

Voluntary Disclosures via Social Media and the Role of Comments

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Abstract

Recently, the SEC effectively expanded the communication channels available for management by determining that social media is an acceptable channel for financial disclosures. Given these channels are more widely available to investors, both naïve and sophisticated, there is the potential for manipulating investors' perceptions of the valence of the disclosure in a manner that is beyond traditional disclosures envisioned by the SEC Acts. This paper examines the influence of disclosures and attached comments via social media utilizing a 2x4 between-subjects experimental design with hypotheses based upon the majority influence and spiral of silence theories. Results indicate that investors' perceptions of the news and their reactions to the news are influenced by the attached comments. Further, the results show that the reactions to good versus bad news are symmetrical when comments are attached to the disclosures and that the comments can change the valence of the news.

1. Introduction

Assessing investors' reactions to voluntary financial disclosures has been the focus of a long stream of accounting research. Research has analyzed investors reactions to news in many areas, including their reactions to earnings per share disclosures (Skinner [1994]); earnings per share forecasts (Kothari et al. [2009]); readability of the disclosure (Rennekamp [2012]); and the creditability of the information source (Clement and Tse [2003]). While the research has been extensive, the use of social media as a disclosure channel and investors' reactions to the disclosed news has not been examined.

This paper expands the literature on investors' reactions to voluntary disclosures by examining investors' reactions to news disclosed via social media and to the comments that may be attached to the disclosed news. The results indicate that the investors' perceptions concerning the valence of the news and their valuation judgments were influenced by the attached comments. In keeping with Kothari, Wysocki and Shu [2009] and Skinner [1994], the reactions to the news were asymmetrical when no comments were attached to the news. However, contrary to prior research, when comments were attached to the disclosures, the reactions to the news were symmetrical and in certain cases the bad news disclosures were perceived to be good news. The results lead to a call for the Securities and Exchange Commission (SEC) to revisit the regulation allowing for social media as a disclosure channel for financial information.

On April 2, 2013 the SEC issued a Report of Investigation regarding the investigation of Reed Hastings and Netflix, Inc. (SEC [2013]). The report was in response to an SEC investigation into Mr. Hastings' financial disclosure concerning Netflix, Inc. on his personal Facebook page. The report provides additional guidance regarding Regulation FD (Reg FD) (SEC [2000]) and company websites (SEC [2008]), by acknowledging that social media is an acceptable channel for financial disclosures (SEC [2013]).

While adoption of this disclosure method has been slow, companies are beginning to take advantage of social media as a disclosure channel. A major difference exists in the channels, which can lead to social media as a disclosure channel being used by management to manipulate naïve investors' perception of the valence of the disclosure in a manner that is beyond the scope and protection of the regulation.

The difference and possible danger that is inherent with social media as a disclosure channel lies in the nature of the communication. The disclosure channels of press releases and company websites have two main things in common: (1) they are one-way communication channels and (2) the company controls the communication. Social media, is a three-way communication channel where all parties have the ability to participate in the conversation and management has the ability to manipulate the conversation. Further, in social media there is the potential for private or personal communication rather than only entity communication.

Management has been shown to manipulate the conversation in conference calls by not responding to questions from some participants (Hollander et al. [2010]) and by deception (Larcker and Zakolyukina [2012]). With conference calls, even though management can refuse to respond to questions and can present information in a deceptive manner (Larcker and Zakolyukina [2012]), management can only control one side of the conversation and the other side is still heard by the other participants. With social media this is not the case.

When social media is used for disclosures, all parties have the ability to add to the conversation, but the company ultimately has the ability to effectively control all sides of the conversation. In the social media version of three-way communication, the company communicates, via posts or tweets, the disclosed news to the investor; individual investors communicate their views of the information to the company via comments attached to the posts; and the investors' comments are also communicated to other investors. Management can manipulate this conversation by framing information deceptively and, unique to the social media channel, can delete the comments of other participants so that only comments that portray the disclosed news in a favorable manner are available to investors. Other factors that make the comments possibly harmful to investors are that they may be from sources that lack the

knowledge and credibility necessary to make accurate comments regarding the valence of the news (e.g., good news or bad news); there may be a large number of comments; and people are often swayed by the views of others, regardless of the credibility of the communicator. It is the comments attached to the disclosures that are possibly harmful to investors and that are beyond the scope of the guidance from the SEC.

In order to make their investment decisions, investors primarily rely on information provided by the companies in which they invest (Clor-Proell [2009], Pinsker [2011]) and they react to the disclosed news asymmetrically, with stronger reactions to bad news (Kothari, Wysocki and Shu [2009], Skinner [1994]). The rapid dissemination of this financial information is demanded by investors (Ettredge et al. [2002]). Further, companies primarily release good news in a timely manner and delay the release of bad news (Kothari, Wysocki and Shu [2009]). Since investors have the ability to trade on the disclosure almost instantaneously, rapid dissemination can be advantageous for companies and their investors as the news may have a rapid and favorable effect on stock price.

Social media allows companies to reap the full benefit of rapid dissemination as news is disseminated more quickly via social media than via traditional disclosure channels (Doer et al. [2012]). When Reed Hastings made his post that set off the investigation by the SEC in 2012, Netflix' stock price rose approximately 16% within 1.5 days. However, this is a double-edged sword for investors, as investors also receive rapid dissemination of the comments of other investors regarding the companies' posts and tweets. These comments may have an effect on the investors' perceptions of the valence of the news and their decision-making that is more extreme or in the opposite direction of the actual news.

While Reg FD effectively lessened the asymmetry between investors' reactions to good and bad news disclosures, social media as a disclosure channel, through the attached comments, makes it possible for this asymmetry to be exacerbated. And, in the specific case of bad news with all attached comments being positive, the asymmetry in the investors' reactions to the news may be eliminated. Furthermore, as investors comment on the companies posted disclosures, the perception of individual investors regarding the disclosure may be altered via the majority influence effect of herding (Muchnik et al. [2013]), which, as explained by the spiral of silence (Neuwirth and Frederick [2004]), is intensified due to minority opinions being silenced. This paper experimentally tests these assertions.

Phase 1 of the experiment was used to determine what investors felt was good news and bad news in a disclosure of listener hours for a fictitious online streaming music company. 91 participants provided their perception of the valence of the news and provided brief comments explaining the rationale behind their perception. Phase 1 yielded the number of listener hours and selected comments used in the instrument for Phase 2.

