I. Introduction

Despite increased penalties, illegal insider trading continues. The United States Security and Exchange Commission (SEC) reports that it has filed more insider trading cases in the last three years than any other three-year period. During that period, the list includes charges against doctors, lawyers, bankers, accountants, a FDA employee, a managing director from the NASDAQ stock market, multiple hedge fund managers, and other financial professionals. It includes employees of well-known firms such as Goldman Sachs, Wells Fargo, The Galleon Group, Yahoo, and others. In 2013, a KPMG partner was charged with insider trading based on information from an audit client (SEC 2013). The list of illegal insider trading cases is extensive.

An insider trading inquiry may start with the SEC or with an enforcement agency of the U.S. government. For example, the surveillance arm of the Financial Industry Regulatory Authority (FINRA) may notify the SEC about unusual movements in the price of a particular stock. The SEC will then determine if the trading activity is based on public information. If not, the SEC may begin an inquiry for violations of federal securities laws requiring administrative or civil action. It may also notify the Federal Bureau of Investigation, the Justice Department, or the U.S. Attorney’s Office, which in turn may begin a parallel criminal investigation.

Insider information can be passed on from one person to another multiple times before the information is traded on and if the trades are small, it can be hard to detect. Many recent cases involve individuals trading based on tips of insider information from trusted associates rather than from having direct knowledge of the insider information. These cases can be difficult to prove and criminals have become more careful and creative in covering their tracks. Some insider trading networks avoid communicating by e-mail to prevent leaving evidence. Government enforcement agencies have responded by using wiretaps (Rothfeld et al., 2011).

In a 2009 case involving billionaire Raj Rajaratnam, founder of hedge fund The Galleon Group, the FBI discovered a network of conspirators trading information for cash. By the time Mr. Rajaratnam’s trial got underway in March 2011, nineteen of the twenty-six people charged had pleaded guilty. The wiretaps presented by the prosecution were effective. In October 2011 Mr. Rajaratnam, the ring leader in the Galleon case, was sentenced to eleven years in prison which was the longest prison sentence to that date for insider trading (Pulliam and Bray 2011). In July 2013, the Second Circuit Court of Appeals upheld his conviction. Insider trading is difficult to prove but the government has won some high profile cases.

It is important to understand how individuals react to different types of insider information. The willingness to trade based on the direct knowledge of insider information through work may be different...
from the willingness to trade based on insider information received as a tip from a friend. The results of this study show that individuals are more likely to use indirect insider information in the form of a tip from a friend than when they have direct knowledge of the information through work. These are both common forms of insider information. The results indicate that subjects associate the likelihood of getting caught is less when the information comes from a tip from a friend. Additionally, subjects are more willing to use the insider information when the insider information is from a tip. This is troubling because it is difficult to detect and prove cases where the insider information is merely from a tip. It also suggests that the extent of insider trading may be greater than the public realizes.

Many insider trading cases are the result of insiders selling stock before a company discloses bad news rather than buying stock prior to a company disclosing good news to the public. This study addresses whether subjects are more inclined to use insider information when it concerns losing money on a stock they already own versus making money by purchasing a new stock. The study finds that individuals are more likely to use insider information to prevent losing money than to obtain an abnormal gain from buying stock.

Prosecuting insider trading cases is expensive and, therefore, any improvement in identifying or preventing insider trading can have a large economic impact. This study helps to identify those areas where insider trading is most likely to occur. Regulators can focus on those areas and companies can better screen and train employees in the ethics and legal aspects of keeping insider information confidential.

The remainder of this paper is organized as follows. Section II discusses prior research and develops testable hypotheses. Section III describes the sample and the methodology used to test the hypotheses. Section IV presents the results of the study, and Section V provides a conclusion.

II. Background and Hypotheses

Not all insider trading is illegal. Companies encourage managers to invest in the companies they work for. This is often done through the use of stock options and stock appreciation rights. Neither Congress nor the public has an interest in separating management’s goals from the goals of investors. However, insider trading laws are intended to prevent insiders and others with access to non-public information from trading stock to take advantage of private information to the detriment of other stockholders.

Insider information presents an agency problem because top managers know more about the company and know it sooner than the owners and investing public. Because companies operate in a competitive environment, all corporate information cannot be made public. Therefore, information asymmetry will always exist between insiders and the public. Insiders are prohibited under the insider trading laws from trading based on such private information.

All trades cannot be scrutinized for insider trading. However, when a company’s stock goes up or down suddenly, modern technology makes it easy to check if top management recently bought or sold the stock. In fact, corporate insiders are required to report their stock transactions to the SEC. Obviously, they will not report sales they believe to be illegal, and the likelihood of being caught may deter many would-be insider traders. While the individual may be afraid to use the information himself, he may pass the information to a friend. Because no one knows the friend received the information, the friend’s trading will not be scrutinized. Giving this insider information to someone else to trade on is called “tipping” and it is illegal. It is hard to detect.

