-value = 0.044). Therefore, hypothesis 1a is not supported.

I test Hypothesis 1b by comparing Cell 4 (low display proximity, low signal-to-noise) with each of the other three conditions; however, there are no significant differences between those conditions. Therefore, hypothesis 1b is not supported. Thus, there is no evidence the high display proximity, high signal-to-noise condition outperforms the other footnote presentation formats nor evidence to support the low display proximity, low signal-to-noise condition is the worst performing of the experimental conditions.[16]

[16] I used an alternative measure of participants' willingness to invest all $5,000 in the hypothetical company to test the sensitivity of the pairwise comparison. I split participant responses into two groups: those more likely to

Table 12: Effect of Display Proximity and Signal-to-Noise Ratio on Investing Decisions in an Integrative Task

Panel A: Investing a Portion of $5,000 Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 48.6 (4.0) n = 39	Cell 3 37.5 (3.5) n = 51	43.1 (2.7) n = 90
	Low (Inline)	Cell 2 41.7 (3.4) n = 57	Cell 4 33.4 (3.9) n = 49	37.545 (2.5) n = 106
		45.1 (2.7) n = 96	35.5 (2.6) n = 100	40.3 (1.9) n = 196

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 2	(6.888 [5.339])	-6.95, 20.72	H1a	0.570
Cell 1 vs. Cell 3	(11.041 [5.465])	-3.12, 25.20	H1a	0.184
Cell 1 vs. Cell 4	(15.202 [5.513])	0.91, 29.49	H1a/H1b	0.032
Cell 4 vs. Cell 2	(-8.314 [5.005])	-21.28, 4.66	H1b	0.347
Cell 4 vs. Cell 3	(-4.161 [5.139])	-17.48, 9.16	H1b	0.850
Cell 2 vs. Cell 3	(11.041 [5.465])	-8.68, 16.99		0.836

A total of 199 participants completed the experiment; however, 3 observations were eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

invest all $5,000 (i.e., greater than 50) and those less likely to invest all $5,000 (i.e., less than 50). A Chi-squared analysis reveals participants in the high display proximity, high signal-to-noise footnote presentation format are

Table 13: Effect of Display Proximity and Signal-to-Noise Ratio on Investing Judgments in an Integrative Task

Panel A: Future Year Earnings Perceptions Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 71.7 (2.3) n = 39	Cell 3 58.5 (2.9) n = 52	65.1 (2.0) n = 91
	Low (Inline)	Cell 2 64.0 (2.7) n = 58	Cell 4 58.0 (2.5) n = 50	61.0 (1.8) n = 108
		67.8 (2.0) n = 97	58.3 (1.9) n = 102	63.0 (1.4) n = 199

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 2	(7.692 [3.904])	-2.42, 17.81	H1a	0.203
Cell 1 vs. Cell 3	(13.192 [3.994])	2.84, 23.54	H1a	0.006
Cell 1 vs. Cell 4	(13.692 [4.028])	3.26, 24.13	H1a/H1b	0.005
Cell 4 vs. Cell 2	(-6.000 [3.638])	-15.43, 3.43	H1b	0.354
Cell 4 vs. Cell 3	(-.500 [3.734])	-10.18, 9.18	H1b	0.999
Cell 2 vs. Cell 3	(5.500 [3.600])	-3.83, 14.83		0.423

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

significantly less likely to invest in the company (adjusted standardized residual = 2.1).

The second dependent variable is how much of $5,000 the participants are willing to invest in the company. Participant responses are measured on a scale of 0 to 100 where 0 indicates "Nothing at all" and 100 indicates "The Entire Amount". Panel A of Table 12 reports the mean amount of $5,000 participants are willing to invest is 40.3, or approximately $2,015. Participants were asked about their confidence level in their decision to invest a portion of the $5,000. No significant differences between conditions in participants' confidence in their decision to invest a portion of the $5,000 ($p$-value = 0.127, untabulated).

As with the prior dependent variable measure, I compare Cell 1 with the other three cells to test Hypothesis 1a. The mean of Cell 1 ($\bar{x}$ = 48.6) is not significantly different from the mean of Cell 2 ($\bar{x}$ = 41.7) or the mean of Cell 3 ($\bar{x}$ = 37.5) as displayed in Panel B; however, Cell 1 is significantly different (p-value = 0.032) than the mean of Cell 4 ($\bar{x}$ = 33.4) although the difference is the opposite direction of the prediction. In addition, Hypothesis 1b compares Cell 4 with Cells 2 and 3 noting no significant differences between the cells. Thus, both Hypothesis 1a and 1b fail to be supported using this measure.

The two secondary dependent variables measure participants' perceptions about the company's *current year* earnings performance and predicted earnings performance over *the next three years*. These variables are measured on a scale of 0 to 100 where 0 indicates "Very Weak" and 100 indicates "Very Strong". On average participants rated the company's current year performance as strong ($\bar{x}$ = 62.6). There are no significant differences between conditions (untabulated). While this is not surprising given information contained in the footnotes is designed to inform the user about future cash flows and earnings, this variable is important in understanding how the footnote disclosures change their perceptions of the company's expected performance in the future.

Table 13 Panel A reports the mean future earnings performance by condition. Overall, participants viewed the company's future earnings to be strong ($\bar{x}$ = 63.0). As Hypothesis 1a predicts that participants in Cell 1 (high display proximity, high signal-to-noise condition) will be more willing to invest in the hypothetical company than participants in the other three conditions, I perform a pairwise comparison between Cell 1 and Cells 2, 3, and 4 as noted in Panel B. The mean of Cell 1 ($\bar{x}$ = 71.7) is

significantly higher than both the mean of Cell 3 ($\bar{x}$ = 58.5, *p*-value = 0.006) and the mean of Cell 4 ($\bar{x}$ = 58.0, *p*-value = 0.005). Thus, not only is there no support for Hypothesis 1a, participants in the high display proximity, high signal-to-noise condition erroneously have significantly more optimistic perceptions about the company than two other conditions.

The last alternative measure of performance used is the difference between current and future year earnings. Table 14 Panel A provides the descriptive statistics by condition. Overall, the mean of future performance differed from the mean of current year performance by 0.73. Panel B displays the pairwise comparison between Cell 1 ($\bar{x}$ = 4.5) and Cell 3 ($\bar{x}$ = -5.1) and is significant (*p*-value = 0.016); however, the mean difference is in the opposite direction of the hypothesis. Cell 1 is not significantly difference from Cell 2 or Cell 4. Further, participants in Cell 4 are predicted to perform the worst on this task; however, the pairwise comparisons in Panel B indicate no differences between Cell 4 and the other three conditions. Therefore, this test does not support Hypothesis 1a or 1b.

In summary, all five different dependent variables used to test whether participants in the high display proximity, low signal-to-noise footnote presentation format condition are willing to invest more in the company fail to support H1a. In two of the five tests the high display proximity, low signal-to-noise (Cell 3) footnote presentation format outperforms the high display proximity, high signal-to-noise ratio condition (Cell 1) and in two of the five tests the low display proximity, low signal-to-noise ratio condition (Cell 4) outperforms the high display proximity, high signal-to-noise ratio condition (Cell 1). To further explore the differences between groups I perform a MANCOVA as an additional analysis in Section 5.6.

5.5.2 Tests of Hypothesis 2

Hypothesis 2 predicts that non-professional investors who receive a low display proximity, low signal-to-noise presentation format will recognize a greater number of details from footnotes than non-professional investors who receive all other presentation formats. The primary dependent variable for the recognition task is the total number of correct responses to eight questions about the footnotes included in the financial statements. One question per footnote is asked and each question has four available

responses from which the participants are asked to select. A higher score indicates greater recognition of the information included in the footnotes. On average participants recognized information from 3.66 footnotes (minimum = 0 and maximum = 8) as shown in Table 15.

Table 14: Effect of Display Proximity and Signal-to-Noise Ratio on Investing Judgments in an Integrative Task

Panel A: Difference in Earnings Perceptions Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 4.5 (2.4) n = 39	Cell 3 -5.1 (2.2) n = 52	-0.30 (1.61) n = 91
	Low (Inline)	Cell 2 4.3 (2.1) n = 57	Cell 4 -0.8 (2.0) n = 50	1.75 (1.47) n = 107
		4.40 (1.58) n = 96	-2.95 (1.51) n = 102	0.73 (1.09) n = 198

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 2	(.275 [3.159])	-7.91, 8.46	H1a	1.000
Cell 1 vs. Cell 3	(9.673 [3.220])	1.33, 18.02	H1a	0.016
Cell 1 vs. Cell 4	(5.298 [3.247])	-3.12, 13.71	H1a/H1b	0.363
Cell 4 vs. Cell 2	(-5.023 [2.945])	-12.65, 2.61	H1b	0.324
Cell 4 vs. Cell 3	(4.375 [3.010])	-3.43, 12.18	H1b	0.468
Cell 2 vs. Cell 3	(9.397 [2.915])	1.84, 16.95		0.008

A total of 199 participants completed the experiment; however, 1 observation was eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

Table 15: Effect of Display Proximity and Signal-to-Noise Ratio on Recognition of Footnote Disclosures

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 3.54 (0.39) n = 37	Cell 3 3.82 (0.34) n = 50	3.70 (0.26) n = 87
	Low (Inline)	Cell 2 2.91 (0.38) n = 32	Cell 4 4.06 (0.34) n = 53	3.62 (0.26) n = 85
		3.25 (0.28) n = 69	3.94 (0.24) n = 103	3.66 (0.18) n = 172

I estimate a Poisson regression with recognition count as the dependent variable and display proximity and signal-to-noise ratio as independent variables to test whether any differences between groups exist. Analysis of variance is not used because the dependent variable is a count variable and violates the assumption of normality. The overall test is significant (χ^2 = 91.462, p=0.000). Table 16 Panel B displays the results of the model and indicates that the interaction is not significant (Wald χ^2 = 1.426, p=0.232) but there are significant main effects for signal- to-noise ratio (Wald χ^2 = 8.298, p=0.004), the control variables of time spent on the financial statements (Wald χ^2 = 14.63, p=0.000), and time spent responding to the recognition questions (Wald χ^2 = 64.789, p=0.000). Panel C provides that results for the test of Hypothesis 2, which states that participants in the low display proximity, low signal-to-noise footnote presentation format (Cell 4) will recognize more footnote information than those

Table 16: Poisson Regression

Panel A: Omnibus Test[a]

Likelihood Ratio Chi-Square	df	Sig.
91.462	5	0.000

Dependent Variable: Total Recognition

Model: (Intercept), COV_TimeManip, COV_TimeRecog, IV_DISPLAY, IV_SIGNAL, IV_DISPLAY * IV_SIGNAL

[a] Compares the fitted model against the intercept-only model.

Panel B: Tests of Model Effects

Source	Type III		
	Wald Chi-Square	df	Sig.
(Intercept)	220.099	1	0.000
COV_TimeManip	14.63	1	0.000
COV_TimeRecog	64.789	1	0.000
IV_DISPLAY	0.41	1	0.522
IV_SIGNAL	8.298	1	0.004
IV_DISPLAY * IV_SIGNAL	1.426	1	0.232

Dependent Variable: Total Recognition

Model: (Intercept), COV_TimeManip, COV_TimeRecog, IV_DISPLAY, IV_SIGNAL, IV_DISPLAY * IV_SIGNAL

Panel C: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	H:	*p*-value[b]
Cell 1 vs. Cell 2	(0.47 [0.412])	-0.34, 1.27		0.258
Cell 1 vs. Cell 3	(-0.50 [0.400])	-1.29, 0.28		0.210
Cell 1 vs. Cell 4	(-0.68 [0.403])	-1.47, 0.11	H2	0.093
Cell 4 vs. Cell 2	(-1.14 [0.389])	0.38, 1.91	H2	0.003
Cell 4 vs. Cell 3	(0.18 [0.378])	-0.56, 0.92	H2	0.641
Cell 2 vs. Cell 3	(-0.97 [0.391])	-1.73, -0.20		0.013

[b] The p-value in Panel C is the two-tailed p-value based on Least Significant Difference

participants in all other conditions. Although the mean of Cell 4 is greater than all other conditions, Cell 4 is only significantly different from Cell 2 (low display proximity, high signal-to-noise, *p*-value = 0.003). The mean difference between Cell 4 and Cell 1 is marginally significant (*p*-value = 0.093). Therefore, Hypothesis 2 is not supported.

5.5.3 Tests of Hypothesis 3a and 3b

Hypothesis 3a predicts that non-professional investors using the high display proximity, low signal-to-noise format will evaluate the format more usable than non-professional investors using all other footnote disclosure presentation formats. Hypothesis 3b predicts that non-professional investors using the

Table 17: Effect of Display Proximity and Signal-to-Noise Ratio on Usability in an Integrative Task

Panel A: Average Perceived Usefulness Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 3.5 (0.21) n = 39	Cell 3 3.3 (0.18) n = 52	3.4 (0.14) n = 91
	Low (Inline)	Cell 2 3.8 (0.17) n = 57	Cell 4 3.5 (0.17) n = 50	3.6 (0.12) n = 107
		3.7 (0.13) n = 96	3.4 (0.13) n = 102	3.5 (0.09) n = 198

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 3	(0.2212 [0.2693])	-0.477, 0.919	H3a	0.844
Cell 4 vs. Cell 3	(0.1817 [0.2518])	-0.471, 0.834	H3a	0.888
Cell 2 vs. Cell 3	(0.5037 [0.2438])	-0.128, 1.136	H3a/H3b	0.168
Cell 1 vs. Cell 2	(-0.2825 [0.2642])	-0.967, 0.402	H3b	0.709
Cell 4 vs. Cell 2	(-0.3220 [0.2464])	-0.96, 0.316	H3b	0.560
Cell 1 vs. Cell 4	(0.0395 [0.2716])	-0.664, 0.743		0.999

A total of 199 participants completed the experiment; however, 1 observation was eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

low display proximity, high signal-to-noise format will evaluate the format as less usable than non-professional investors in all other presentation formats. Measures of ease of use and usefulness were

Table 18: Effect of Display Proximity and Signal-to-Noise Ratio on Usability in an Integrative Task

Panel A: Average Perceived Ease of Use Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 2.8 (0.22) n = 39	Cell 3 2.6 (0.14) n = 52	2.7 (0.12) n = 91
	Low (Inline)	Cell 2 3.4 (0.16) n = 57	Cell 4 3.0 (0.16) n = 50	3.2 (0.11) n = 107
		3.1 (0.12) n = 96	2.8 (0.12) n = 102	3.0 (0.08) n = 198

Panel B: Average Perceived Ease of Use

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 3	(0.1891 [0.2487])	-0.455, 0.834	H3a	0.872
Cell 4 vs. Cell 3	(0.3591 [0.2325])	-0.244, 0.962	H3a	0.413
Cell 2 vs. Cell 3	(0.7271 [0.2251])	0.144, 1.311	H3a/H3b	0.008
Cell 1 vs. Cell 2	(-0.5380 [0.2440])	-1.17, 0.094	H3b	0.125
Cell 4 vs. Cell 2	(-0.3680 [0.2275])	-0.958, 0.222	H3b	0.371
Cell 1 vs. Cell 4	(-0.1700 [0.2508])	-0.82, 0.48		0.905

A total of 199 participants completed the experiment; however, 1 observation was eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

adapted from Davis (1989) and use a 1 to 7 scale where 1 is “Extremely Likely” and 7 is “Extremely Unlikely”. Five questions were asked of participants for each construct and the average of the scores is used as a composite variable. Recall that participants in both conditions are provide their assessments of

Table 19: Effect of Display Proximity and Signal-to-Noise Ratio on Usability in a Nonintegrative Task

Panel A: Average Perceived Usefulness Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 3.9 (0.23) n = 37	Cell 3 3.4 (0.20) n =50	3.6 (0.15) n = 87
	Low (Inline)	Cell 2 3.9 (0.25) n = 32	Cell 4 3.7 (0.20) n = 53	3.8 (0.16) n = 85
		3.9 (0.17) n = 69	3.6 (0.14) n = 103	3.7 (0.11) n = 172

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 2	(-0.0466 [0.3440])	-0.939, 0.846	H3a	0.999
Cell 1 vs. Cell 3	(0.4449 [0.3090])	-0.357, 1.247	H3a	0.476
Cell 1 vs. Cell 4	(0.1793 [0.3053])	-0.613, 0.971	H3a/H3b	0.936
Cell 4 vs. Cell 2	(-0.2259 [0.3190])	-1.054, 0.602	H3b	0.894
Cell 4 vs. Cell 3	(0.2655 [0.2809])	-0.463, 0.994	H3b	0.780
Cell 2 vs. Cell 3	(0.4915 [0.3226])	-0.346, 1.329		0.426

A total of 199 participants completed the experiment; however, 3 observations were eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

perceived ease of use and perceived usefulness after responding to their respective dependent variables. Given that the task may have an effect on participants' perceptions, I performed separate pairwise comparisons for each task.