In Phase 2, a web-based experiment was used to test the hypotheses regarding whether the comments attached to financial disclosures via social media affected investors' perceptions regarding the disclosure and their reaction to the disclosures. A 2x4 experimental design was used in which the valence of the news between good news and bad news and for the disclosure to have all positive comments, all negative comments, a mix of comments that approximates neutrality in the comments, and no comments, were manipulated. The participants responded to several dependent variable questions regarding their perceived valence of the news, common stock valuation judgments, and management credibility.

The results showed that investors' perceptions of the valence of the disclosed news via social media were influenced by comments attached to the post. The main effects of the news and disclosure groups were significant, as well as several pair-wise comparisons across comment groups being significantly different. Of particular interest is that when all positive comments were attached to bad news, the news was considered by the participants to be good news, with the perception of the news being greater than all other bad news comment groups and greater than some of the good news comment groups.

The results reveal that attached comments significantly influence investors' stock valuation judgments. Consistent with prior research (Kothari, Wysocki and Shu [2009], Skinner [1994]), when no comments were attached to the disclosures the reactions were asymmetrical, with stronger reactions to bad news. However, when comments were attached to the disclosures, the reactions were contrary to prior research and no significant differences existed between the participants' reactions to good news or bad news.

The testing of investors' perceptions on management credibility yielded results that show that management was deemed to be more credible when good news was disclosed. Also, when all positive comments were attached to a disclosure of bad news the perception of management's credibility was significantly higher than when all negative comments were attached.

The study contributes to the voluntary disclosure literature by analyzing investment decisions and perceptions of disclosures via social media in a situation where investors' views of the disclosure are directly attached via comments to management's disclosures, which is unique to the social media disclosure channel. The findings also contribute to practice by providing evidence that may call into question the legitimacy of social media as a disclosure channel.

Section 2 contains a discussion of the context of the research and development of the hypotheses. Section 3 presents the research method. The results are discussed in Section 4. The paper concludes in Section 5.

2. Research Context and Hypotheses

2.1 The Effect of Herding and Majority Opinion on Investors

Herding has been shown to have an effect on analysts' forecasts. Hong et al. [2000] found that inexperienced analysts are more likely to release earnings forecasts that are closer to the median forecast of other analysts. Analysts have also been shown to be more likely to herd if they self-assess their forecasting ability to be low (Clement and Tse [2005], Scharfstein and Stein [1990], Trueman [1994]). Gleason and Lee [2003] suggest that uninformed analysts make small revisions to their initial forecasts and herd. If analysts herd in their forecasts and forecast revisions, one can infer that naïve investors would be more susceptible to the opinions of others and would herd with regards to their perception of disclosed news and their valuation judgments.

Investors that rely on social media for investment news can be expected to be naïve and uninformed investors. And social media users have been shown to be subject to herding effects. In social media when an individual views a positively rated news, the herding effect proposes that they will likewise rate the news positively (Muchnik, Aral and Taylor [2013]). This was found to be the case for positive ratings, but not for negative ratings, even if the positive rating was provided 'incorrectly'. However, when a negative rating was provided incorrectly, a correction effect occurred where individuals were more likely to correct a negative ranking with a positive ranking than to concur with the ranking and likewise negatively rank a post. The herding effect has also shown that predictions about future investment decisions are influenced

by prior correct recommendations, regardless of whether a new prediction is well founded (Andersson et al. [2009]).

Majority opinion is another closely related concept that can expand the understanding provided by herding theory. Research has shown that if a majority opinion exists, the majority of other individuals will go along with that opinion. This has been shown in research related to group decision support systems with the input a person would provide in a group setting (Zhang et al. [2007]). If the majority of a group agree on a given set of information, it is less likely that a group member will offer a contrary opinion.

Similarly, Akerlof [1970] suggests that naive investors in the used car market do not have ability to discern “lemons” from good cars based on the biased information which they receive. Due to the majority influence provided by comments on a financial disclosure via social media, the naïve investor will likely have a difficult time determining good investments from “lemons”.

2.2 The Effect of the Spiral of Silence on Investors

The effect of herding and majority opinion are exacerbated by the spiral of silence, which supports the concept that when an opinion is expressed and supported by the majority, minority opinions are less likely to be expressed (Neuwirth and Frederick [2004]). These findings suggest that when individuals are overwhelmed with a majority opinion that contradicts their opinion, they cope with the situation and move on, without sharing their viewpoints.

McLeod et al. [1997] showed that as individuals rely on computer-mediated communication (rather than face-to-face) minority comments had a much more difficult time in improving the group investment decision quality when the majority disagreed. In particular, computer-mediated communication allows the minority opinion to comment, but reduces the influence of their comments as compared to the majority opinion. When it comes to comments

on social media posts, individuals will have opportunities to present dissenting opinions in the comments section, giving them a voice. However, if the dissenting opinion is in the minority as compared to the majority opinion the investment decision will likely be made in line with the majority opinion.

Drawing upon the spiral of science (Neuwirth and Frederick [2004]) and majority opinion (Zhang, Lowry, Zhou and Fu [2007]), research has shown that the majority opinion will also affect decision-making. In an investment setting, when individuals with a minority dissenting opinion are given the opportunity to continue investing resources into a failing endeavor with substantial sunk costs, a strong majority opinion by those wanting to continue investing will outweigh the opinion of a dissenting rational individual (Smith et al. [1998]). Thus, it is expected that a person's opinion of a financial disclosure will be influenced to match the majority opinion.

The participants in Phase 2 of the experiment receive good or bad news disclosures that were hypothetically disseminated via social media. The disclosures have (1) all positive comments, (2) all negative comments, (3) a mix of positive and negative comments, or (4) no comments attached. It is hypothesized that the comments will influence the participants' perception of the valence of the news and the valuation judgments. The following hypotheses formally state the expectations:

- H1.** Investors receiving good (bad) news via social media channels will perceive the news to be less positive (negative) if all of the comments are negative (positive).
- H2.** Investors' changes in valuation judgment will be less positive (negative) when receiving good (bad) news via social media channels if all of the comments are negative (positive).

Of particular interest is the case where bad news is disclosed about a company via social media and all of the attached comments are positive. In this case, it is likely that individual's perception of the bad news will be less negative than when only negative comments (i.e, in line with the bad news) are attached and when no comments are attached. The valence of the bad news may even be changed to good news when only positive comments are attached. This would result in the asymmetry in the investors' reactions to good and bad news being eliminated. Formally stated,

H3. The asymmetry between the reactions to the good and bad news will be eliminated when all of the comments are positive.