Several studies have addressed whether insider trading should be illegal and whether it is unethical (Werhane, 1989; Meulbroek, 1992; Ma and Sun, 1998; Snoeyenbos and Smith, 2000; McGee, 2009; Bhattacharya and Daouk, 2009). While the debate over whether insider trading is harmful goes on between academic researchers, most modern countries now have laws against it, although the laws vary by country.
Bris (2005) investigates insider trading laws across fifty-two different countries and finds that the level and profitability from insider trading increases as enforcement increases but more severe penalties reduce insider trading. Bhattacharya and Daouk (2009) find that when countries have insider trading laws but do not enforce them, the effect can be worse than not having the laws at all.

Thompson (2013) compares insider trading laws in the fourteen largest securities markets in the world. The markets are very different and the level of enforcement and severity of penalties between countries varies widely, but clearly, the largest economies are trying to discourage illegal insider trading. Trading based on non-public information is illegal in the United States and most modern stock markets in the world. Such illegal trading can carry substantial penalties including incarceration.

In addition to the legal aspects of insider trading there is also an ethical issue. Some studies look for characteristics in individuals that might lead to insider trading. Dunkelberg and Jessup (2001) examine high profile criminal cases that involved white-collar crimes including insider trading and find no clear pattern in the backgrounds to indicate why the individuals committed their crimes. However, Abdolmohammadi and Sultan (2002) use a simulated trading environment and find that subjects with lower ethics scores were more likely to use insider information.

Statman (2009) finds that insider trading is viewed differently in different societies. The study shows that individuals in the United States, China, and Taiwan do not view insider trading similarly. In particular, subjects in China did not consider using indirect insider information unfair while subjects in the United States and Taiwan did. This study brings up an additional issue—is all insider trading viewed as equally unethical? Unlike laws which are defined by society and must be followed by those in the society, ethics vary in different cultures among different people. Some may view trading based on insider information obtained through work as very wrong but trading based on the same information that is received as a tip may be viewed as less wrong.

Stories in the popular press have cited cases where individuals regularly engaged in insider trading and tried to disguise their activities. The SEC’s case against Mr. Rajaratnam provides evidence that he advised his co-conspirators to make fake e-mail trails and buy and sell extra shares to disguise their insider trading (Rothfeld et al., 2011). Recent academic studies also find evidence of individuals using insider information to sell their stock to avoid a loss and then trying to conceal their actions (Beneish et al., 2012; Chen et al., 2013). In some cases, company executives can use their positions to postpone negative news from the public so that their trades will not appear to be the result of the insider information.

A study by Beneish and Vargus (2002) looks at the information content of insider trading. They find that insiders use their knowledge of the quality of the company’s earnings in their decision to buy or sell the stock. Some studies have identified situations where insider trading is more likely to exist. Frankel and Li (2004) find that less information asymmetry is associated with less insider trading and that greater analyst following reduces the ability of insiders to take advantage of private information. Marsden and Tung (1999), using a simulated trading environment, demonstrate that subjects are able to outperform the market when no penalties are imposed, but by imposing penalties, the premium earned from insider trading can be removed.

Illegal insider trading is usually motivated by financial gain where individuals illegally use private information to achieve abnormal profits or to prevent losses. To identify why some individuals break the law and others do not can be viewed as a question of perceptions about crime and punishment. A person’s desire to commit a crime is a function of his expected utility from the crime. Under utility theory, an individual will only commit a crime if his utility from the crime exceeds his costs. (Becker, 1968). Expected gain provides motivation to commit an offense. It can include gain or loss avoidance and can include both monetary and non-monetary rewards. A person must weigh this benefit against the likelihood of being caught and the punishment for being caught. Punishments can include fines and
incarceration and internal items like guilt and social stigma, however, this view does not fully incorporate ones ethical values.

Utility theory states that the utility from a crime is the sum of the likelihood of being caught times the utility expected if caught plus the likelihood of not being caught times the utility expected if not caught. This theory is purely based on logic and has been expanded and refined many times. The motivation to commit a crime can be anything that increases a person’s utility. Expected gain has been found to have a significant effect on compliance with laws (Ali et al., 2001; Alm et al., 1992; Beams et al., 2003; Terpstra et al., 1991).

**Tipping vs Direct Knowledge**

An individual’s actions are a response to his perception of motivations and deterrents. Therefore, the true likelihood of being caught or the true expected gain is not a motivation for action, but rather, the individual’s perceptions of expected gain, likelihood of getting caught and potential penalties are the motivations on which the individual is acting (Grasmick and Green, 1980; Ghosh and Crain, 1996).