Table 20: Effect of Display Proximity and Signal-to-Noise Ratio on Usability in a Nonintegrative Task

Panel A: Average Perceived Ease of Use Estimated Marginal Means (Std. Error)

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	Cell 1 3.3 (1.4) n = 37	Cell 3 3.0 (1.2) n =50	3.1 (0.15) n = 87
	Low (Inline)	Cell 2 3.5 (1.5) n = 32	Cell 4 3.1 (1.3) n = 53	3.3 (0.15) n = 85
		3.4 (0.16) n = 69	3.0 (0.13) n = 103	3.2 (0.11) n = 172

Panel B: Pairwise Comparisons

Comparisons (EMM Diff. [Std Error])		95% Conf. Interval	Hypothesis	*p*-value[1]
Cell 1 vs. Cell 2	(-0.2249 [0.3283])	-1.077, 0.627	H3a	0.903
Cell 1 vs. Cell 3	(0.3230 [0.2949])	-0.442, 1.088	H3a	0.693
Cell 1 vs. Cell 4	(0.2434 [0.2914])	-0.513, 0.999	H3a/H3b	0.838
Cell 4 vs. Cell 2	(-0.4684 [0.3045])	-1.258, 0.322	H3b	0.417
Cell 4 vs. Cell 3	(0.0796 [0.2681])	-0.616, 0.775	H3b	0.991
Cell 2 vs. Cell 3	(0.5479 [0.3079])	-0.251, 1.347		0.287

A total of 199 participants completed the experiment; however, 3 observations were eliminated in this analysis due to missing data.

1 The p-value in Panel B is the two-tailed p-value based on Tukey's Honest Significant Difference

Table 17 and Table 18 report the estimated marginal means for perceived usefulness and perceived ease of use, respectively, for the integrative task. The average perceived usefulness is 3.5 whereas the average ease of use is 3.0. Panel B of Table 17 reports no significant difference between groups for perceived usefulness. Panel B of Table 18 reports the mean of the high display proximity, low signal-to-noise format is significantly different from only the mean of the low display proximity, high signal-to-noise format (p-value = 0.008).

Table 19 and Table 20 report the estimated marginal means for perceived usefulness and perceived ease of use, respectively, for the non-integrative task. The average perceived usefulness is 3.7 whereas the average ease of use is 3.2. Panel B of Table 19 reports there is no significant difference between groups for perceived usefulness. Panel B of Table 20 indicates there is no significant difference between groups for perceived ease of use. Given that only one pairwise comparison was significant out of both tasks, Hypothesis 3a and 3b are not supported.

5.6 Additional Analyses

As noted in the prior section, the dependent variables are highly correlated and thus I performed an additional test of Hypotheses 1a and 2b using multivariate analysis of covariance (MANCOVA). MANCOVA has three assumptions that must be met to effectively draw conclusions on the validity of the hypotheses. First, MANOVA relies on the assumption that the dependent variables are normally distributed (Mendenhall and Sincich 2003). I evaluate each dependent variable distribution individually under the assumption that a normal univariate distribution would also lead to a normal distribution in combination as there is no direct test for multivariate normality (Hair et al). The second assumption with MANCOVA is that there is equivalence of covariance matrices across the groups (Hair et al 2010). The third assumption is discussed in section 5.6.3 below.

5.6.1 Assumption of Normality

The null hypothesis is that the data are normally distributed and thus a non-significant result indicates that we fail to reject the null hypothesis. I examined the dependent variables for each task independently using both the Kolmogorov-Smirnov and Shaprio-Wilk statistical tests. As shown in Table

21, all dependent variables for the recognition task are significant and thus are not normally distributed.

These tests are highly sensitive to subtle differences in normality and thus I observe the histogram for

Table 21: Test of Normality

Recognition Task

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Perception of Current Year Earnings	0.157	170	0.000	0.931	170	0.000
Confidence in their Perception of Current Year Earnings	0.142	170	0.000	0.942	170	0.000
Prediction of Earnings in Three Years	0.120	170	0.000	0.961	170	0.000
Confidence in their Prediction of Earnings in Three Years	0.106	170	0.000	0.958	170	0.000
Difference in Earnings Predictions	0.081	170	0.009	0.977	170	0.006
Composite of Usability	0.153	170	0.000	0.939	170	0.000
Average Usability	0.153	170	0.000	0.939	170	0.000
Composite of Ease of Use	0.091	170	0.001	0.962	170	0.000
Average Ease of Use	0.091	170	0.001	0.962	170	0.000

a Lilliefors Significance Correction

Investing Task

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Invest all $5,000	0.155	181	0.000	0.921	181	0.000
Confidence in Investing all of $5,000	0.124	181	0.000	0.93	181	0.000
Invest part of $5,000	0.123	181	0.000	0.949	181	0.000
Confidence in Investing part of $5,000	0.086	181	0.002	0.951	181	0.000
Perception of Current Year Earnings	0.128	181	0.000	0.964	181	0.000
Confidence in their Perception of Current Year Earnings	0.088	181	0.002	0.958	181	0.000
Prediction of Earnings in Three Years	0.116	181	0.000	0.962	181	0.000
Confidence in their Prediction of Earnings in Three Years	0.100	181	0.000	0.964	181	0.000
Difference in Earnings Predictions	0.126	181	0.000	0.946	181	0.000
Composite of Usability	0.082	181	0.004	0.977	181	0.004
Average Usability	0.082	181	0.004	0.977	181	0.004
Composite of Ease of Use	0.083	181	0.004	0.964	181	0.000
Average Ease of Use	0.083	181	0.004	0.964	181	0.000

a Lilliefors Significance Correction

each dependent variable by task. The distributions are normal for all dependent variables in the investing task with the exception of likelihood to invest $5,000 and amount of $5,000 to invest, which appear to have two potential means. To address any potential issues with these two variables I considered non-parametric ANOVA to confirm the MANOVA results. In the recognition task, the earnings variables are relatively normally distributed; however, the average ease of use and average usefulness appear to have two slight mean differences. As with this issue in the investing task I used non-parametric ANOVA to confirm the results of the MANOVA.

5.6.2 Assumption of Equality of Variance-Covariance in MANCOVA

I used Box's M to test the second assumption of whether there is equality of the covariance matrices across groups. The null hypothesis states that there is equal covariance across groups. A *p*-value above 0.001 indicates that the null hypothesis should not be rejected (Pallant 2005, 258). As shown in Table 22, Panel A, the *p*-values for the recognition task are 0.119 for the investing dependent variables and 0.565 for the ease of use/usefulness dependent variables. For the investing task *p*-values are 0.465 for the investing dependent variables and 0.660 for the ease of use/usefulness dependent variables as shown in Table 21, Panel C.

In addition to Box's M, I used Levene's Test of Equality of Variance Errors. A *p*-value above 0.05 indicates that the assumption of equal variances is not violated (Mendelhall and Sincich 2003). Table 22 displays Levene's test statistics for both the recognition task and investing task in Panel B and Panel D, respectively. All variables exceed a *p*-value of 0.05 with the exception of average usefulness related to the recognition task.

5.6.3 Assumption of Independence in MANCOVA

The third MANCOVA assumption addresses the independence of the observations. To address this assumption, each participant was randomly assigned to one of eight conditions. In addition, participants are AMT workers that are located around the United States and completed the experiment on their own

time over the course of several weeks. There are three IP addresses that completed the survey twice and have been eliminated from the analysis.[17]

Table 22: Tests of the Homogeneity of the Variance Covariance Matrices					
Panel A: Box's Test of Equality of Covariance Matrices (Recognition Task)					
	Box's M	*F*-statistic	df1	df2	*p*-value
Investing Dependent Variables	14.433	1.567	9	181842.9	0.119
Ease of Use and Usability Dependent Variables	7.873	0.855	9	181842.9	0.565
Investing DVs include Perception of Current Year Earnings and Prediction of Earnings in Three Years					
Panel B: Levene's Test of Equality of Error Variances (Recognition Task)					
		F-statistic	df1	df2	*p*-value
Perception of Current Year Earnings		2.005	3	168	0.115
Prediction of Earnings in Three Years		0.346	3	168	0.792
Average Usability		3.162	3	168	0.026
Average Ease of Use		1.289	3	168	0.28
Panel C: Box's Test of Equality of Covariance Matrices (Investing Task)					
	Box's M	*F*-statistic	df1	df2	*p*-value
Investing Dependent Variables	31.3	1	30	79671.769	0.465
Ease of Use and Usability Dependent Variables	6.909	0.753	9	315875.588	0.66
Investing DVs include Likelihood to invest all $5,000, percentage of $5,000 to invest, perception of current year earnings, and Prediction of Earnings in Three Years					
Panel B: Levene's Test of Equality of Error Variances (Investing Task)					
		F-statistic	df1	df2	*p*-value
Invest all $5,000		0.676	3	178	0.568
Invest part of $5,000		0.371	3	178	0.774
Perception of Current Year Earnings		1.62	3	178	0.186
Prediction of Earnings in Three Years		1.62	3	178	0.165
Average Usability		0.172	3	194	0.915
Average Ease of Use		2.035	3	194	0.11

[17] An Internet Protocol (IP) address is a 32-bit number assigned to a device on a network. Observations with the same IP address are eliminated because it increases the likelihood that either the same person completed the

5.6.4 MANCOVA testing

I used MANCOVA to test these hypotheses as the measures of their willingness to invest all $5,000 and the percentage of $5,000 they are willing to invest are highly positively correlated. The MANCOVA results for the dependent measure are presented in Panel A of Table 23. As observed in Table 23 Panel A, the interaction hypotheses of H1a and H1b are not supported (F=1.075 p=0.371).[18] ANOVA results are not interpreted as the MANCOVA is not significant.[19][20]

Although hypotheses H1a and H1b predicting an interaction of display proximity and signal-to-noise are not supported, a significant main effect is observed for signal-to-noise ratio (F=4.117, p-0.003), which is inconsistent with expectations. Table 23, Panel B displays the univariate results for signal-to-noise ratio. Both measures of non-professional investors' investing decisions are significant: participants' willingness to invest all $5,000 (F=10.176, p=0.002) and participants' proportion of $5,000 they are willing to invest in the company (F=9.901, p=0.002). The mean of ALL5000 is 32.112 for the low signal-to-noise ratio condition and 44.373 for the high signal-to-noise condition. In other words, non-professional investors are less willing to invest in a company that has signs of poorer future performance when footnotes are displayed simultaneously than when they are displayed one at a time. This result is in the opposite direction of my expectations related to hypotheses H1a and H1b, which predicted the high signal-to-noise condition would result in less willingness (e.g., lower means) to invest in the company.

A marginally significant main effect for display proximity is observed (F = 2.133, p = 0.079). However, neither the likelihood to invest all $5,000 nor the percentage of $5,000 non-professional investors are willing to invest is significant. The effect is significant for participants' perceptions' of

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experiment multiple times or two people in close physical proximity completed the experiment together. In each of the three cases both IP addresses began the experiment on the same day.

[18] The MANCOVA controls for participants' perceptions about the change in cash and the change in net income from the prior year to the current year. Without controlling for these variables, the interaction remains insignificant (F=1.098, p=0.359, untabulated) and signal-to-noise ratio remains significant (F=3.534, p=0.008.

[19] The failure to find support for the hypothesis holds when Windsorizing the time on experiment variable at 5 percent (untabulated). Although the interaction is significant, participants in the low signal-to-noise condition are less willing to invest in the company – consistent with the full sample. Statistical analysis was not performed on the sample excluding those who failed the attention or manipulation check questions due to insufficient sample size.

Table 23: The Overall Effect of Display Proximity and Signal-to-Noise Ratio on Investor Judgments					
Panel A - Multivariate Results					
Independent Variable:				F-Value[1]	p-value
Display Proximity				2.133	0.079
Signal-to-Noise Ratio				4.117	0.003
DP x SN				1.075	0.371
Panel B - Univariate Results					
Independent Variable:	df	SS	MS	F-Value	p-value
Display Proximity					
All $5000[a]	1	168.964	168.964	0.257	0.613
Part $5000[b]	1	1322.346	1322.346	2.186	0.141
Current Earnings[c]	1	1242.879	1242.879	6.047	0.015
Future Earnings[d]	1	321.667	321.667	1.114	0.293
Signal-to-Noise Ratio					
All $5000[a]	1	6681.558	6681.558	10.176	0.002
Part $5000[b]	1	5990.125	5990.125	9.901	0.002
Current Earnings[c]	1	486.956	486.956	2.369	0.126
Future Earnings[d]	1	3792.16	3792.16	13.129	0.000
DP x SN					
All $5000[a]	1	757.046	757.046	1.153	0.284
Part $5000[b]	1	0.655	0.655	0.001	0.974
Current Earnings[c]	1	0.21	0.21	0.001	0.975
Future Earnings[d]	1	333.342	333.342	1.154	0.284

[1]Wilks' Lambda

[a]All $5000 = Participants" willingness to invest an entire $5,000 in the company

[b]Part $5000 = Portion of $5,000 participants' are willing to invest in the company

[c]Current Earnings = Perceptions of the company's current fiscal year end performance

[d]Future Earnings = Perceptions of the company's' performance in three years

current year earnings. The mean of current year earnings is 60.342 for the low display proximity condition and 65.693 for the high display proximity. Thus participants viewing the footnote disclosures below the financial statements, regardless of whether the footnotes were shown singularly or

[20] I use separate ANCOVAs to test each dependent variable included in the MANCOVA as the DVs are highly correlated. In untabulated results, there are no differences between groups for either the ALL5000 or PART5000 dependent variables, thus confirming the results of the MANCOVA.

simultaneously, perceived the company's current earnings as weaker than participants who viewed the footnote disclosures to the right of the financial statements.

In addition to the main effect of signal-to-noise on investing judgements described above, signal-to-noise ratio also has a main effect on participants' perceptions of the company's earnings in three years ($F = 13.129$, $p = <0.001$). The mean of the perception of future earnings for the low signal-to-noise

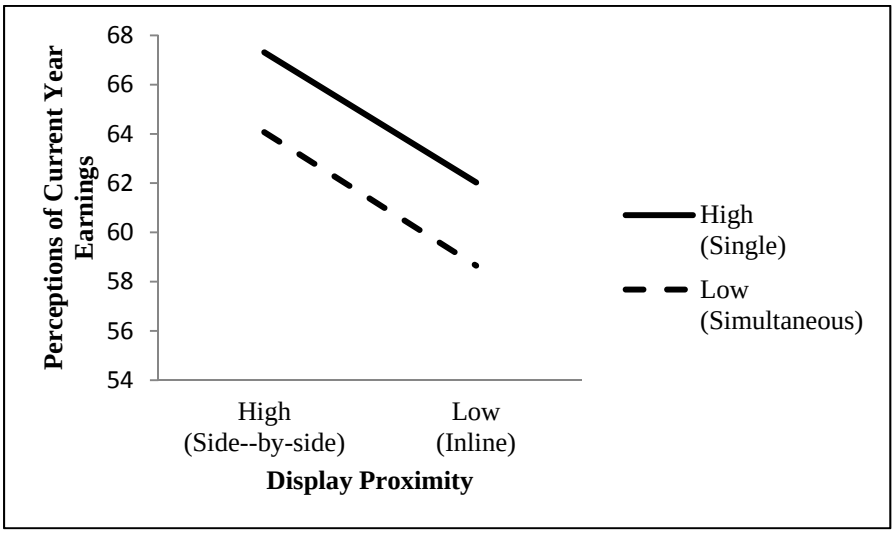

Figure 3. Perceptions of Current Year Earnings

condition is 59.809 whereas the mean for the high signal-to-noise condition is 69.047. This finding means that participants who see one footnote at a time perceive the company's future earnings to be stronger than participants who view all footnotes simultaneously.