The amount and valence of the comments attached to disclosures disseminated via social media may also influence investors' perceptions of the credibility of the disclosing organization's management. Investors perceive management that is more forthcoming and accurate in their disclosures to be more credible (Koonce and Lipe [2010], Mercer [2005]). Thus, one can infer from this that as more people provide evidence, via comments that are consistent with the valence of the disclosures, investors would perceive management to be more credible.

Research also shows that when disclosure accuracy is low, investors perceive management as less credible (Mercer [2005], Tan et al. [2002]). Therefore, when there are comments attached to the disclosures that are contrary to the valence of the disclosure, investors may perceive management as less credible. Thus:

H4. Investors receiving good (bad) news will perceive management as less (more) credible if all of the comments are negative (positive).

3. Method

3.1 Participants

Participants¹ for both phases of the experiment were recruited from Amazon's Mechanical Turk platform (AMT)². AMT is an online market for researchers to obtain paid participants to participate in cognitive tasks, such as taking online surveys and participating in online experiments (Brandon et al. [2013], Rennekamp [2012]). Participants obtained via AMT have been successfully used by accounting researchers (Rennekamp [2012], van der Heiden [2013]).

Phase 1 of the experiment included 114 initial observations. Fifteen observations were removed due to failed manipulation checks, three were removed for unrealistic answers to years of work experience, and five were removed for unreasonable answers to other items. Thus, 91 observations were used in Phase 1.

Observations for Phase 2 of the experiment were obtained from 338 participants. 61 observations were removed for failed manipulation and/or attentiveness checks, three were removed for invalid answers, and 43 were removed for not being Facebook users. Therefore, the data set for Phase 2 contained 231 observations.

Overall, 61.2% (38.8%) of the participants were male (female). On average the participants were 30.68 years old with 11.63 years of work experience. The participants had completed an average of 1.22 accounting courses and 1.09 finance courses. For Phase 2 of the study, the 231 participants access their Facebook page an average of 5 days per week.

3.2 Expert Panel

Four accounting and two finance researchers analyzed the experimental materials for both phases of the study and the same four accounting researchers analyzed the comments during

¹Participants were required to be residents of the United States of America and at least eighteen years of age.

² Participants in Phase 1 were paid \$0.25 for their participation, while Phase 2 participants were paid \$0.75. The difference in compensation was due to the increased time required to complete Phase 2.

Phase 1. They provided guidance on the instrument development, concluded that the valence of the manipulated news was indeed “good” and “bad”, and that the comments obtained in Phase 1 were both positive and negative. Furthermore, they concluded that the instrument was valid and realistic.

3.3 Design

The experiment used a 2x4 between-subjects design where the disclosure of private corporate information of a fictitious music streaming company via a social media disclosure channel and the comments attached to the disclosure were manipulated (see Figure 1: Panel A). As discussed earlier, the experiment was conducted in two phases. In Phase 1, the participants received a scenario in which a fictitious company disclosed new private financial information via an online social network. The participants were asked a number of questions concerning the disclosure, in order to determine the valence of the disclosed news and to elicit comments concerning the news that could be used as comments that would be attached to the disclosures in Phase 2. In Phase 2, the participants received the same scenario as in Phase 1, but with the good and bad news and the type of attached comments being manipulated. This phase was used to obtain data that was used to test the hypotheses. Figure 1: Panel B contains a timeline of the experiment.

***** Insert Figure 1 Approximately Here *****

3.4 Manipulations

The experimental scenario was that of a fictitious Internet streaming music service. This industry was selected to be in a similar industry as Netflix, in order to allow for a disclosure that was similar to the disclosure from the Netflix CEO that led to the change in the regulation. The data was based upon that of Pandora Media, Inc.³, but was consistently changed by a given

³ Pandora Media, Inc. operates an online music streaming service at the url <http://www.pandora.com>. Pandora is the market leader in free online music streaming.

percentage, so as to make the numbers more comprehensible for the participants and to disguise the identity of the actual company. The background information for the company was constant throughout the experiment. The manipulations related to the number of listener hours disclosed by the company and the comments attached to the post containing the disclosure. Appendix A contains the experimental materials for both phases of the experiment.

In Phase 1, the number of disclosed listener hours ranged from 300 to 900 hours, in 100-hour increments. In Phase 2, the listener hours were manipulated as either 300 hours or 500 hours. The choice of 300 or 500 hours was determined from the results of Phase 1 and is discussed in the next subsection. Both number of listener hours showed an increase from the previous year, but 300 hours was such a small increase that the Phase 1 participants considered it bad news. 500 listener hours was considered a substantial increase from the previous year and as good news by these participants.

The comments attached to the posted disclosure were manipulated as all positive comments, all negative comments, a mixture of positive and negative comments, or no comments. The comments used in Phase 2 were chosen from those provided by the Phase 1 participants. The comments were slightly altered to make them appear to be legitimate Facebook posts.

3.5 Task and Procedures

Phase 1 of the study was conducted to determine the number of listener hours and the comments to be used in the financial disclosure for Phase 2. The participants in Phase 1 were provided a scenario containing the background information for the fictitious company. Following the background information was a disclosure of the number of listener hours the company provided in the previous calendar year. The number of listener hours randomly varied from 300 to 900 hours in 100-hour increments. The participants were asked to provide their perception of

the news on a 101-point scale ranging from 0 (very bad news) to 100 (very good news). They were then asked to provide a short (less than 100 words) comment on why they perceived the news as they did in the previous question. The participants also answered manipulation and attentiveness check questions, questions regarding realism of the scenario, and demographic questions.

The Phase 1 results were analyzed to determine the number of listener hours that represented good and bad news to the participants. Also, the comments from the participants were analyzed and a set of 14 comments were selected that provided a clear rationale for why the participants believed the news to be good or bad. The selected comments were altered to make them appear as legitimate short Facebook posts. The experts concluded that the selection of 300 and 500 listener hours were indeed bad and good news. They also categorized the set of selected and altered comments and unanimously agreed on a final set of 7 positive and 7 negative comments. Obtaining the manipulations from actual participants provided the scenario with validity and realism that would otherwise have been difficult to obtain.

Based upon the information from Phase I, an instrument was developed that was pretested on a sample of 159 undergraduate students. They also offered suggestions to make the instrument clearer. After evaluating the comments the instrument was modified. Analysis of the pretest results indicated that the manipulations were understandable and that the instrument would yield usable observations for hypothesis testing.