Given that there is a marginal effect of display proximity on current year earnings and a significant effect of signal-to-noise on future year earnings, I created a difference variable to test whether participants' forward looking judgments of company performance are influenced by display proximity and signal-to-noise ratio. Table 24 presents the results of the ANCOVA model used to test whether the difference between non-professional investors' current year earnings perceptions and their earnings perceptions in three years differs by condition. There is a significant main effect for signal-to-noise ratio

such that when non-professional investors viewed footnote disclosures that are shown individually their expectations of future performance were higher than their perceptions of current year performance.

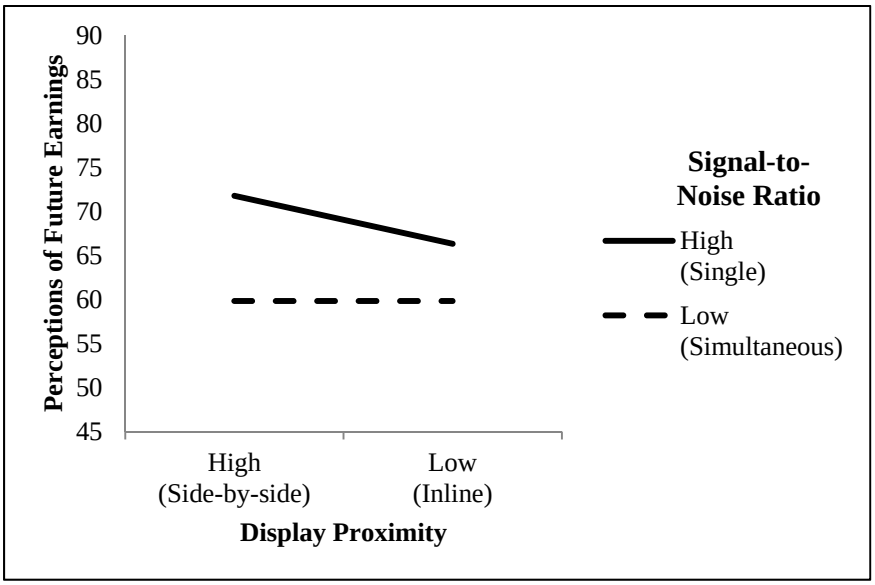

Figure 4. Perceptions of Future Year Earnings

Nonprofessional investors who viewed footnote disclosures simultaneously rated the company's future performance lower than their current year earnings perceptions as would be expected reading footnote disclosures indicating poor future performance.

Table 24 Differences of Current Earnings Perceptions to Future Earnings Perceptions				
ANCOVA Results				
Sources of Variation	Type III SS	df	F-Statistic	p-value
Model	4583.435	5	4.055	0.002
Display Proximity	134.588	1	0.595	0.441
Signal-to-Noise Ratio	2461.55	1	10.889	0.001
DP x SN	314.966	1	1.513	0.220
Change in Cash	481.891	1	2.132	0.146
Change in Net Income	96.547	1	0.427	0.514

Recall that the specific pairwise comparisons used to test Hypotheses 1a failed to support that a specific footnote disclosure presentation format allows users to perform better on an integrative (investing) task. In examining the MANCOVA there is evidence to suggest that high signal-to-noise ratio format is preferable to low signal-to-noise ratio presentation formats in performing an integrative task. In other words, non-professional investors viewing footnotes simultaneously perform better than non-professional investors who view the footnotes individually on investing tasks.

Table 25: The Overall Effect of Display Proximity and Signal-to-Noise Ratio on Perceived Ease of Use and Perceived Usefulness (Integrative)

Panel A - Multivariate Results

Independent Variable:	F-Value[1]	p-value
Total Time	2.942	0.055
Time on Financial Statements	6.176	0.003
Display Proximity	4.574	0.011
Signal-to-Noise Ratio	0.848	0.430
DP x SN	0.379	0.685

Panel B - Univariate Results

Independent Variable:	df	SS	MS	F-Value	p-value
Display Proximity					
Perceived Ease of Use[a]	1	10.004	10.004	7.730	0.006
Perceived Usefulness[b]	1	2.680	2.680	1.715	0.192
Signal-to-Noise Ratio					
Perceived Ease of Use[a]	1	2.059	2.059	1.591	0.209
Perceived Usefulness[b]	1	2.153	2.153	1.278	0.242
DP x SN					
Perceived Ease of Use[a]	1	0.973	0.973	0.752	0.387
Perceived Usefulness[b]	1	0.550	0.550	0.352	0.554

[1]Wilks' Lambda

5.6.5 Additional Analysis of Hypotheses 3a and 3b

Table 25 presents an additional test of the effect of display proximity and signal-to-noise ratio on perceived ease of use and perceived usefulness in the integrative task. The MANCOVA controls for both

time on the experiment and participants' time spent viewing the financial statements variables.[21] The MANCOVA revealed no statistically significant differences in measures of perceived ease of use or perceived usefulness related to the interaction (F = 0.379, p = 0.685); however, a significant main effect of display proximity (F = 4.574, p = 0.011) is presented in Table 25 Panel A. The univariate results

		Signal-to-Noise Ratio		
		High (Single)	Low (Simultaneous)	
Display Proximity	High (Side-by-side)	3.513	2.644	2.725
	Low (Inline)	3.795	3.003	3.199
		3.153	2.820	

Scale is coded as 1- Easy to Use to 7 -Difficult to Use

Figure 5. Integrative Task: Perceived Ease of Use

presented in Panel B indicate that the effect of display proximity on perceived ease of use is significant (F = 7.730, p = 0.006). Figure 5 presents the marginal means for each condition. Thus, when the display proximity is high (i.e., footnotes presented next to the financial statements), participants perceive the presentation format of the footnote disclosures as being easier to use than when the display proximity is low (i.e., footnotes are displayed below the financial statements). This effect is significant when controlling for time on the experiment and participants' time viewing the financial statements and footnotes; however, the display proximity is not significant when time is uncontrolled.

[21]A MANOVA was performed without controlling for the effect of time and the results are qualitatively similar. The interaction of display proximity and signal-to-noise ratio is nonsignificant (F = 0.769, p = 0.465, untabulated). A nonsignificant results is also observed for display proximity (F = 0.283, p = 0.754) and signal-to-noise ratio (F = 1.738, p = 0.179, untabulated).

The results of the MANCOVA used to test whether there is a significant effect of presentation format on perceived ease of use or perceived usefulness for the non-integrative task are shown in Table 26. These results show that there is no statistically significant difference in perceived ease of use or perceived usefulness across conditions.

Table 26: The Overall Effect of Display Proximity and Signal-to-Noise Ratio on Perceived Ease of Use and Perceived Usefulness (Non-integrative)

Panel A - Multivariate Results					
Independent Variable:				F-Value[1]	p-value
Total Time				1.850	0.161
Time on Financial Statements				0.583	0.560
Display Proximity				0.806	0.449
Signal-to-Noise Ratio				1.558	0.214
DP x SN				0.769	0.465
Panel B - Univariate Results					
Independent Variable:	df	SS	MS	F-Value	p-value
Display Proximity					
Perceived Ease of Use[a]	1	2.697	2.697	1.586	0.210
Perceived Usefulness[b]	1	2.276	2.276	1.165	0.282
Signal-to-Noise Ratio					
Perceived Ease of Use[a]	1	5.316	5.316	3.125	0.079
Perceived Usefulness[b]	1	3.85	3.85	1.971	0.162
DP x SN					
Perceived Ease of Use[a]	1	0.384	0.384	0.226	0.635
Perceived Usefulness[b]	1	0.292	0.292	0.149	0.700

[1]Wilks' Lambda

Recall that there is a high degree of positive correlation between perceived ease of use and perceived usefulness. This degree of correlation may cause multicollinearity problems in MANOVA. As such, I perform a separate ANOVA to test the robustness of the MANCOVA. In untabulated result, the ANOVA model is significant and display proximity is significant ($F = 7.327$, $p = 0.007$). The results of both the MANCOVA and ANOVA taken together indicate that there is a significant effect of display

proximity on perceived ease of use when controlling for time on the experiment and time participants' viewed the financial statements and related footnote disclosures.[22]

[22] As an additional test I combine participants from both tasks into a single sample. I performed a MANCOVA on the combined sample using total time on the experiment, time participants viewed the financial statements, and task type as covariates. The results show a significant main effect for both display proximity ($F = 4.053$, $p = 0.018$) and a marginally significant main effect for signal-to-noise ratio ($F = 2.250$, $p = 0.082$).

6.0 SUMMARY AND CONCLUSIONS

6.1 Summary of Key Findings

This study examines the effect of display proximity and signal-to-noise ratio on non-professional investors' performance on two tasks. In an integrative task, participants are asked to make judgements about the performance of a hypothetical company and decide whether to invest in the company and if so, how much of an investment to make. Participants in the integrative task are expected to acquire information from multiple sources – in particular, both the financial statements and footnote disclosures – and process those sources of information together to make their judgments about the company. A non-integrative task asks participants to recognize information from the footnote disclosures from among several choices. The non-integrative task uses only one source of information for participants to acquire and store in memory.

Footnote disclosures provide relevant information to the users of financial statements. Information contained within the disclosures are not able to be recognized in the financial statements themselves such as the case with accounting policies, while others expound upon information already contained in the body of the financial statements (Schipper 2007). Although these disclosures contain relevant information useful for investor decision making, non-professional investors tend to not only fixate on earnings and underestimate the diagnosticity of footnotes (Sloan 1996; Elliott et al. 2011a), they also tend to be overconfident in their decisions and commit limited cognitive resources to attend to information (Barber and Odean 2002; DellaVigna and Pollet 2009; Hirshleifer et al. 2011). These issues in non-professional investor decision making result in mispricing and resource misallocation (Daniel et al. 2002).

Regulators have recognized the need for improvements to disclosures in notes of the financial statements and actively work to address investor decision-making shortcomings. (SEC 1998; FASB 2012). The SEC, through their Plain English Handbook, has provided well-established guidelines in

improving the readability of disclosure documentation. The FASB, recognizing the increase in mandatory and voluntary disclosures has led to questions about the relevance and usefulness of information disclosed, asked for comment across a broad range of topics including the format and organization of disclosures. Of particular relevance to my study is whether alternative methods of presenting and organizing notes would improve the effectiveness of footnote disclosures.

Hypothesis 1a and 1b predict signal-to-noise ratio and display proximity affect investor judgments and decisions on an integrative task. Specifically, a high display proximity, high signal-to-noise presentation format would result in non-professional investors incorporating more footnote disclosures information into their judgements and a low display proximity, low signal-to-noise presentation format would result in the least disclosure information being integrated into their decisions. There was no support that one format outperforms all other formats. In additional analyses, signal-to-noise ratio does affect investor decision making; however, my results show that the effect is in the opposite direction than expected. Participants in the low signal-to-noise presentation format condition were least likely to invest in a company whose footnote disclosures revealed negative information about the future prospects of the company. Further, when examining the effect of presentation format on their perceptions of current and future performance, I find participants who viewed the footnote disclosures simultaneously had lower perceptions of the firm's future earnings performance. Thus, the low signal-to-noise condition caused participants to integrate more information from the footnote disclosures with the financial statement information presented.

Hodge (2001) found that investors viewing online financial statements that link to audited and unaudited information result in higher earnings judgments than those viewing financial statements in the traditional hardcopy format. Although my results appear to contradict those findings in that I find that the low display proximity, low signal to noise (referred to as the traditional or PDF format) does not alter investors' judgements, an important distinction is that Hodge (2001)'s participants are able to click a link that takes them directly to the additional information, which is not replicated in my study. Thus, the

traditional PDF format in his study does not result in higher earnings judgements moreso because of the linking to additional information rather than the location and diagnosticity of the disclosures.

Hypothesis 2 predicts that participants in the low display proximity, low signal-to-noise condition will recognize more information about footnote disclosures they have previously viewed. Although the low display proximity, low signal-to-noise ratio footnote presentation format yielded the highest mean footnote recognition, non-professional investors' performance on this task was not significantly better than all other conditions. There is some evidence to suggest that high signal-to-noise ratio presentation format aids non-professional investors in recognizing footnote information. This effect is largely driven by the poor performance of non-professional investors in the low display proximity, high signal-to-noise ratio footnote disclosure presentation format condition.

Hypothesis 3a predicts that participants viewing the high display proximity, low signal-to-noise format will evaluate the format easier to use than participants in other conditions whereas hypothesis 3b predicts that the low display proximity, high signal-to-noise condition will be perceived as the most difficult to use. I did not find support for either hypothesis under both tasks. Consistent with my hypothesis, participants in the high display proximity conditions evaluated the format easier to use than the low display proximity presentation format. As hypotheses 1a and 1b show that participants incorporated more information from footnote disclosures into their judgements about the company under the low signal-to-noise presentation formats, there is no additional usability benefits to be gained by implementing this presentation format. Further, although there are no performance benefits in altering the display proximity of the footnote disclosures, participants rated the high display proximity condition as easier to use suggesting that firms or third party intermediaries may consider implementing this presentation format to increase usability of the financial statement and footnote disclosures without detriment to the judgments of the users of that information

6.2 Contributions

My study contributes to standard setting, research, and practice. First, I contribute to the human factors literature in that Proximity Compatibility Principle does not correctly predict user judgments in the non-integrative task in my study. This finding may represent a boundary condition to Proximity Compatibility Principle and future research can examine whether the lack of support can be replicated in other accounting tasks.

I contribute to the extensive presentation format literature in accounting by examining narrative presentation format characteristics of display proximity and signal-to-noise. While much of the prior literature focused on accounting presentation effects has been focused on format changes that affect the underlying information content of the accounting information, my study examines physical proximity characteristics without changing the underlying information content. Much of the narrative presentation literature has examined the use of hyperlinking footnote disclosures to the related financial statement line items. I show that alternative presentation formats can be achieved through the use of current technologies and can significantly affect some aspects of integrative (investing) and non-integrative (recognition) task performance.

I further contribute to the existing theory on presentation format in accounting by providing evidence in support of Libby and Emett (2014)'s assertion that alternative narrative presentation of financial information does not affect the pricing but may affect the ease or manner of processing. My results show that non-professional investors' current and future judgments about company performance are different depending on the signal-to-noise presentation, supporting the notion that their judgments can be affected and that those judgements do not always translate into differences in investing decisions.

These results are useful to firms that are seeking to provide more effective methods of communicating financial information to their stakeholders without compromising the ease with which users' access the information. By showing that there is no negative effect of alternative presentation formats on non-professional investors' decision-making and finding positive effects in presenting footnotes with higher

signal-to-noise, firms that seek to increase the salience of underlying disclosures may opt to alter the format in which they present information to stakeholders.

Lastly, these results are useful to standard setters that seek to improve the readability and use of footnote disclosures in the accounting domain. Specifically the FASB asked in its Disclosures Framework whether other possibilities to the format and organization of footnote disclosures should be considered. Certainly this study provides evidence that such possibilities exist through human and technology interactions – specifically, signal-to-noise of the associated footnotes disclosures. My findings open the possibility of examining additional alternative presentation formats to aid in the acquisition and processing of disclosures such as linking multiple footnotes to a line item and multiple line items to one note.

6.3 Limitations

As with all experimental studies, my study is subject to limitations. First, participants completed the experiment using computers outside of my experimental control. In addition, participants were able to use the web browser of their choice. Although the experiment was tested on multiple computers with multiple browsers there exists the possibility that slight differences may be unaccounted for in the statistical analyses.

Second, Amazon Mechanical Turk (AMT) workers have different incentives than normal investors. A non-professional investor has an incentive to maximize their return on investment. This can be achieved by allocating more effort or more time towards the investing task. AMT workers are paid a set wage for completion of a specific task. AMT workers can maximize their hourly rate by completing tasks as quickly as possible thereby increasing the number of tasks given a fixed wage per task. Although participants can be eliminated from the analysis for failure to answer attention questions (such as the attention question in this study in which participants were instructed to click on a specified box on the screen), AMT workers may be more skilled at identifying attention check questions, as they are, in many

cases, professional survey takers. Given the high failure rate for the attention check question in this study, it is likely that the AMT workers were not actively seeking an attention question of that nature. Thus, it may be that the amount of attention given to the study is accurately reflected in the pass rate of the attention check question and participants may not have given their full effort to the experiment.