In Phase 2, the participants received the background scenario for the fictitious company, after which they were asked to provide an initial common stock valuation for the company. Following their initial evaluation, the participants received a financial disclosure that was designed to resemble a Facebook post and were told that the company's CEO posted the

disclosure on the company's online social media site. The post had comments randomly attached to it in one of the following conditions: all positive comments, all negative comments, a mix of positive and negative comments, or no comments. The participants then provided a second common stock valuation for the company, indicated their perception of the news, and provided their perception on the credibility of management. Manipulation and attentiveness check questions and demographic questions concluded Phase 2.

3.6 Dependent Variables

Several dependent variables will be used to test the hypotheses. In keeping with prior research, perception of the news, valuation judgments, and perceptions of management's credibility were measured (Koonce and Lipe [2010], Rennekamp [2012]).

After receiving the disclosure, the participants were asked if they perceived the disclosure as being good news or bad news, which assessed whether they perceived the comments as adding to or changing the valence of the news. The responses were captured by asking the participants to indicate their perception of the news on a 101-point scale ranging from 0 = "very bad news" to 100 = "very good news."

The participants were asked, both before and after receiving the disclosure, to indicate on a 101-point scale, a valuation of the common stock of the organization. The scale ranges from 0 = "low" and 100 = "high." The difference between (change in) the two measures is the dependent variable and captures the participants' reactions to the disclosure and comments. (Koonce and Lipe [2010], Rennekamp [2012]).

Taking the average of management's perceived trustworthiness and competence created the perception of management's credibility construct. Participants were asked, after receiving the disclosure, to indicate on separate 101-point scales the trustworthiness of management and the

competence of management. The trustworthiness scale ranged from 0 = “very untrustworthy” to 100 = “very trustworthy.” The competence scale ranged from 0 = “very incompetent” to 100 = “very competent” (Koonce and Lipe [2010], Rennekamp [2012]).

4. Results

4.1 Phase 1

Phase 1 of the study was used to determine what level of disclosed listener hours the participants perceived to be good news and bad news and subsequently used in Phase 2 as the number of listener hours in the disclosure. Also, Phase 1 was used to collect actual comments from the participants that would be used in Phase 2 as the comments that would be attached to the disclosure.

As seen in Table 1: Panel B, the perception of the valence of the news significantly varied between the number of listener hours ($F = 24.537$; $p < 0.01$). Analysis of the means from Panel A showed a large increase in perception of the news for listener hours between 400 and 500, showing that to be the most likely cutoff between good news and bad news. This cutoff was supported by the comments from the participants on why they perceived the news as they did. Pair-wise comparisons showed that significant differences existed between 300 and 500 listener hours ($p < 0.01$) and between 400 and 500 listener hours ($p < 0.01$). However, the difference between 300 and 400 listener hours was insignificant ($p = 0.50$). Therefore, 300 and 500 listener hours were selected as the bad and good news, respectively, for the disclosure in Phase 2.

14 of the provided comments (7 positive and 7 negative) that succinctly and clearly stated the participants’ rationale for the perception of the news were selected and slightly altered to resemble comments on Facebook. These comments were given to the four accounting professors, who are social media users, who classified them as positive and negative comments. Their

classifications were in line with the participants'. These comments were used in Phase 2 as the attached comments.

***** Insert Table 1 Approximately Here *****

4.2 Effect of the Comments on Perception of the News

The expectation for H1 is that investors receiving good (bad) news via social media channels will perceive the news to be less positive (negative) if all of the comments are negative (positive). Descriptive statistics for the changes in valuation are presented in Table 2, Panel A.

The Analysis of Variance (ANOVA) results provided in Panel B show that changes in the valuations significantly differ across the comment groups. As expected, there was a significant main effect for the valence of the news ($F = 35.5085$; $p < 0.01$), indicating that the participants perceive good and bad news differently with good news being perceived more highly than bad news. The main effect for comments ($F = 34.0886$; $p < 0.01$) supports that the comments attached to the posted disclosures play a significant role in differentiating the participant's perception of the valence of the news. The differentiation of the perception was further supported by the significant interaction effect ($F = 9.4026$; $p < 0.01$). Figure 2 graphically displays the interaction.

Pair-wise comparisons showed that all negative comments (mean = 34.708) reduced the perceived valence of good news to a level significantly below that of good news with all positive comments (mean = 70.541; $p < 0.01$) and with no comments (mean = 71.533; $p < 0.01$). The investors' perceptions of good news with all negative comments do not significantly differ from those of the mixed comment group, but do approach significance (mean = 53.885; $p = 0.06$).

Interestingly, looking at the bad news comment pairs shows that all positive comments (mean = 63.594) significantly increase the perception of the news over the all negative comment group (mean = 24.971; $p < 0.01$) and the no comments group (mean = 33.611; $p < 0.01$). Also, when all positive comments are attached to a bad news disclosure, the mean perception of the news is greater than the overall mean of the perception of the good news (58.394). Therefore, all positive comments can change the perceived valence of bad news to that of good news. In keeping with the results of the good news pairs, the perceptions of all positive comments do not significantly differ from the mixed comment group, but do approach significance (mean = 48.040; $p = 0.06$). The results partially support H1.

***** Insert Table 2 Approximately Here *****

***** Insert Figure 2 Approximately Here *****

4.3 Effects of the comments on Changes in Valuation

Hypothesis 2 predicts that changes in the valuations will be less positive (negative) when receiving good (bad) news via social media channels if all of the comments are negative (positive). The ANOVA results, as presented in Table 3 and Figure 4, show that the main effects of news ($F = 37.945$; $p < 0.01$), comments ($F = 10.526$; $p < 0.01$), and the interaction ($F = 5.249$; $p < 0.01$) are significant. Hence, valuation changes for all the good news comment groups are more positive than those for all respective bad news comment groups.

Pair-wise comparison analysis indicates that H2 is partially supported. When the news was bad, the all positive comments group significantly lessened the participants' reactions to the news (as evidenced by the average change of the participants' valuations from their initial valuation to their post-disclosure valuation) over the all negative comments group ($p < 0.01$) and

the no comments group ($p = 0.01$), but was not to a level different from the mixed comment group.

On the other hand, when the news was good, the comments did not have a significant effect on the change in the valuation, except for the pairwise. When the news is good and the comments are all positive as opposed to all negative, the difference is approaching significance ($p = 0.07$).