Third, late in the study it was noted that certain task-presentation format conditions had a higher dropout rate than other task-presentation format conditions. Data is not available to calculate the relative dropout rate for each condition; however, dropout rates were generally higher for the recognition task. It is hypothesized that the difference is due to the compensation rate and AMT worker expectations. Specifically, AMT workers were paid the same amount for each of the eight conditions (two tasks and four presentation formats). AMT workers expect to be disqualified for failing to respond correctly to traditional attention check questions. The nature of the recognition task is such that an average AMT worker who is blind to the study's research question and hypotheses may interpret the eight recognition questions as attention check questions. Fearing a rejected Human Intelligence Task (HIT), which would negative impact their worker rating and subsequently their ability to qualify for preferred HITs, they may return the HIT without completing the experiment. It may also be that AMT workers drop out because they did not read the information in enough detail to answer the recognition questions. As it is not known whether the AMT workers who drop out are diligent, effortful workers who produce high quality work or low quality workers who produce low quality work inferences about the effect of drop outs on the study are difficult to determine.

Two additional limitations arise from the limitations in directly observing investors true investment analysis process. For instance, this study cannot directly assess the information the participants used in the responses. A direct approach would be to track eye and head movements using eye tracking analysis to confirm whether the process by which participants search and acquire information is as expected. Further, investors generally have more investing analysis tools available during their decision-making process. It is possible that investors who have more complex analyses – such as the use of certain

financial ratios – may receive more benefit those investors who have less complex analyses in both their performance on the task as well as their perceptions of ease of use and usefulness.

6.4 Future Research

A number of future research opportunities have arisen from the unexpected results of this experiment. As mentioned in the limitations section, the information used by participants cannot be directly assessed using the experiemental method in the this study. Physiological observation methods, such as eye tracking, may provide additional insight to the underlying process that participants use in acquiring and processing financial inforamtion.

Related to understanding participants' decision-making processes, a future study could examine whether greater benefit is received for participants with more extensive decision-making processes. In particular, if some participants rely more heavily on analysis that by its nature requires the integration of multiple sources of inforamtion, do those participants accrue greater benefits than participants who fixate on specific line items and fail to use technological aides to view and process sources of information (which may not be relevant to their decision-making process)?

An additional area of focus is the relation between usability measures and performance. Very few studies have sought to examine directly the relation between perceived ease of use, perceived usefulness, and perforamance on a task. Moreover, display proximity posits that peformance is improved by reducing mental load associated with mismatched display and processing proximity. As those resources are freed, they can be reallocated to higher level processing. Output quality and result demonstrability are constructs that are related to performance on a task. Further they are predictors of perceived usefulness. Future research can examine these antecedents explicitly to understand their relation to task performance.

As the FASB noted in its Disclosure Framework, multiple notes can affect multiple line items in the financial statements. My study focuses on a single note being clearly related to a single line item. A future study could examine whether a single note that is associated with multiple line items affects task performance in a different manner than the relation examined in this study. Certainly multiple line items

associated with single (or multiple) note increases the number of inforamtion sources that need to be integrated. This in turn may increase the benefits of display proximity hypothesized, but not realized, in my experiement.

Similarly my experiment only allows for one note to be viewable at at time in the high signal-to-noise ration conditions. In practice, multiple notes may also have a relation in which multiple notes being viewable increases both signal-to-noise and display proximity for more than one note, but less than the full set of footnote disclosures. Overall, future studies could isolate the effects of specific limitations in my study to contribute to both the boundary conditions of specific effects as well as highlight subtle nuances that may be limited in scope in the current design.

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APPENDICES

Appendix A – IRB Approval Letter

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

10/3/2014

Kevin Agnew, B.S.
USF School of Accountancy, College of Business
4202 East Fowler Avenue, BSN 3403
Tampa, FL 33620

RE: **Exempt Certification**
IRB#: Pro00017084
Title: Non-Professional Investor Judgments

Study Approval Period: 10/3/2014 to 10/3/2019

Dear Mr. Agnew:

On 10/3/2014, the Institutional Review Board (IRB) determined that your research meets USF requirements and Federal Exemption criteria as outlined in the federal regulations at 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Your study qualifies for a waiver of the requirements for the documentation of informed consent as outlined in the federal regulations at 45CFR46.117(c) which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: (1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF IRB policies and procedures. Please note that changes to this

protocol may disqualify it from exempt status. Please note that you are responsible for notifying the IRB prior to implementing any changes to the currently approved protocol.

The Institutional Review Board will maintain your exemption application for a period of five years from the date of approval or for three years after a Final Progress Report is received, whichever is longer. If you wish to continue this protocol beyond five years, you will need to submit a new application at least 60 days prior to the end of your exemption approval period. Should you complete this study prior to the end of the five-year period, you must submit a request to close the study.

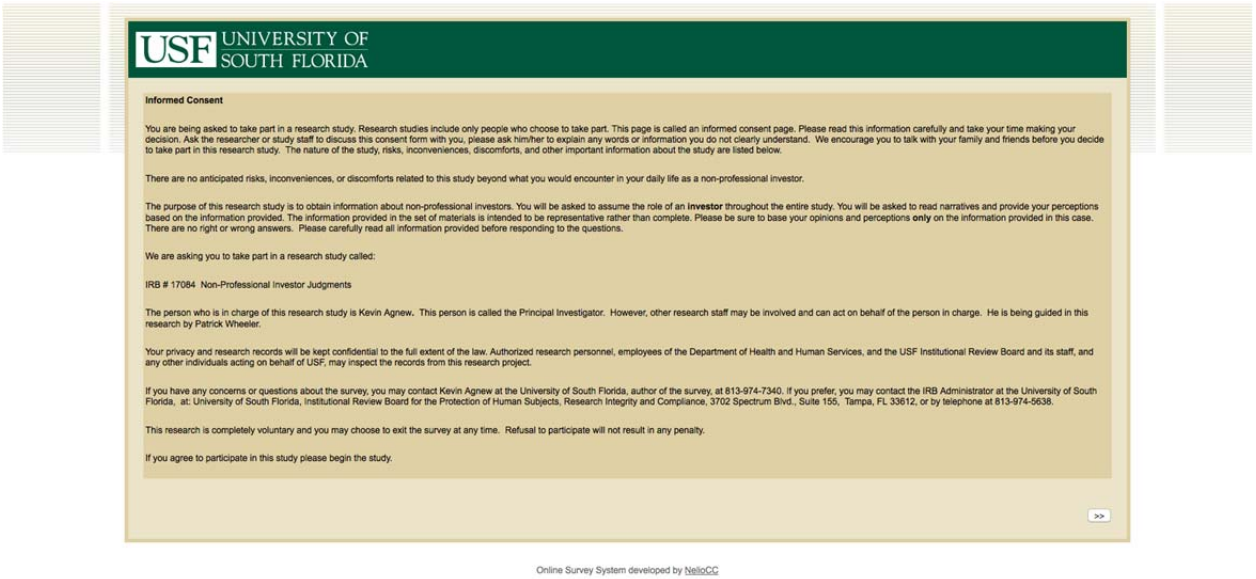
We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

Appendix B – Experimental Instrument



USF UNIVERSITY OF SOUTH FLORIDA

Informed Consent

You are being asked to take part in a research study. Research studies include only people who choose to take part. This page is called an informed consent page. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

There are no anticipated risks, inconveniences, or discomforts related to this study beyond what you would encounter in your daily life as a non-professional investor.

The purpose of this research study is to obtain information about non-professional investors. You will be asked to assume the role of an **investor** throughout the entire study. You will be asked to read narratives and provide your perceptions based on the information provided. The information provided in the set of materials is intended to be representative rather than complete. Please be sure to base your opinions and perceptions **only** on the information provided in this case. There are no right or wrong answers. Please carefully read all information provided before responding to the questions.

We are asking you to take part in a research study called:

IRB # 17084 Non-Professional Investor Judgments

The person who is in charge of this research study is Kevin Agnew. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. He is being guided in this research by Patrick Wheeler.

Your privacy and research records will be kept confidential to the full extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, and the USF Institutional Review Board and its staff, and any other individuals acting on behalf of USF, may inspect the records from this research project.

If you have any concerns or questions about the survey, you may contact Kevin Agnew at the University of South Florida, author of the survey, at 813-974-7340. If you prefer, you may contact the IRB Administrator at the University of South Florida, at: University of South Florida, Institutional Review Board for the Protection of Human Subjects, Research Integrity and Compliance, 3702 Spectrum Blvd., Suite 155, Tampa, FL 33612, or by telephone at 813-974-5638.

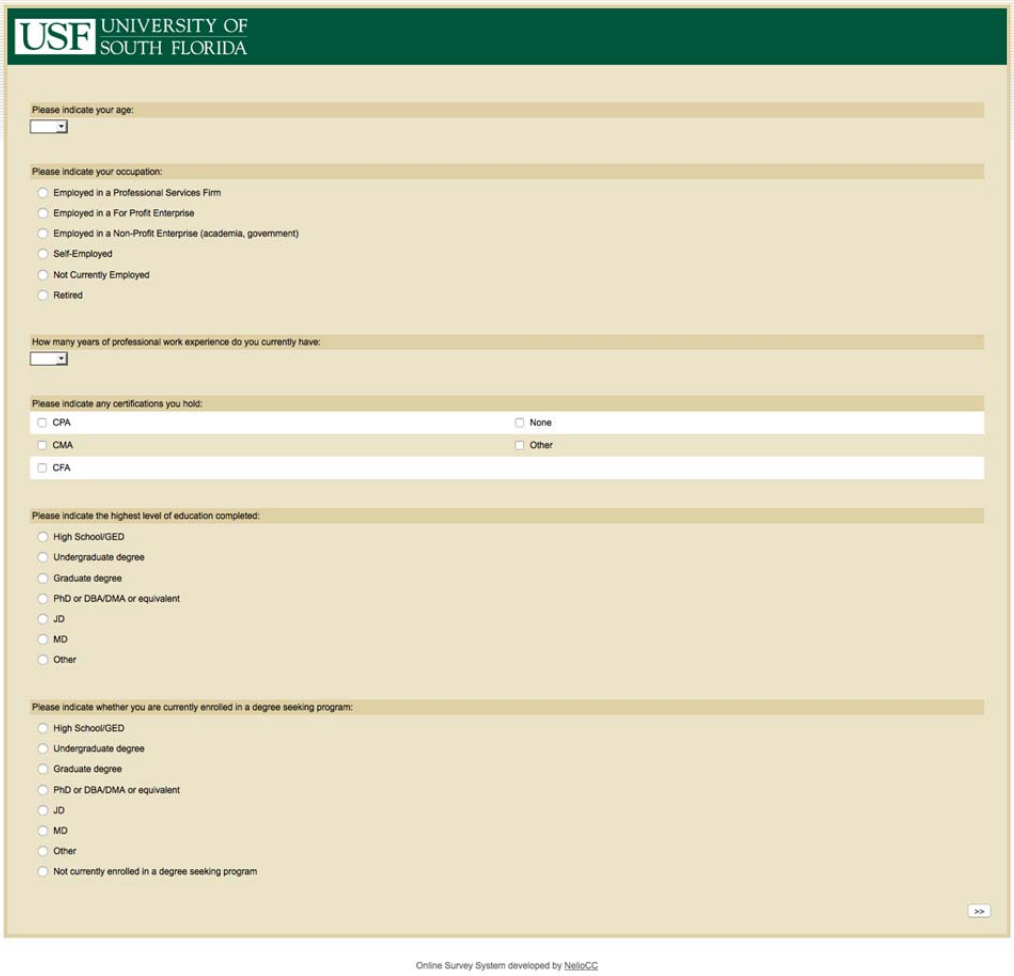
This research is completely voluntary and you may choose to exit the survey at any time. Refusal to participate will not result in any penalty.

If you agree to participate in this study please begin the study.

>>

Online Survey System developed by NelloCC

Informed Consent



USF UNIVERSITY OF SOUTH FLORIDA

Please indicate your age:

Please indicate your occupation:

- Employed in a Professional Services Firm
- Employed in a For Profit Enterprise
- Employed in a Non-Profit Enterprise (academia, government)
- Self-Employed
- Not Currently Employed
- Retired

How many years of professional work experience do you currently have:

Please indicate any certifications you hold:

- CPA
- CMA
- CFA
- None
- Other

Please indicate the highest level of education completed:

- High School/GED
- Undergraduate degree
- Graduate degree
- PhD or DBA/DMA or equivalent
- JD
- MD
- Other

Please indicate whether you are currently enrolled in a degree seeking program:

- High School/GED
- Undergraduate degree
- Graduate degree
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- JD
- MD
- Other
- Not currently enrolled in a degree seeking program