The results of the testing of the difference between the reaction of the investors to good and bad news supported H3. Evaluation of the pair-wise comparisons between the like-kind comment groups for good and bad news (see bottom four rows of Table 3: Panel C) show that the asymmetry purported by Kothari, Wysocki and Shu [2009] and Skinner [1994] does exist when no comments are attached to the disclosures ($p < 0.01$) and the reaction to the bad news was greater than the reaction to the good news. However, contrary to prior research, when comments were attached to the disclosures the asymmetry was eliminated for all of the comment group pairs. The pair-wise differences were insignificant for the reactions between the all positive ($p = 0.87$), all negative ($p = 0.19$), and mixed ($p = 0.48$) comment groups.

***** Insert Table 3 Approximately Here *****

***** Insert Figure 3 Approximately Here *****

4.4 Effect of comments on Management Credibility

As discussed previously, the construct of credibility was created to test Hypothesis 4 (investors' perception of managements' credibility). The measures for trustworthiness and competence were averaged to yield the credibility construct (Rennekamp [2012]). Cronbach's

alpha for the credibility construct equals 0.85, which exceeds the 0.70 threshold (Nunnally [1978]), confirming that the construct is reliable.

Table 4: Panel B provides the ANOVA results that show the main effects for news ($F = 15.761$; $p < 0.01$) and comments ($F = 4.271$; $p < 0.01$) are both significant. Analysis of the means in Panel A shows that management was perceived to be more credible when the disclosure contained good news. The interaction approaches significance ($p = 0.09$) and is graphically displayed in Figure 4.

Pair-wise comparisons (see Panel C) indicate that a significant difference existed between bad news with all positive comments and bad news with all negative comments ($p = 0.01$). This result shows that when bad news is disclosed, investors' perceptions of management's credibility can be significantly increased if all positive comments are attached to the posted disclosure. Consistent with the results for both the perception of the news and the change in valuation, positive comments can reduce the effect of bad news and possibly change it to good news. Therefore, H4 is partially supported.

***** Insert Table 4 Approximately Here *****

***** Insert Figure 4 Approximately Here *****

5. Conclusion

Research has shown that in making investment decisions, investors rely on news provided by the companies in which they invest (Clor-Proell [2009], Pinsker [2011]) and they react to the disclosed news asymmetrically, with stronger reactions to bad news (Kothari, Wysocki and Shu [2009], Skinner [1994]). Not only does the disclosed news influence the

investors, but so does the readability of the news (Rennekamp [2012]). The current study extends prior research on valuation judgments and financial disclosure using a controlled experiment to determine if comments attached to news disclosed with financial information via social media influences the investors' perceptions of the disclosed news, their valuation judgments, and their perceptions of management's credibility. The research on the asymmetry in investors' reactions to disclosed news is also extended.

The study finds that investors are, in fact, influenced by comments attached to financial disclosures via social media. In keeping with prior research on herding and social media (Muchnik, Aral and Taylor [2013]), investors are also influenced by majority opinions delivered via social media comments. When investors received all positive comments attached to both good and bad news, their perception of the valence of the news was significantly more positive than when the comments were all negative and when no comments were attached. The effect is most noteworthy in the case where bad news is disclosed and all positive comments were attached to the post. In this case, the valence of the news was changed with the bad news being perceived as good news.

Investors' reactions to the comments were also manifested in their valuation judgments. Interestingly, when the disclosed news was bad, the investors' reactions were significantly weaker when all of the comments were positive, as opposed to when the comments were all negative or when there were no comments. Most importantly, the asymmetry between the reactions to good and bad news was eliminated when comments were attached to the disclosures. This result is contrary to the findings of (Kothari, Wysocki and Shu [2009], Skinner [1994]), and showed the power that comments have on investors' judgment and decision-making.

Also influenced was the investors' perception of management's credibility. Although this was only realized in the case of all positive comments versus all negative comments attached to bad news disclosures. This adds support to the prior results, which indicated that the perception of and reaction to bad news was significantly more positive.

The study is limited by holding the readability of the disclosure and the comments constant, which could be eliminated by future research. Further limiting the study is that the scenario dealt only with the situation of comments attached to the original posted disclosure and not with the reactions to the disclosures if the original post was shared and reposted on another social media user's Facebook "wall." Future research could replicate this study on other social media sites (e.g., Twitter and LinkedIn). Another area of future research would be to add avatars or profile pictures to add information regarding the identity of the commenters to see if they instill a change in investors' reactions to the comments.

The results indicate that the SEC may need to revisit the guidance regarding the use of social media channels for financial disclosures. While the disclosure itself falls under the guidance, the attached disclosures do not. However, management can manipulate the comments and the comments do influence investors' judgment and decision-making. In particular, guidance is needed on whether comments should be allowed to be attached to posts, thus removing the issue of social media as a three-way communication channel where the investors' stated viewpoint can be manipulated by management.

Appendix A: Experimental Materials

Panel A: Background Information

Please carefully consider the information in the following scenario before answering the questions that follow.

You have conducted considerable research on the investment potential of companies in the streaming music industry. Your analysis of firms in the industry has led you to narrow down the important factors differentiating firms in this industry to be the number of listener hours, percent change in revenue, and percent change in net income. The following information pertains to one of the firms that you are evaluating.

Radio-for-All is an Internet streaming music company offering both a free and paid version of their streaming music service. The company has been in business for 6 years and has been publicly traded for 4 years. Management has been the same throughout the life of the company. Subscriber and financial data for the company are provided below:

RADIO-FOR-ALL DATA

Panel A: Radio-for-All Subscriber Data

	2008	2009	2010	2011
Listener hours	110 million	136 million	203 million	295 million
% change from Prior Year		24%	49%	46%

Panel B: Radio-for-All Financial Data

	2008	2009	2010	2011
Revenue	\$2.6 million	\$3.3 million	\$4.9 million	\$7.1 million
% change from Prior Year		26%	48%	46%
Net Income	\$62,308	\$79,823	\$116,928	\$171,339
% change from Prior Year		28%	46%	47%

INDUSTRY DATA

Panel C: Industry Averages

	2008	2009	2010	2011
Listener hours	121 million	139 million	199 million	344 million
% change from Prior Year		15%	43%	73%

Panel D: Estimated INDUSTRY Average for 2012

	2012
Listener Hours	600 million
% change from Prior Year	74%

Radio-for-All did not disclose a goal for listener hours for 2012.

The streaming music industry is a young, growing, and competitive industry.

Radio-for-All does not pay dividends.

Analysts' expectations for Radio-for-All's earnings per share have been met or exceeded each year since 2008.

All other factors that would be considered in making an investment decision on this firm are in line with their competitors, including stock price.

Panel B: Example Disclosure (Bad News with All Positive Comments)

Radio-For-All

Radio-For-All had 300 million listener hours for 2012.

[Like](#) · [Comment](#) · [Share](#) · 2 hours ago near Eupora ·

Rob Adkins I think this is good, because their audience is increasing. Business is getting better and better throughout the years.

2 hours ago via mobile · Like

Elaine Crumley It was less than the industry average but the economy struggled in 2012 and the numbers are still increasing over 2011. Overall, any growth is still good.

2 hours ago · Like

Savanna Harrison Listening hours are rising and predicted to continue to rise in addition to increasing revenue and net income so while Radio-For-All may be below industry averages they are continuing to grow.

2 hours ago via mobile · Like

Brad Stevens Even though the announcement is lower than the average, it is still an increase for the company.

1 hour ago · Like

Steven Henderson I think this is good because there is an increase in listeners.

1 hour ago via mobile · Like

Amber Jaynes The percent increase was not as high as the industry's, but it was still a good increase nonetheless. Net profit should increase from the previous year.

57 minutes ago · Like

Bob Carver The listener hours have increased over their previous year. It looks like it could be a potentially good investment.

30 minutes ago via mobile · Like

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Figure 1: Experimental Design and Timeline of Events

Panel A: 2x4 Between-Subjects Experimental Design

		Comments			
		No Comment	All Positive	All Negative	Mixed
News	Good	Positive	Magnified Positive	Crossover	Positive (Difference between No)
	Bad	Negative	Crossover	Magnified Negative	Negative (Difference between No)

Panel B: Timeline of Events for Phase 1 and Phase 2 of the Experiment

Phase 1			Phase 2					
Participants received background information on the company and a disclosure of private information. They then provided a judgment on their perception of the valence of the news and commented on why they believed the news to be good or bad.	>	Data from the experiment were analyzed to determine the number of listener hours and comments to use in Phase 2.	>	New participants received background information on the company and provided an initial valuation of the company.	>	Participants received a disclosure of private financial information from the company with or without attached comments.	>	Participants provided a new valuation for the company and answered several questions concerning their perceptions of the news and management, how they made their judgments, and demographic questions