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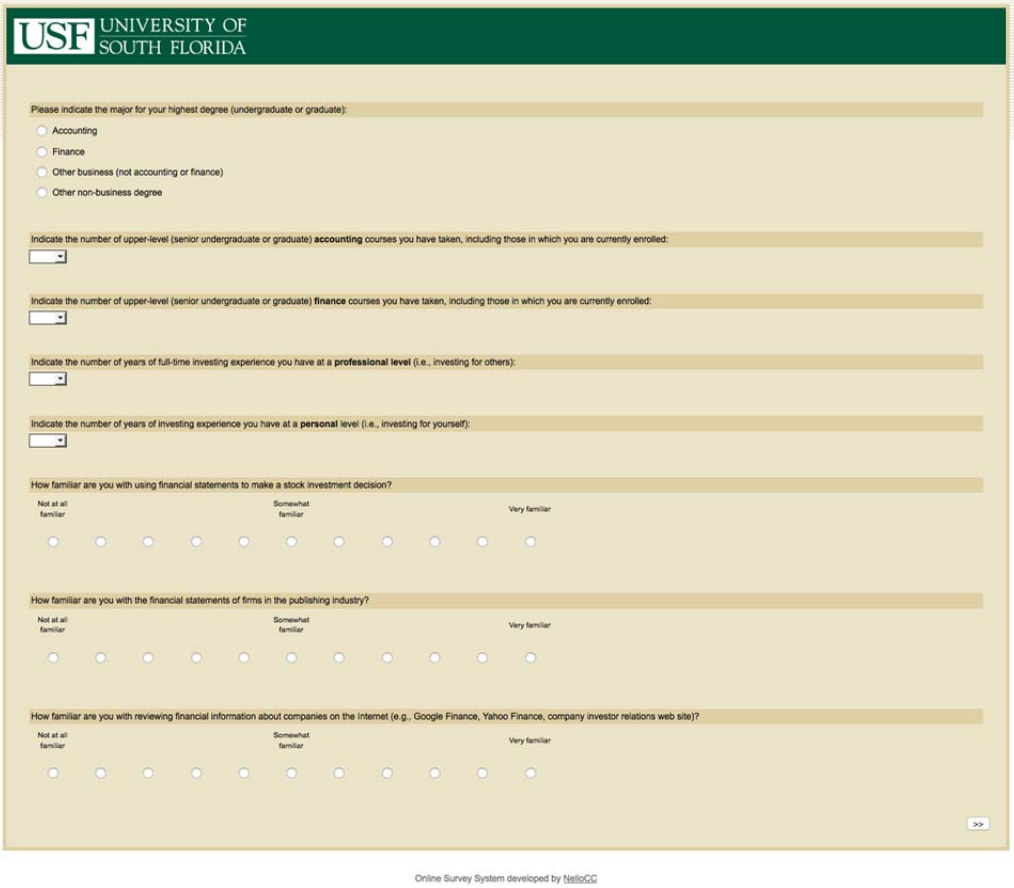
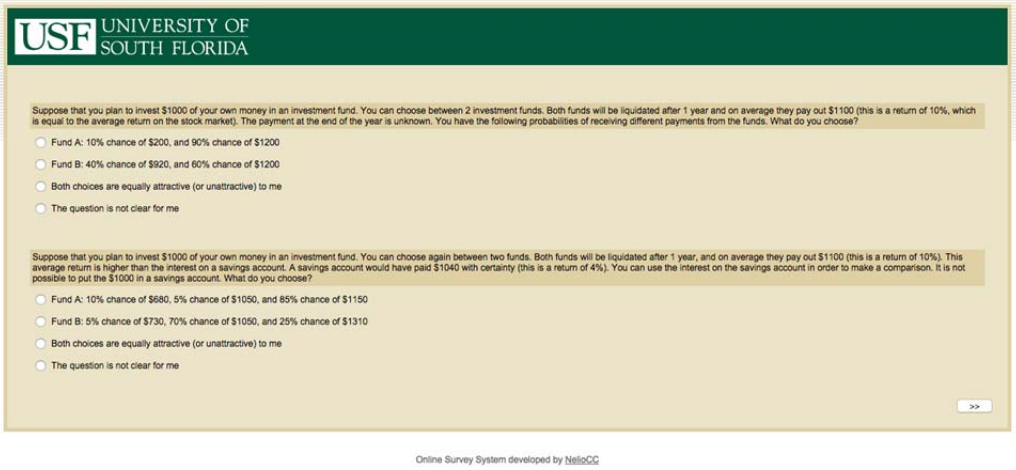
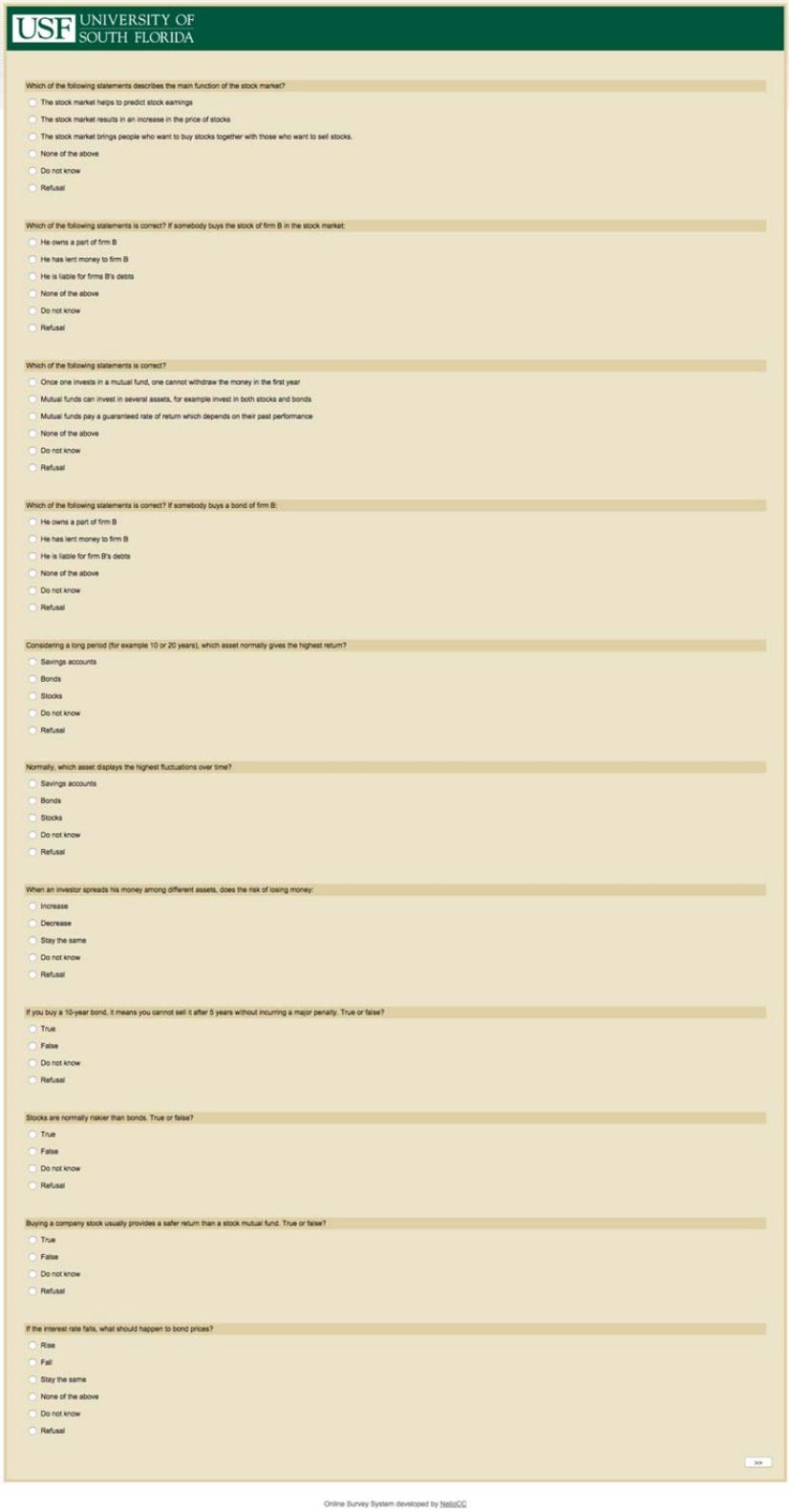
Participant Demographics



Participant Demographics



Participant Risk Taking



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Which of the following statements describes the main function of the stock market?
- The stock market helps to predict stock earnings
- The stock market results in an increase in the price of stocks
- The stock market brings people who want to buy stocks together with those who want to sell stocks.
- None of the above
- Do not know
- Refusal

Which of the following statements is correct? If somebody buys the stock of firm B in the stock market:
- He owns a part of firm B
- He has lent money to firm B
- He is liable for firms B's debts
- None of the above
- Do not know
- Refusal

Which of the following statements is correct?
- Once one invests in a mutual fund, one cannot withdraw the money in the first year
- Mutual funds can invest in several assets, for example invest in both stocks and bonds
- Mutual funds pay a guaranteed rate of return which depends on their past performance
- None of the above
- Do not know
- Refusal

Which of the following statements is correct? If somebody buys a bond of firm B:
- He owns a part of firm B
- He has lent money to firm B
- He is liable for firm B's debts
- None of the above
- Do not know
- Refusal

Considering a long period (for example 10 or 20 years), which asset normally gives the highest return?
- Savings accounts
- Bonds
- Stocks
- Do not know
- Refusal

Normally, which asset displays the highest fluctuations over time?
- Savings accounts
- Bonds
- Stocks
- Do not know
- Refusal

When an investor spreads his money among different assets, does the risk of losing money:
- Increase
- Decrease
- Stay the same
- Do not know
- Refusal

If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penalty. True or false?
- True
- False
- Do not know
- Refusal

Stocks are normally riskier than bonds. True or false?
- True
- False
- Do not know
- Refusal

Buying a company stock usually provides a safer return than a stock mutual fund. True or false?
- True
- False
- Do not know
- Refusal

If the interest rate falls, what should happen to bond prices?
- Rise
- Fall
- Stay the same
- None of the above
- Do not know
- Refusal

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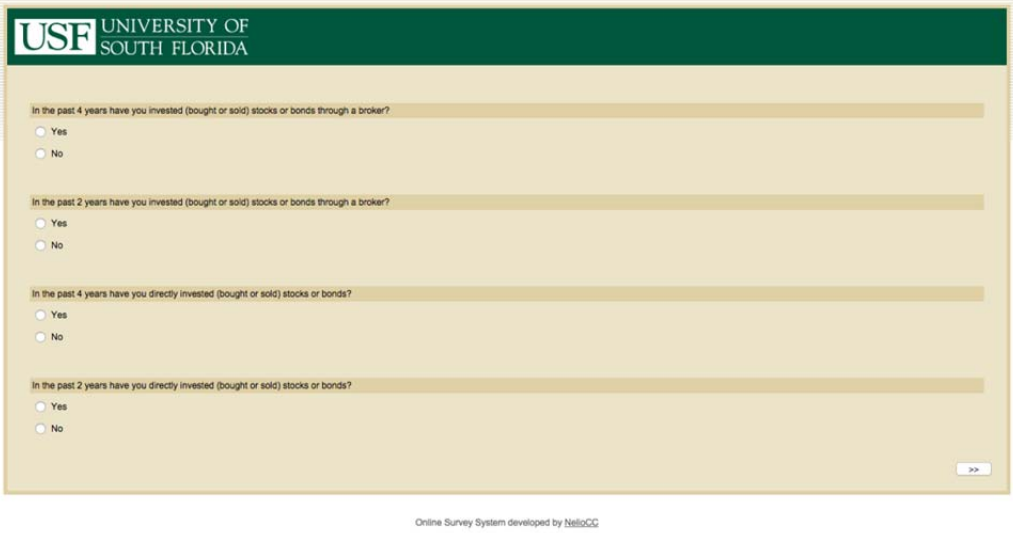
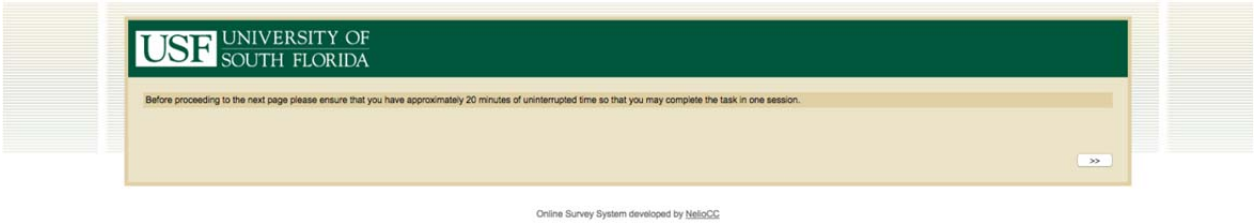
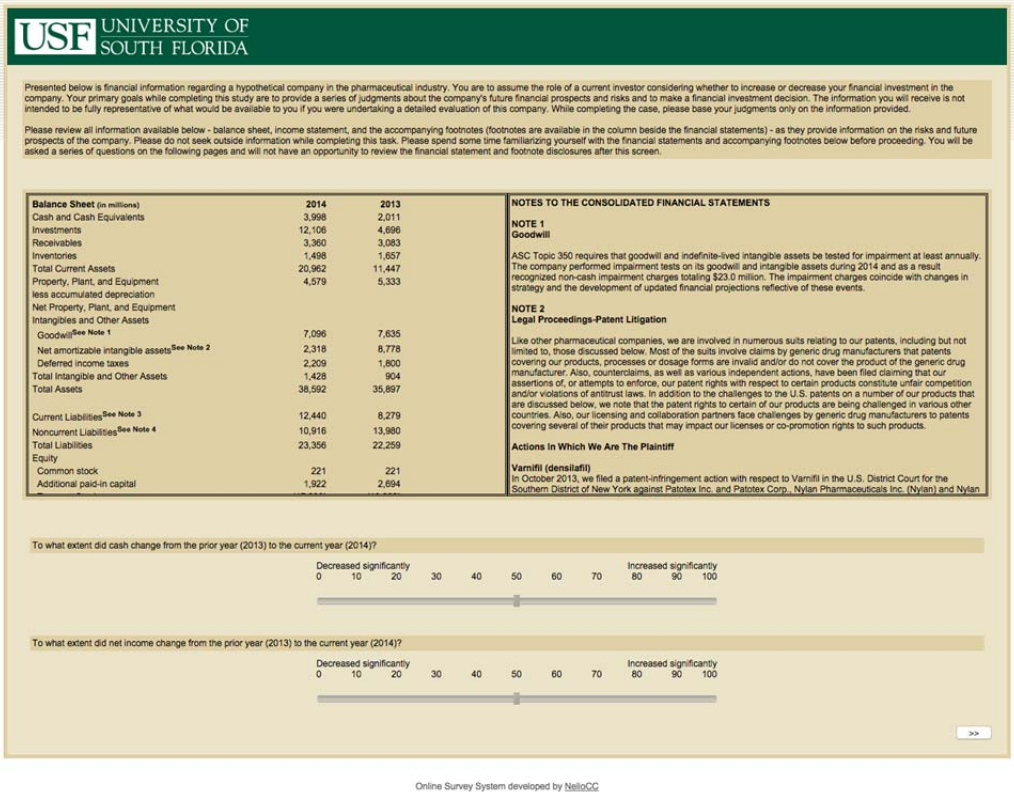
Participant Financial Knowledge



Participant Investing Experience

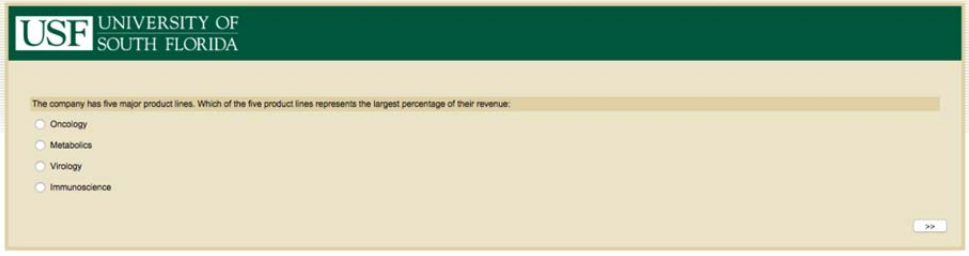


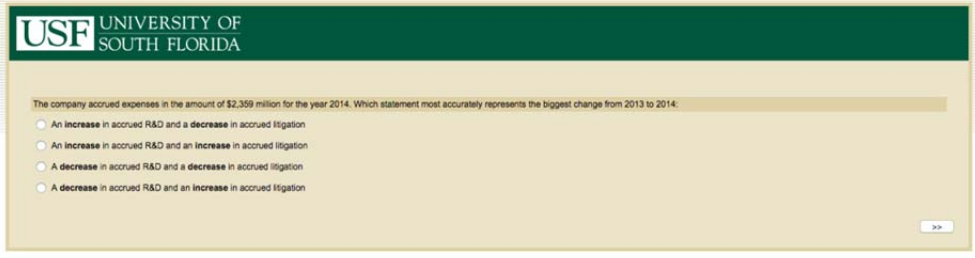
Participant Instructions. From here the participants are then routed to one of the two tasks and one of the four presentation formats.

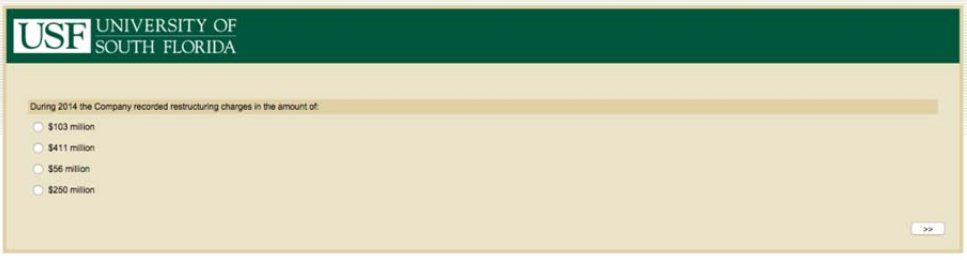


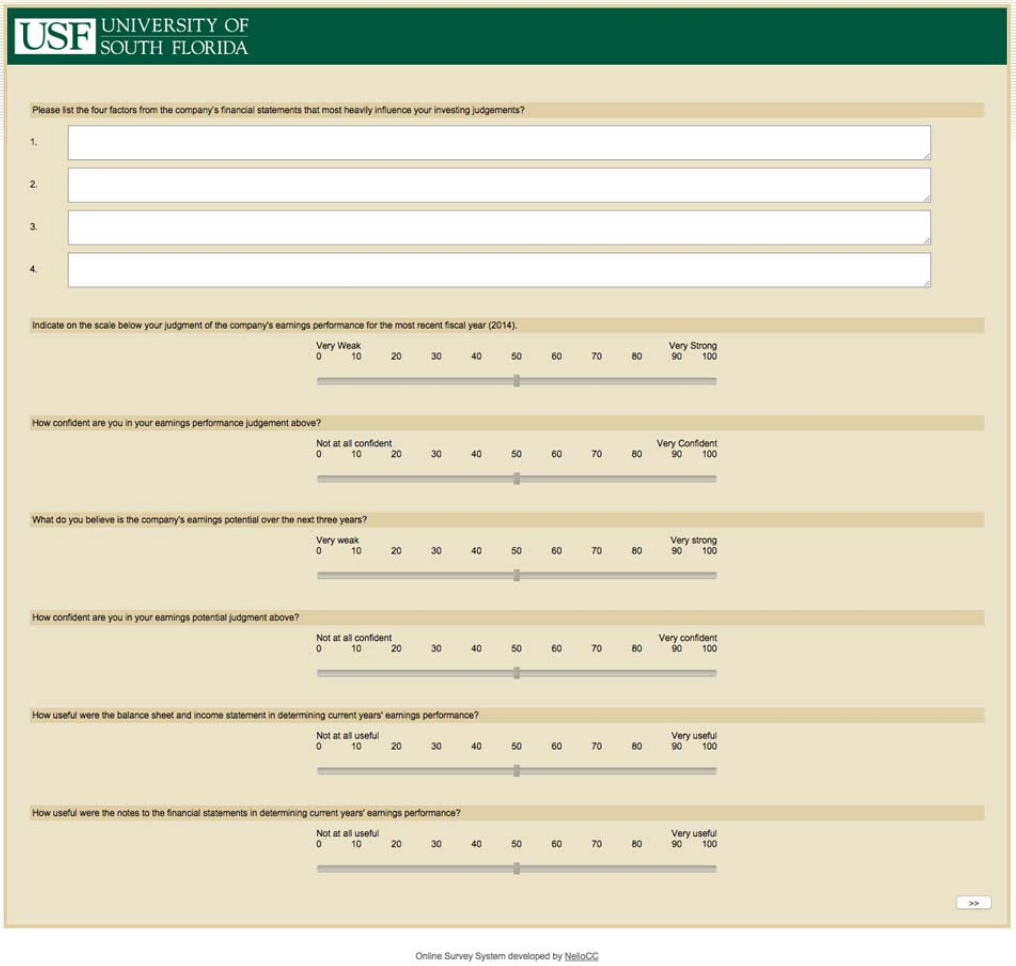
High display proximity, low signal-to-noise

Nonintegrative task

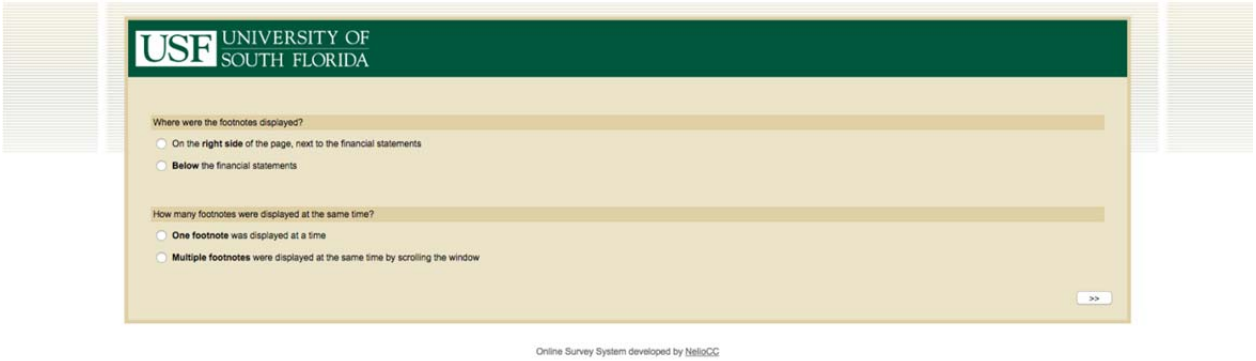




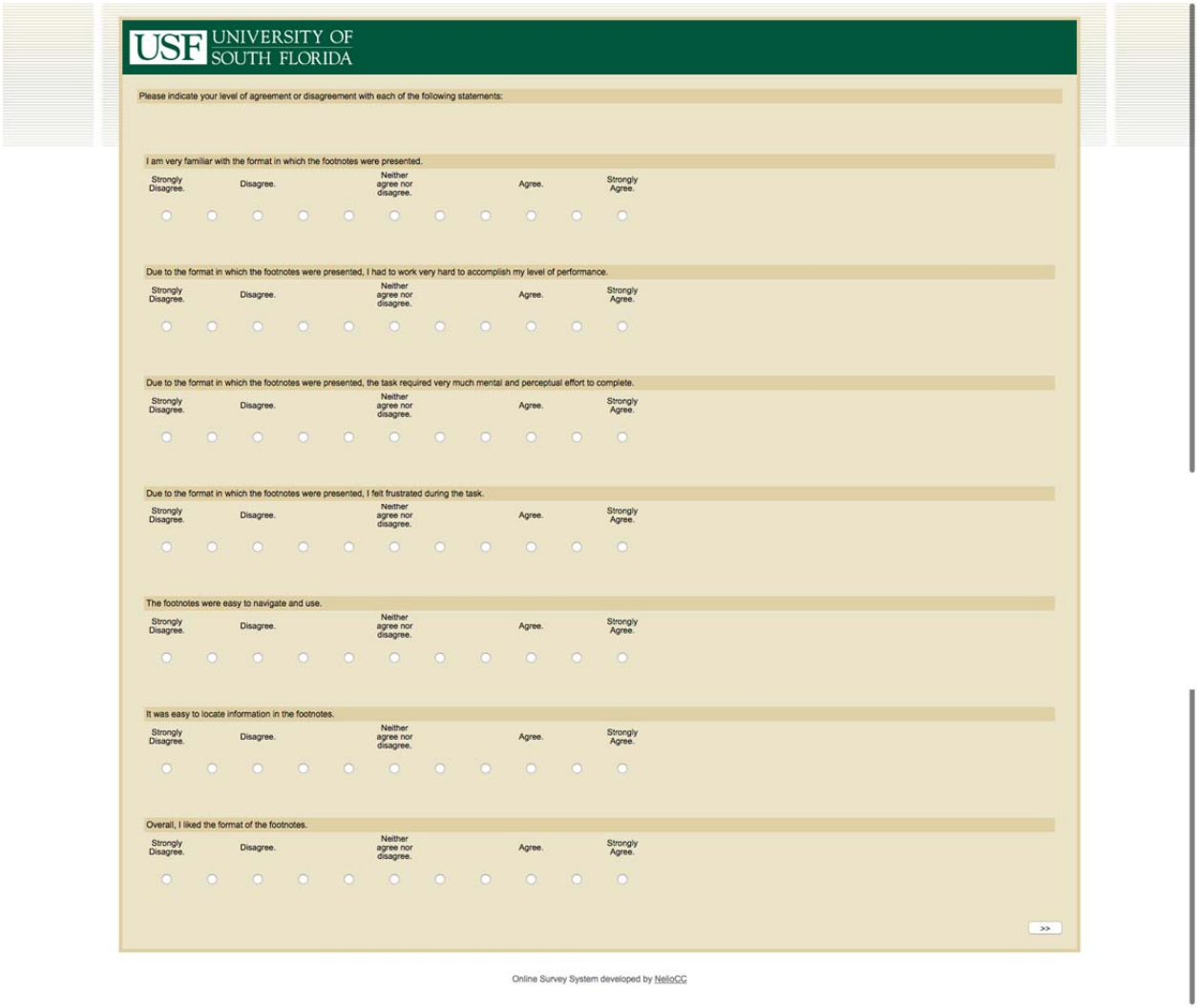




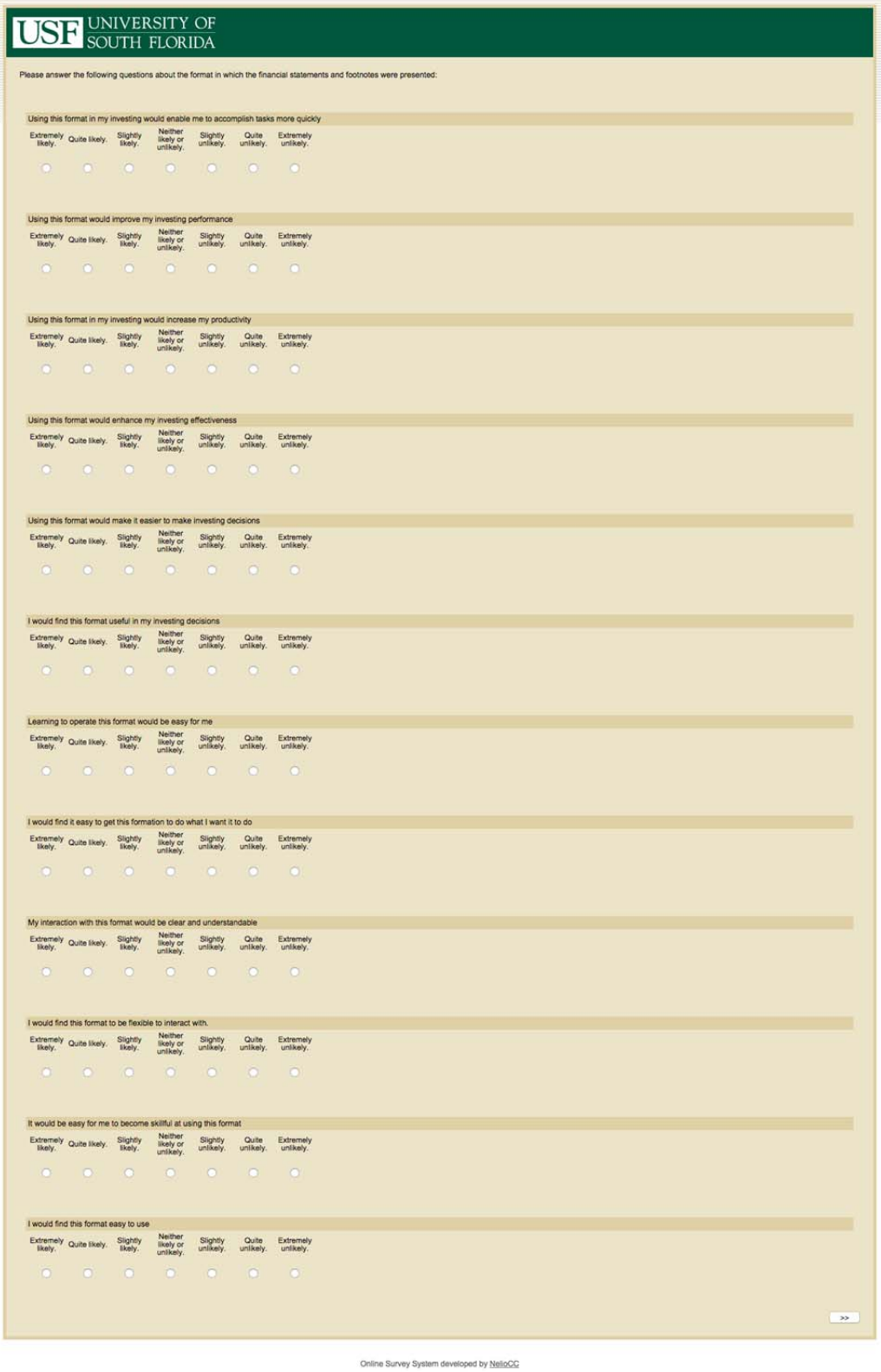
Secondary DVs



Manipulation check



Ease of Use (Dull et al 2003)



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Please answer the following questions about the format in which the financial statements and footnotes were presented:

Using this format in my investing would enable me to accomplish tasks more quickly

Using this format would improve my investing performance

Using this format in my investing would increase my productivity

Using this format would enhance my investing effectiveness

Using this format would make it easier to make investing decisions

I would find this format useful in my investing decisions

Learning to operate this format would be easy for me

I would find it easy to get this formation to do what I want it to do

My interaction with this format would be clear and understandable

I would find this format to be flexible to interact with.

It would be easy for me to become skillful at using this format

I would find this format easy to use

Extremely likely. | Quite likely. | Slightly likely. | Neither likely or unlikely. | Slightly unlikely. | Quite unlikely. | Extremely unlikely.

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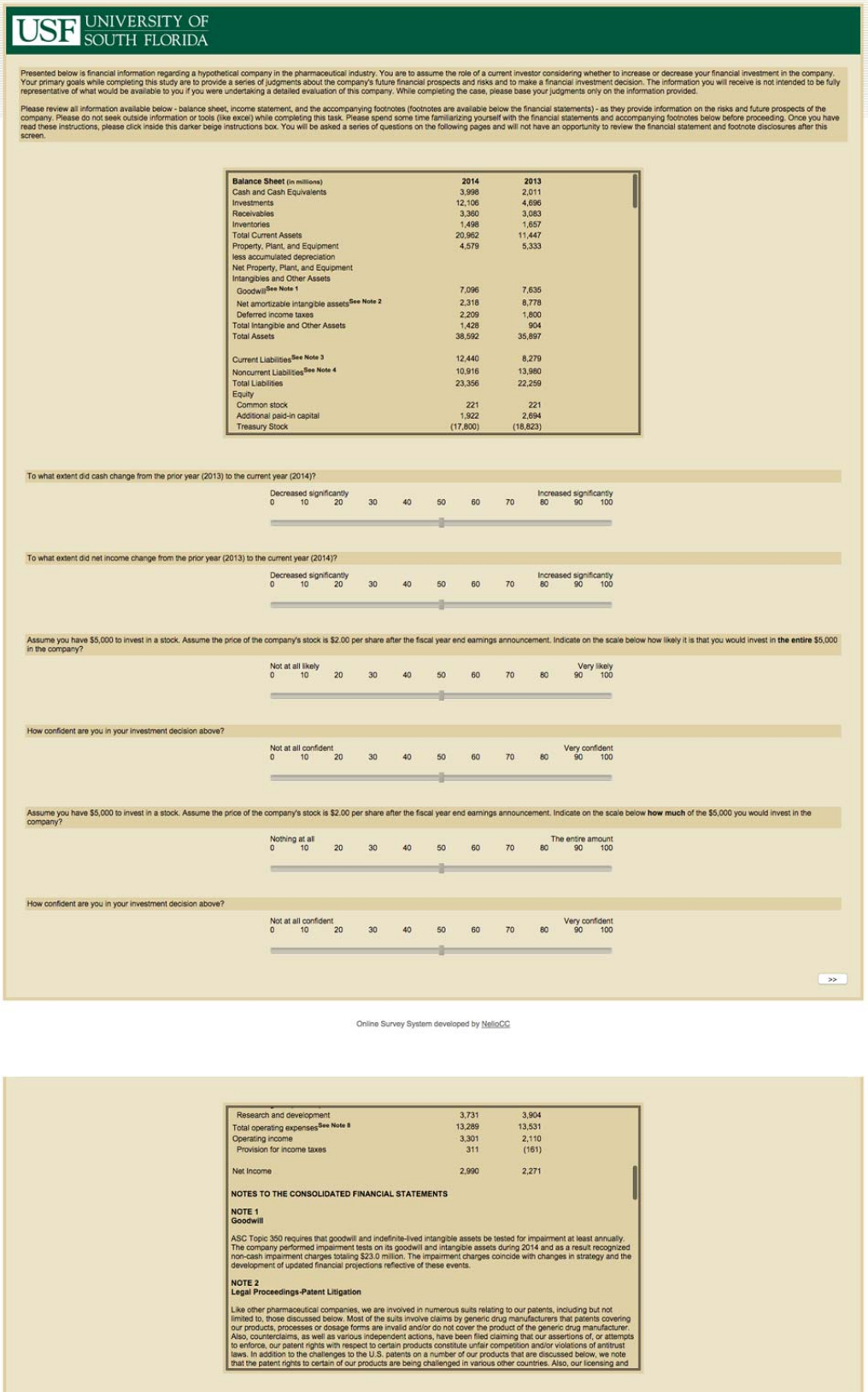
Perceived Ease of Use and Perceived Usefulness (TAM)



USF UNIVERSITY OF SOUTH FLORIDA

Presented below is financial information regarding a hypothetical company in the pharmaceutical industry. You are to assume the role of a current investor considering whether to increase or decrease your financial investment in the company. Your primary goals while completing this study are to provide a series of judgments about the company's future financial prospects and risks and to make a financial investment decision. The information you will receive is not intended to be fully representative of what would be available to you if you were undertaking a detailed evaluation of this company. While completing the case, please base your judgments only on the information provided.

Please review all information available below - balance sheet, income statement, and the accompanying footnotes (footnotes are available below the financial statements) - as they provide information on the risks and future prospects of the company. Please do not seek outside information or tools (like excel) while completing this task. Please spend some time familiarizing yourself with the financial statements and accompanying footnotes below before proceeding. Once you have read these instructions, please click inside this darker beige instructions box. You will be asked a series of questions on the following pages and will not have an opportunity to review the financial statement and footnote disclosures after this screen.