Figure 2: Plot of News*Comments on Perception of News

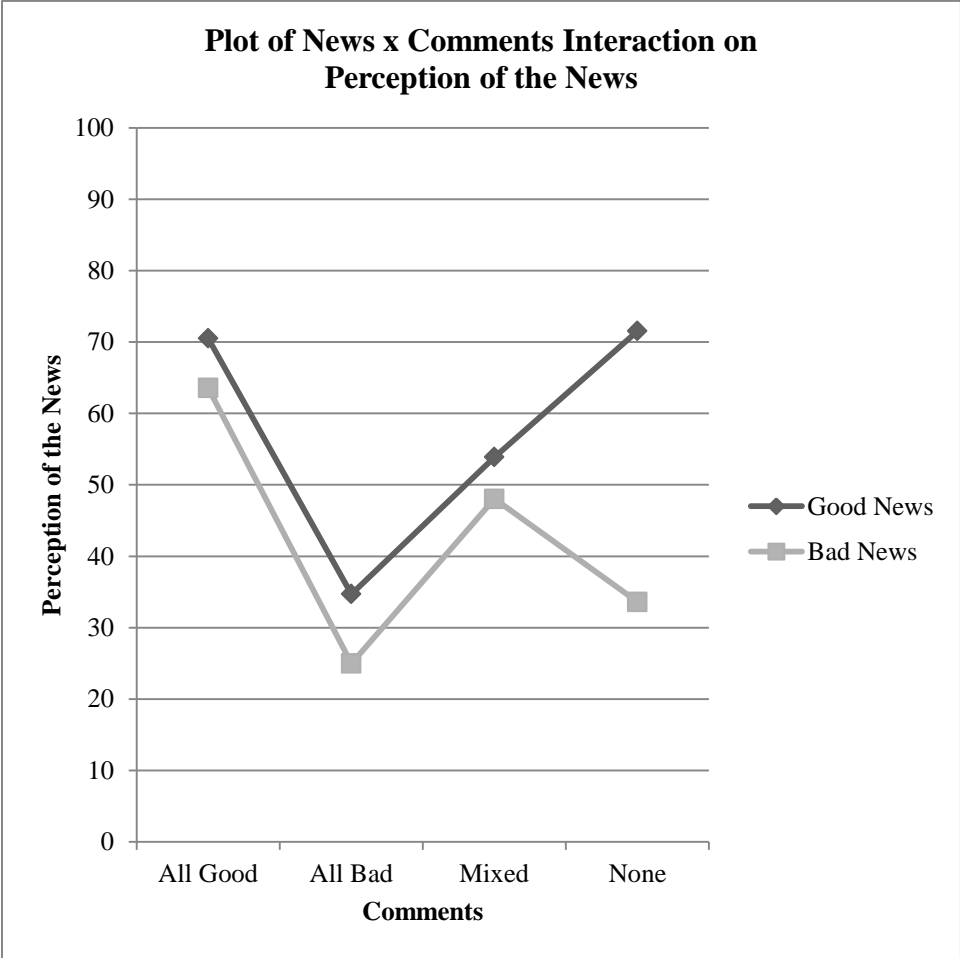


Figure 3: Plot of News*Comments on Change in Valuation

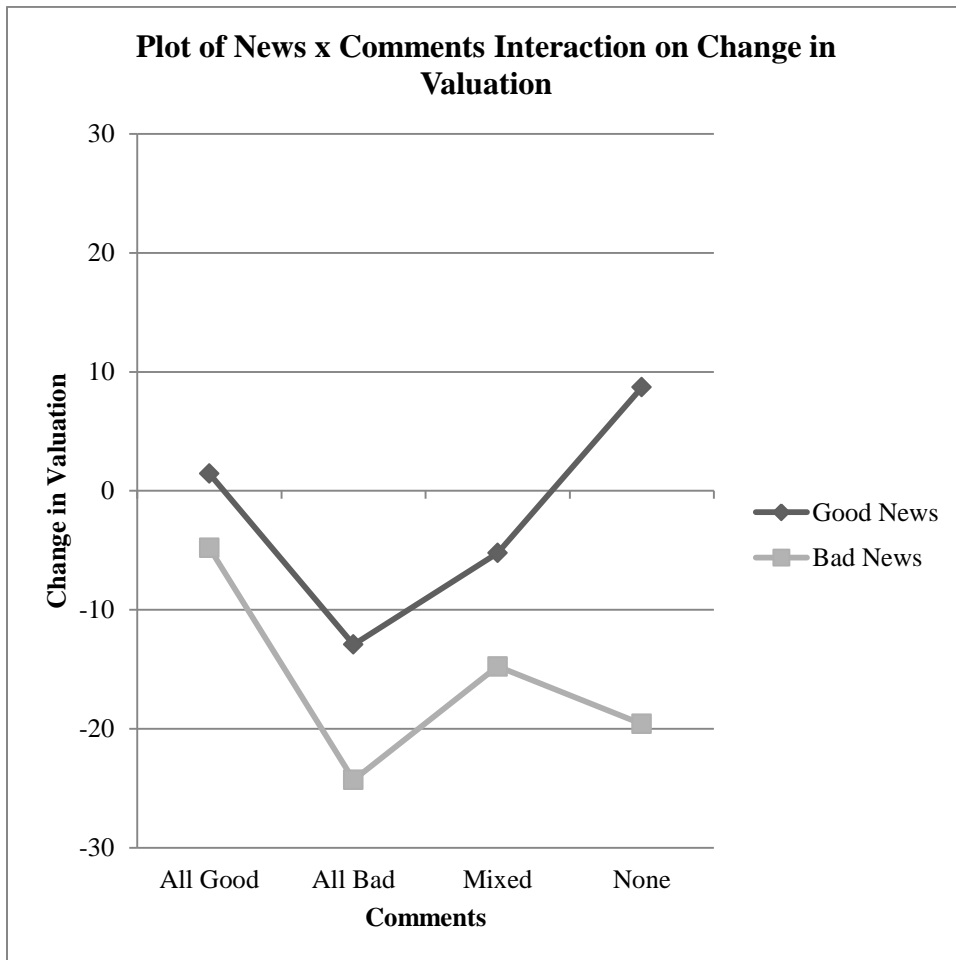


Figure 4: Plot of News*Comments on Management Credibility

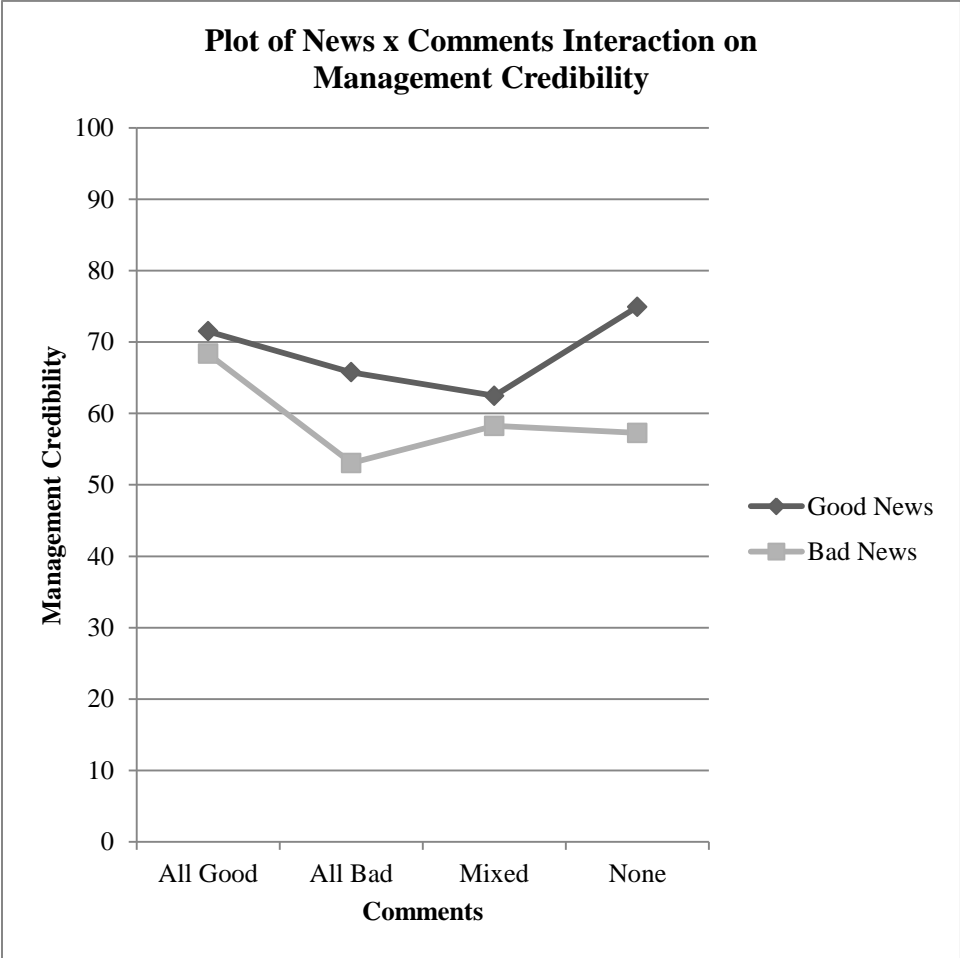


Table 1: Descriptive Statistics and Analysis of Variance: Perception of the Valence of the News for Phase 1

Panel A: Descriptive Statistics: Mean and (Standard Deviation)

Listener Hours							Overall
300	400	500	600	700	800	900	
36.50	48.83	79.00	85.40	92.47	85.06	87.63	77.21
(15.250)	(22.993)	(7.280)	(11.316)	(6.116)	(14.501)	(15.203)	(22.989)
n = 8	n = 12	n = 9	n = 10	n = 15	n = 18	n = 19	N = 91

Panel B: Perception of the Valence of the News: One-Way Analysis of Variance*

Source	d.f.	S.S.	M.S.	F-Statistic	p = Value
Between Groups	6	30,283.867	5,047.311	24.537	<0.01
Within Groups	84	17,279.165	205.704		
Total	90	47,563.033			

Panel C: Pair-Wise Comparisons*

Comparison	Difference	p-Value
300 – 400	-12.333	0.50
300 – 500	-42.500	<0.01
400 – 500	-30.167	0.01

* Levene's Test (F-Statistic = 4.542, p-Value < 0.01) indicates that the variances are unequal. However, Analysis of Variance is robust to non-normality, "especially when sample sizes are similar" (Moore and McCabe [2003]). Therefore, Analysis of Variance results were presented. Tukey-Kramer HSD was used for the pair-wise comparisons.