Balance Sheet (in millions)	**2014**	**2013**
Cash and Cash Equivalents	3,998	2,011
Investments	12,106	4,696
Receivables	3,360	3,083
Inventories	1,498	1,657
Total Current Assets	20,962	11,447
Property, Plant, and Equipment	4,579	5,333
less accumulated depreciation		
Net Property, Plant, and Equipment		
Intangibles and Other Assets		
Goodwill See Note 1	7,096	7,635
Net amortizable intangible assets See Note 2	2,318	8,778
Deferred income taxes	2,209	1,800
Total Intangible and Other Assets	1,428	904
Total Assets	38,592	35,897
Current Liabilities See Note 3	12,440	8,279
Noncurrent Liabilities See Note 4	10,916	13,980
Total Liabilities	23,356	22,259
Equity		
Common stock	221	221
Additional paid-in capital	1,922	2,694
Treasury Stock	(17,800)	(18,823)

To what extent did cash change from the prior year (2013) to the current year (2014)?

Decreased significantly 0 10 20 30 40 50 60 70 80 90 100 Increased significantly

To what extent did net income change from the prior year (2013) to the current year (2014)?

Decreased significantly 0 10 20 30 40 50 60 70 80 90 100 Increased significantly

Assume you have $5,000 to invest in a stock. Assume the price of the company's stock is $2.00 per share after the fiscal year end earnings announcement. Indicate on the scale below how likely it is that you would invest in **the entire** $5,000 in the company?

Not at all likely 0 10 20 30 40 50 60 70 80 90 100 Very likely

How confident are you in your investment decision above?

Not at all confident 0 10 20 30 40 50 60 70 80 90 100 Very confident

Assume you have $5,000 to invest in a stock. Assume the price of the company's stock is $2.00 per share after the fiscal year end earnings announcement. Indicate on the scale below **how much** of the $5,000 you would invest in the company?

Nothing at all 0 10 20 30 40 50 60 70 80 90 100 The entire amount

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>>

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Research and development	3,731	3,904
Total operating expenses See Note 8	13,289	13,531
Operating income	3,301	2,110
Provision for income taxes	311	(161)
Net Income	2,990	2,271

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1
Goodwill

ASC Topic 350 requires that goodwill and indefinite-lived intangible assets be tested for impairment at least annually. The company performed impairment tests on its goodwill and intangible assets during 2014 and as a result recognized non-cash impairment charges totaling $23.0 million. The impairment charges coincide with changes in strategy and the development of updated financial projections reflective of these events.

NOTE 2
Legal Proceedings-Patent Litigation

Like other pharmaceutical companies, we are involved in numerous suits relating to our patents, including but not limited to, those discussed below. Most of the suits involve claims by generic drug manufacturers that patents covering our products, processes or dosage forms are invalid and/or do not cover the product of the generic drug manufacturer. Also, counterclaims, as well as various independent actions, have been filed claiming that our assertions of, or attempts to enforce, our patent rights with respect to certain products constitute unfair competition and/or violations of antitrust laws. In addition to the challenges to the U.S. patents on a number of our products that are discussed below, we note that the patent rights to certain of our products are being challenged in various other countries. Also, our licensing and

IntegrateiveTask: Low Display Proximity; Low Signal-To-Noise

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Treasury Stock	(17,800)	(18,823)
Retained earnings	30,893	29,546
Total Stockholder's Equity	15,236	13,638
Total Liabilities & Stockholders' Equity	38,592	35,897

Income Statement (in millions)	2014	2013
Net Product Sales See Note 5	12,509	11,674
Alliance and other revenues	4,081	3,967
Total Revenues	16,590	15,641
Operating expenses See Note 6		
Cost of sales and operating expenses	4,619	4,610
Selling, general and administrative expense See Note 7	4,084	4,220
Advertising and product promotion	855	797
Research and development	3,731	3,904
Total operating expenses See Note 8	13,289	13,531
Operating income	3,301	2,110
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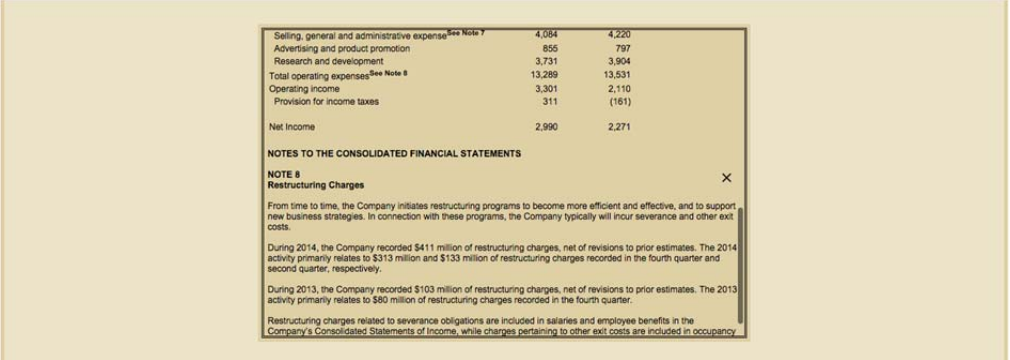
NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS



Selling, general and administrative expense[See Note 7]	4,084	4,220
Advertising and product promotion	855	797
Research and development	3,731	3,904
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

NOTE 8
Restructuring Charges

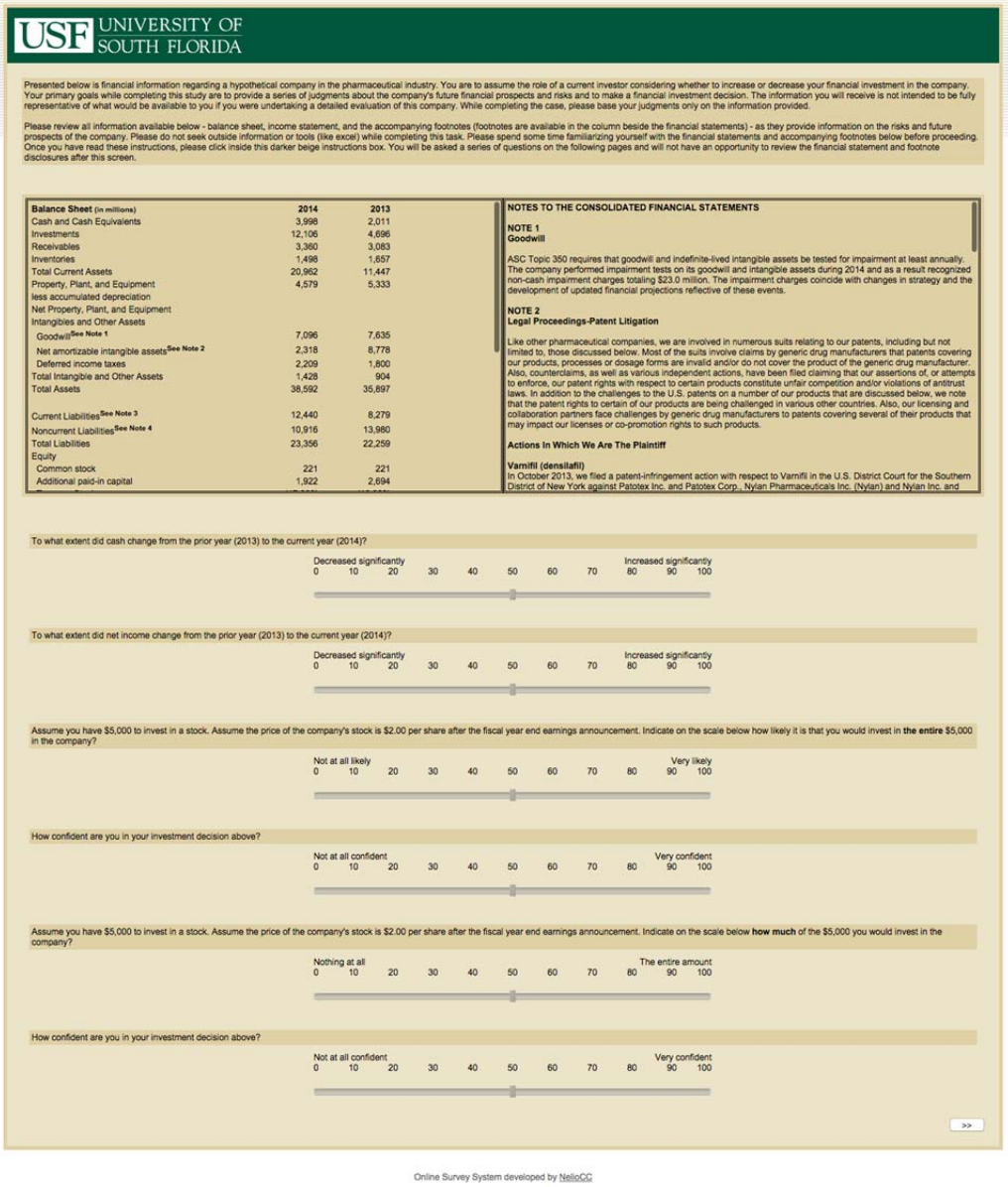
From time to time, the Company initiates restructuring programs to become more efficient and effective, and to support new business strategies. In connection with these programs, the Company typically will incur severance and other exit costs.

During 2014, the Company recorded $411 million of restructuring charges, net of revisions to prior estimates. The 2014 activity primarily relates to $313 million and $133 million of restructuring charges recorded in the fourth quarter and second quarter, respectively.

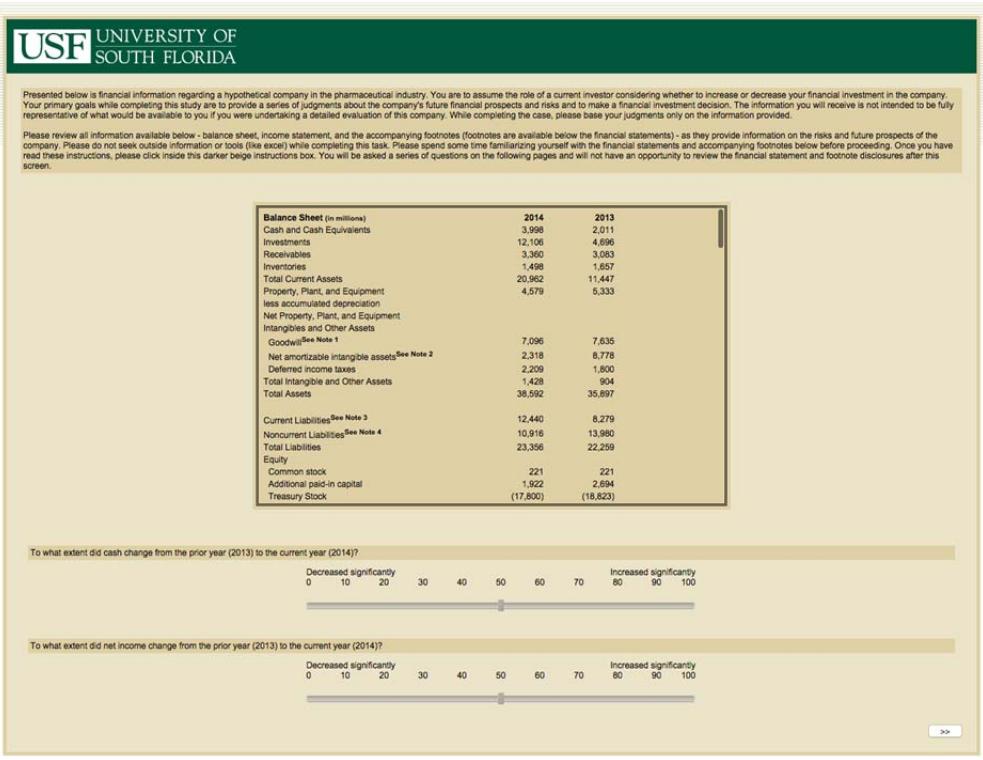
During 2013, the Company recorded $103 million of restructuring charges, net of revisions to prior estimates. The 2013 activity primarily relates to $80 million of restructuring charges recorded in the fourth quarter.

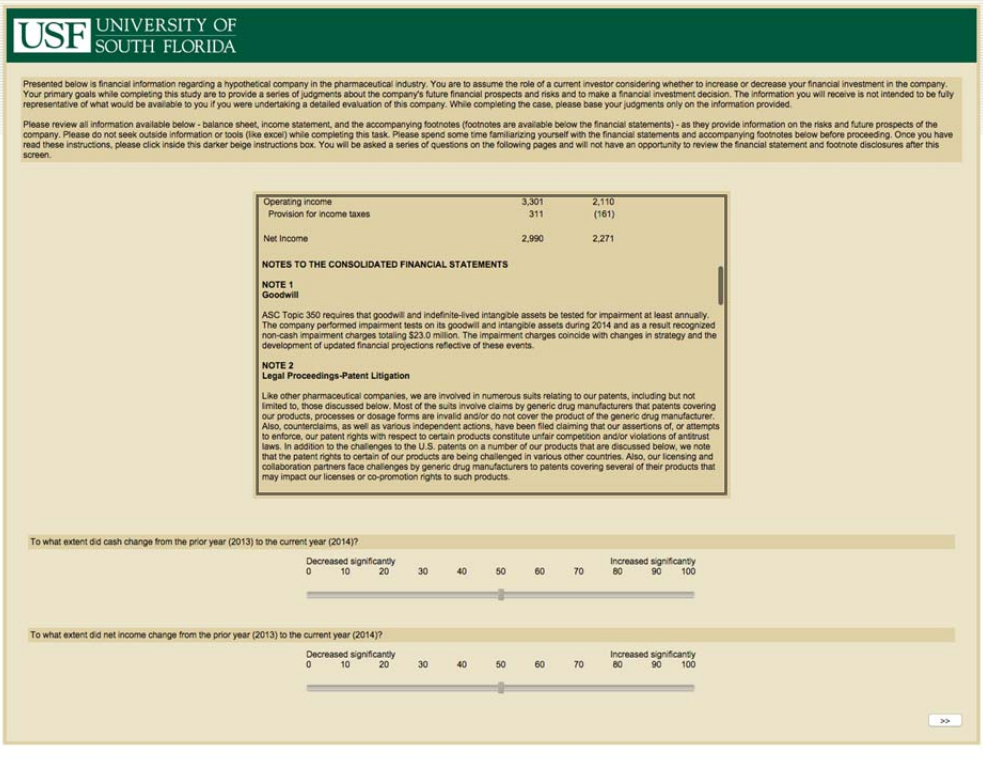
Restructuring charges related to severance obligations are included in salaries and employee benefits in the Company's Consolidated Statements of Income, while charges pertaining to other exit costs are included in occupancy

Integrative Task: Low Display Proximity; High Signal-to-Noise

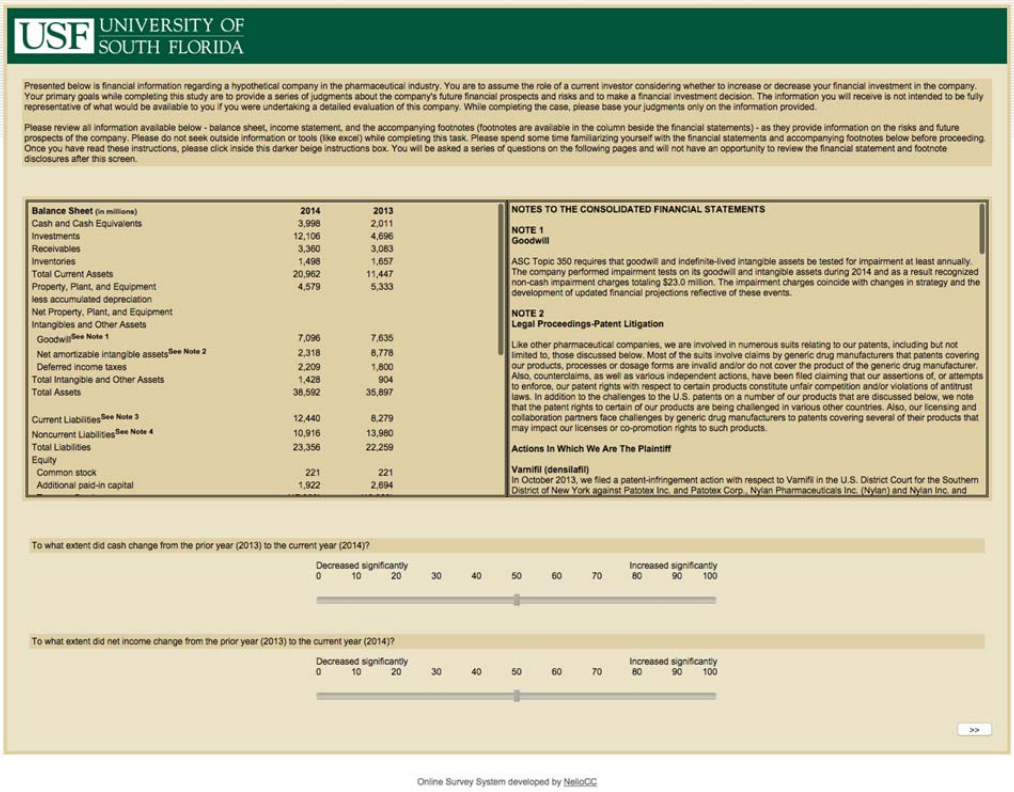


Integrative Task: High Display Proximity; Low Signal-to-Noise





Nonintegrative Task: Low Display Proximity; Low Signal-to-Noise



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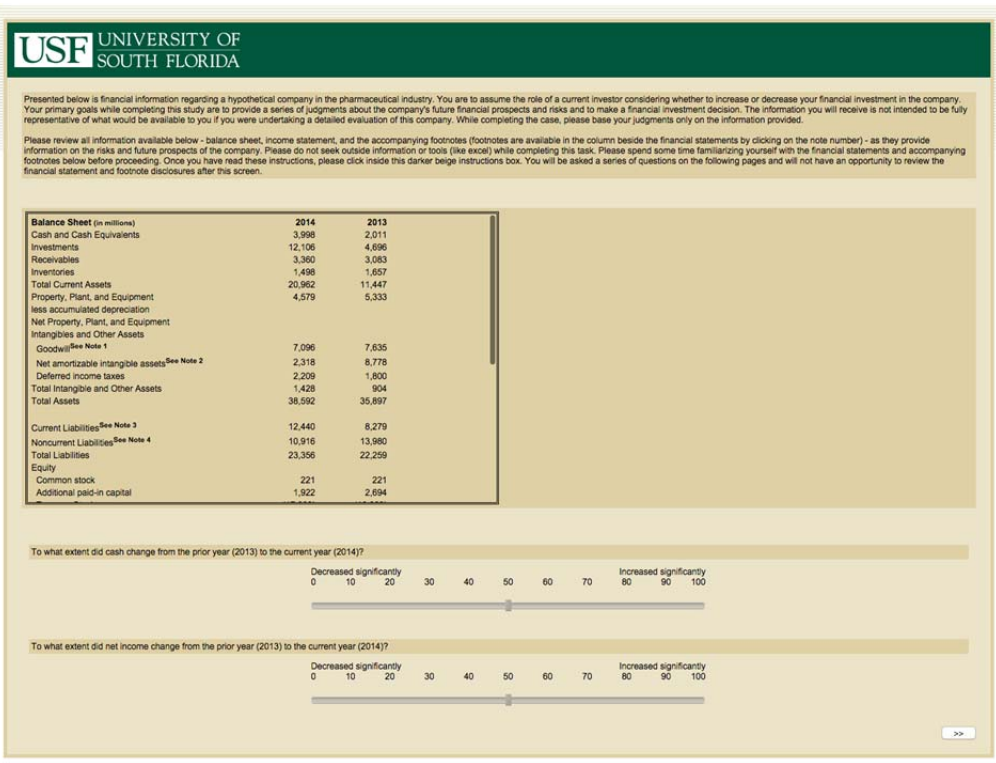

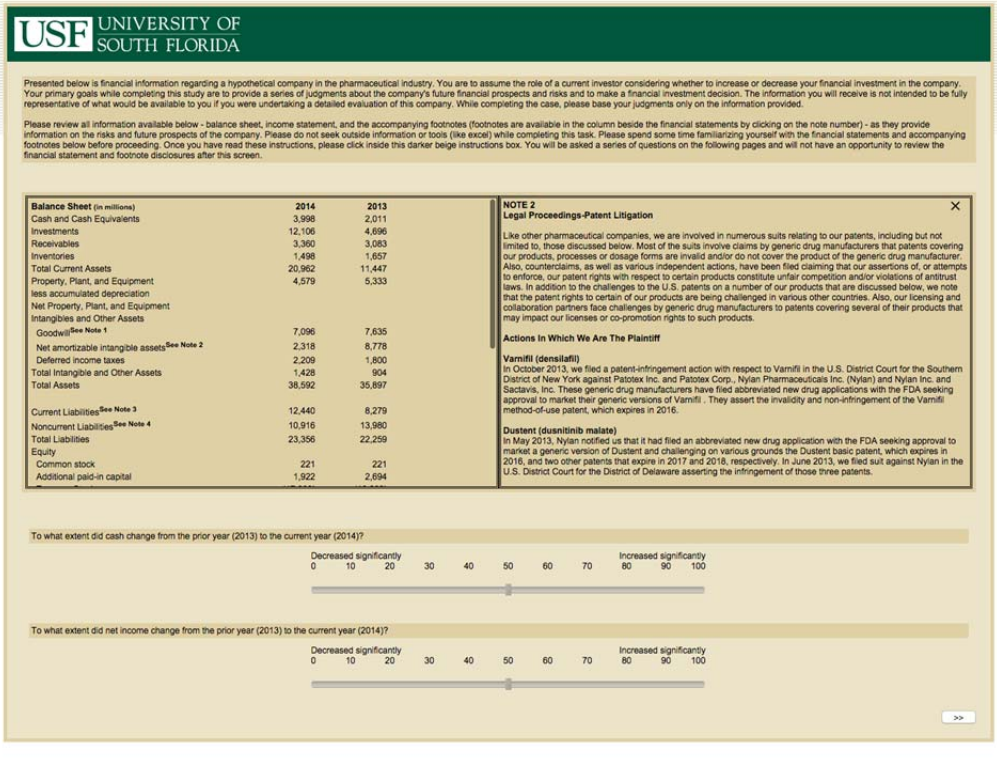

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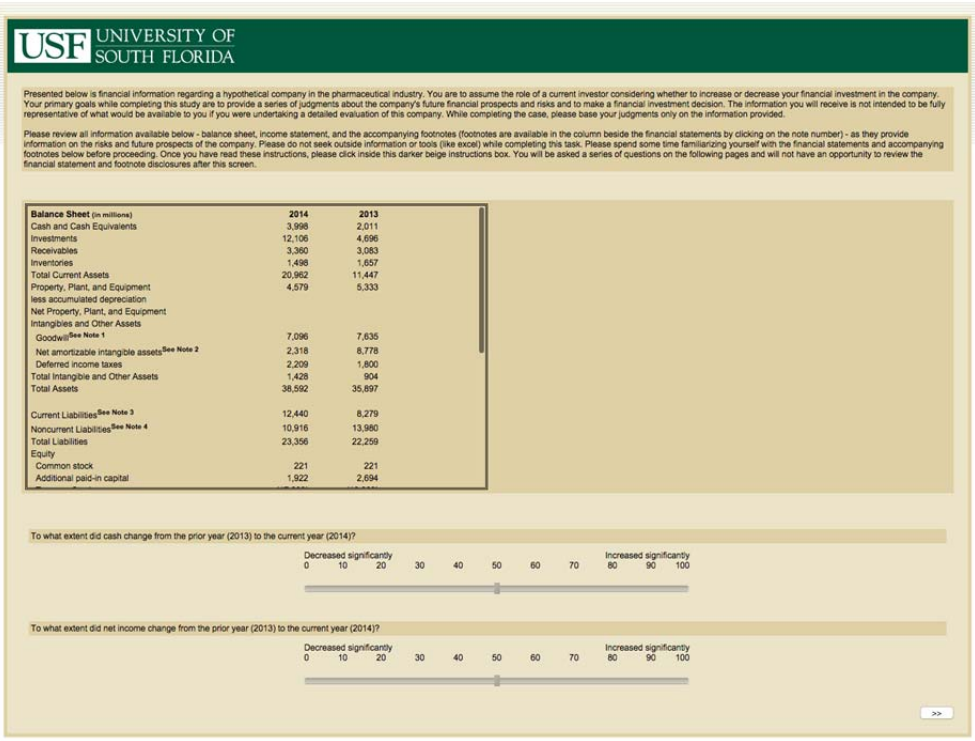

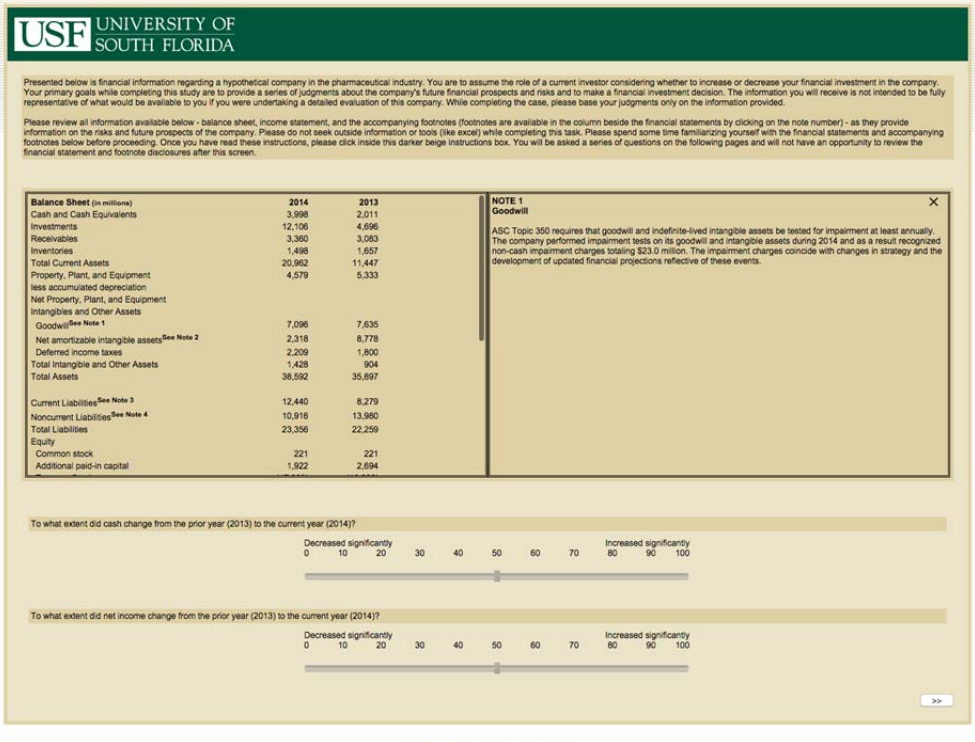

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Appendix C – Balance Sheet and Income Statement

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Appendix D – Footnote Disclosures

Notes to the Financial Statements

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Actions In Which We Are The Plaintiff

Varnifil (densilafil)
In October 2013, we filed a patent-infringement action with respect to Varnifil in the U.S. District Court for the Southern District of New York against Patotex Inc. and Patotex Corp., Nylan Pharmaceuticals Inc. (Nylan) and Nylan Inc. and Sactavis, Inc. These generic drug manufacturers have filed abbreviated new drug applications with the FDA seeking approval to market their generic versions of Varnifil . They assert the invalidity and non-infringement of the Varnifil method-of-use patent, which expires in 2016.

Dustent (dusnitinib malate)
In May 2013, Nylan notified us that it had filed an abbreviated new drug application with the FDA seeking approval to market a generic version of Dustent and challenging on various grounds the Dustent basic patent, which expires in 2016, and two other patents that expire in 2017 and 2018, respectively. In June 2013, we filed suit against Nylan in the U.S. District Court for the District of Delaware asserting the infringement of those three patents.

Note 3
Commitments and Contingencies

Purchase obligations, which include all legally binding contracts, such as firm commitments for inventory purchases, merchandise royalties, equipment purchases, marketing-related contracts, software acquisition/license commitments and service contracts, were $1,396 million and $1,907 million at December 31, 2014 and December 31, 2013, respectively. We issue inventory purchase orders, which represent authorizations to purchase that are cancelable by their terms. We do not consider purchase orders to be firm inventory commitments. If we choose to cancel a purchase order, we may be obligated to reimburse the vendor for unrecoverable outlays incurred prior to cancellation. We also issue trade letters of credit in the ordinary course of business, which are not obligations given they are conditioned on terms of the letter of credit being met.

Trade letters of credit totaled $1,516 million and $1,522 million at December 31, 2014 and December 31, 2013, respectively, a portion of which are reflected in accounts payable. Standby letters of credit, relating primarily to retained risk on our insurance claims, totaled $66 million and $71 million at December 31, 2014 and December 31, 2013, respectively.

We are exposed to claims and litigation arising in the ordinary course of business and use various methods to resolve these matters in a manner that we believe serves the best interest of our shareholders and other constituents. We believe the recorded reserves in our consolidated financial statements are adequate in light of the probable and estimable liabilities.

Note 4
Legal Settlements

Legal settlements and loss contingencies for the year ended December 31, 2014 were $227 million, compared to $79 million in 2013. The expense in 2013 was mainly related to $74 million related to the jeperadizol lawsuit, which was settled in the first quarter of 2014. The expense in 2014 was mainly related to $220 million related to the modezoril lawsuit, which is ongoing.

Note 5
Segment Reporting

The company operates in a single segment engaged in the discovery, development, licensing, manufacturing, marketing, distribution and sale of innovative medicines that help patients prevail over serious diseases. A global research and development organization and supply chain organization are responsible for the development and delivery of products to the market. Regional commercial organizations are used to distribute and sell the product. The business is also supported by global corporate staff functions. Segment information is consistent with the financial information regularly reviewed by the chief executive officer for purposes of evaluating performance, allocating resources, setting incentive compensation targets, and planning and forecasting future periods.

Products are sold principally to wholesalers, and to a lesser extent, directly to distributors, retailers, hospitals, clinics, government agencies and pharmacies.

Dollars in Millions	2013	2012
Virology		
Varnifil (densilafil)	$ 3,927	$ 3,588
Dustent (dusnitinib malate)	2,779	2,821
Jeperadizol (jeperadonal citraonal))	2,754	2,937
Oncology		
Modezoril (modonazol filasim)	1,880	1,919
Sprycel (dasatinib)	696	786
Yervoy (ipilimumab)	960	986
Metabolics		
Bydureon (exenatide extended-release for injectable suspension)*	298	378
Byetta (exenatide)*	400	519
Forxiga (dapagliflozin)	23	211
Onglyza/Kombiglyze (saxagliptin/saxagliptin and metformin)	877	1009
Immunoscience		
Nulojix (belatacept)	26	211
Mature Products and All Other	1,765	2,256
Total Revenues	$ 16,385	$ 17,621

Note 6
Accrued Expenses

December 31, 2014
Dollars in Millions

	2014	2013
Employee compensation and benefits	892	735
Royalties	213	123
Accrued research and development	161	416
Restructuring - current	128	73
Pension and postretirement benefits	47	47
Accrued litigation	227	79
Other	691	679
Total accrued expenses	2,359	2,152

Note 7
Subsequent Event

In March 2015, we announced a headquarters workforce reduction. As a result, we expect to record approximately $100 million of severance and other benefits-related charges within SG&A in the first quarter of 2015, the vast majority of which are expected to require cash expenditures.

Note 8
Restructuring Charges

From time to time, the Company initiates restructuring programs to become more efficient and effective, and to support new business strategies. In connection with these programs, the Company typically will incur severance and other exit costs.

During 2014, the Company recorded $411 million of restructuring charges, net of revisions to prior estimates. The 2014 activity primarily relates to $313 million and $133 million of restructuring charges recorded in the fourth quarter and second quarter, respectively.

During 2013, the Company recorded $103 million of restructuring charges, net of revisions to prior estimates. The 2013 activity primarily relates to $80 million of restructuring charges recorded in the fourth quarter.

Restructuring charges related to severance obligations are included in salaries and employee benefits in the Company’s Consolidated Statements of Income, while charges pertaining to other exit costs are included in occupancy and equipment and other expenses.