Table 2: Descriptive Statistics and Analysis of Variance: Perception of the Valence of the News

Panel A: Descriptive Statistics: Mean and (Standard Deviation)

News	Comments				Overall
	All Positive	All Negative	Mixed	None	
Good	70.541 (17.285) n = 24	34.708 (20.474) n = 24	53.885 (16.153) n = 26	71.533 (21.644) n = 30	58.394 (24.001) n = 104
Bad	63.594 (21.669) n = 32	24.971 (13.820) n = 34	48.040 (20.464) n = 25	33.611 (22.826) n = 36	41.693 (24.779) n = 127
Overall	66.571 (20.041) n = 56	29.000 (17.410) n = 58	51.020 (18.444) n = 51	50.848 (29.182) n = 66	

Panel B: Perception of the Valence of the News: Analysis of Variance*

Source	d.f.	S.S.	M.S.	F-Statistic	p = Value
News	1	12,887.589	12,887.589	35.5085	<0.01
Comments	3	39,332.092	13,110.697	34.0886	<0.01
News*Comments	3	10,848.893	3,616.298	9.4026	<0.01
Error	223	85,767.242	384.606		

Panel C: Pair-Wise Comparisons*

Comparison (News/Comments)	Difference	p-Value
Good/All Negative – Good/All Positive	-35.833	<0.01
Good/All Negative – Good/Mixed	16.657	0.06
Good/All Negative – Good/None	-36.825	<0.01
Bad/All Positive – Bad/All Negative	38.623	<0.01
Bad/All Positive – Bad/Mixed	15.554	0.06
Bad/All Positive – Bad/None	29.983	<0.01

* Levene's Test (F-Statistic = 2.179, p-Value = 0.04) indicates that the variances are unequal. However, Analysis of Variance is robust to non-normality, "especially when sample sizes are similar" (Moore and McCabe [2003]). Therefore, Analysis of Variance results were presented. Tukey-Kramer HSD was used for the pair-wise comparisons.

Table 3: Descriptive Statistics and Analysis of Variance: Change in Valuations

Panel A: Descriptive Statistics: Mean and (Standard Deviation)

Disclosure	Comments				Overall
	All Positive	All Negative	Mixed	None	
Good News	1.458 (11.128) n = 24	-12.917 (12.850) n = 24	-5.231 (9.219) n = 26	8.700 (15.901) n = 30	-1.442 (14.918) n = 104
Bad News	-4.781 (16.963) n = 32	-24.294 (19.863) n = 34	-14.760 (19.938) n = 25	-19.583 (21.444) n = 36	-16.165 (20.786) n = 127
Overall	-2.107 (14.955) n = 56	-19.586 (18.083) n = 58	-9.902 (16.014) n = 51	-6.727 (23.702) n = 66	

Panel B: Change in Valuations: Analysis of Variance*

Source	d.f.	S.S.	M.S.	F-Statistic	p = Value
News	1	10,834.943	10,834.943	37.945	<0.01
Comments	3	9,17.199	3,005.733	10.526	<0.01
News*Comments	3	4,496.210	1,498.737	5.249	<0.01
Error	223	63,676.545	285.545		

Panel C: Pair-Wise Comparisons*

Comparison (News/Comments)	Difference**	p-Value
Good/All Negative – Good/All Positive	-14.375	0.07
Good/All Negative – Good/Mixed	-7.686	0.75
Good/All Negative – Good/None	-21.617	<0.01
Bad/All Positive – Bad/All Negative	19.513	<0.01
Bad/All Positive – Bad/Mixed	9.979	0.35
Bad/All Positive – Bad/None	14.802	0.01
Good/All Positive – Bad/All Positive	6.240	0.87
Good/All Negative – Bad/All Negative	11.377	0.19
Good/Mixed – Bad/Mixed	9.529	0.48
Good/None – Bad/None	21.042	<0.01

* Levene's Test (F-Statistic = 2.397, p-Value = 0.02) indicates that the variances are unequal. However, Analysis of Variance is robust to non-normality, "especially when sample sizes are similar" (Moore and McCabe [2003]). Therefore, Analysis of Variance results were presented. Tukey-Kramer HSD was used for the pair-wise comparisons.

** The signs of the differences are opposite their effect due to the nature of the variable. For example, when the second valuation was less than the first valuation, the change would be negative. This would result in a positive pair-wise difference due to subtracting a negative.

Table 4: Descriptive Statistics and Analysis of Variance: Management Credibility**Panel A: Descriptive Statistics: Mean and (Standard Deviation)**

Disclosure	Comments				Overall
	All Positive	All Negative	Mixed	None	
Good News	71.500 (13.467) n = 24	65.771 (13.919) n = 24	62.462 (14.752) n = 26	74.917 (15.890) n = 30	68.904 (15.249) n = 104
Bad News	68.359 (14.856) n = 32	53.059 (20.286) n = 34	58.260 (20.180) n = 25	57.278 (23.485) n = 36	59.134 (20.629) n = 127
Overall	69.705 (14.237) n = 56	58.319 (18.876) n = 58	60.402 (17.572) n = 51	65.295 (22.090) n = 66	

Panel B: Management Credibility: Analysis of Variance*

Source	d.f.	S.S.	M.S.	F-Statistic	p = Value
News	1	5,010.326	5,010.326	15.761	<0.01
Comments	3	4,073.465	1,357.822	4.271	<0.01
News*Comments	3	2,131.719	317.891	2.235	0.09
Error	223	63,676.545	285.545		

Panel C: Pair-Wise Comparisons*

Comparison (News/Comments)	Difference	p-Value
Good/All Negative – Good/All Positive	-5.729	0.95
Good/All Negative – Good/Mixed	3.309	>0.99
Good/All Negative – Good/None	-9.146	0.57
Bad/All Positive – Bad/All Negative	15.301	0.01
Bad/All Positive – Bad/Mixed	10.099	0.40
Bad/All Positive – Bad/None	11.082	0.18

* Levene's Test (F-Statistic = 2.072, p-Value = 0.05) indicates that the variances are unequal. However, Analysis of Variance is robust to non-normality, "especially when sample sizes are similar" (Moore and McCabe [2003]). Therefore, Analysis of Variance results were presented. Tukey-Kramer HSD was used for the pair-wise comparisons.