If an individual knows for certain that he will not get caught committing an illegal act, the severity of punishment will have no effect. The true likelihood of being caught is never so certain; however, it is the individual’s perception that he is acting on. If individuals believe their likelihood of getting caught is lower, they will be more apt to commit the crime (Tittle, 1980; Grasmick and Scott, 1982; Mason and Calvin, 1984; Mendes and McDonald, 2001).

For insider trading, the likelihood of getting caught is expected to increase when an individual can be traced to the information. Many insider trading cases are the result of information being leaked or “tipped” to people outside the organization who have no direct ties to the company that the insider information concerns. Because tipping is difficult to detect, insider information received as a tip is expected to represent a lower likelihood of getting caught, whereas information acquired directly through work represents a higher likelihood of getting caught.

An alternate possibility is that individuals may perceive that the likelihood of being caught is less when the information is received through direct knowledge. By receiving a tip from a friend there is at least one more individual that is aware of the crime and therefore the perception could be that trading based on the tipped information has a greater likelihood of getting caught than when one has direct knowledge.

There are many specific details to any situation involving insider trading that would have an effect on one’s perception of the likelihood of being caught. However, overall it is expected that individuals who receive insider information by way of a tip will perceive a lower likelihood of being caught than those who have direct knowledge of the insider information through work. The following hypothesis is tested:

**H1:** The perception of the likelihood of being caught will be less when insider information is received as a tip than when it is received through direct knowledge.

As brought out in the Statman (2009) study, it is possible that some individuals or cultures may view using a tip differently. Some individuals may feel that using a tip is “fair game” whereas using ones confidential work information is unjust. Other research has addressed whether insider trading is a fair measure to compensate executives in a company. Ma and Sun (1998) argue that insider trading ethics should be looked at as an economic issue assessing whether overall shareholder wealth is increased. Therefore, a counter argument could be made that insider information obtained through work is somehow earned by virtue of working for the company whereas using an insider tip given by someone else is unjust because the individual has put no effort into the company. Some may view information derived from direct knowledge through work should be more reliable than a tip from a friend. This could make individuals more inclined to trade when the insider information is based on direct knowledge than when it is from a tip.
While there are counter arguments, overall it is expected that individuals will be more apt to use insider information when it is obtained from a tip because they will perceive a lower likelihood of being caught. The following hypothesis will be used to test whether individuals are more likely to trade on insider information when it is received as a tip rather than having direct knowledge of the information.

**H2:** Individuals who receive insider information from a tip will be more likely to take part in insider trading than those who have direct knowledge through work.

People do not always make the most rational choices. Prospect theory is a refinement of utility theory, which adds a human reality to choices that are not entirely logic based (Kahneman and Tversky, 1979). People tend to be risk adverse although the degree of risk aversion varies among individuals. Therefore, individuals receive greater utility from avoiding a loss than acquiring a gain of the same dollar amount. Yao et al., (2004) look at changes in investment risk preferences over time and find that individuals are less risk adverse when stock returns are high and more risk adverse when stock returns are low. The authors find that this tendency could lead to buying stocks when prices are high and selling when prices are low.

Other studies have found a disposition effect, which shows that investors are more willing to sell stocks that have a gain and to hold stocks that have a loss. Odean (1998) documents this phenomenon and notes that this is not logical since the tax effects cause lower after-tax returns from selling gains and holding losses. Kaustia (2010) finds that the magnitude of the disposition effect does not change as the level of losses increase. Investors are no more willing to sell at a large loss than they are at a small loss. There is a significant difference between a gain and a loss but the magnitude of the gain or loss has much less effect. If an individual is holding a stock that has a gain, he is more apt to sell it and he is more apt to hold a stock that has a loss.

While the disposition effect may encourage investors to hold losses, this tendency may not apply if an investor has insider information that the stock price is about to go down because in this case the investor can avoid the loss by selling beforehand. An individual’s risk aversion may be more relevant if he believes he has credible information about future movements in the stock price.

Applying this to insider trading suggests that individuals may be more willing to use insider information if they believe a stock they currently own is about to go down in value than to buy a new stock they think will go up in value. There have been many cases of insider trading, both to prevent losses and obtain abnormal gains. In February 2014, an employee from SAC Capital Advisors was convicted of insider trading for buying the results of a clinical trial for an Alzheimer’s drug from doctors before it was made public. The insider tips allegedly allowed the company to sell $700 million in investments in the two drug companies involved and allowed SAC Capital Advisors to profit and/or avoid losses of $276 million (McCoy, 2014).

The Enron and ImClone scandals were both examples of individuals with insider information selling their stock early with knowledge that the stocks were about to go down in value. Conroy and Emerson (2006) find that subjects were significantly less understanding of accounting tricks and insider trading following the media coverage of the Enron and ImClone scandals.

Based on utility theory, the ability to avoid a loss provides motivation to trade based on insider information. As mentioned before, Kaustia (2010) finds that the magnitude of a loss does not affect the degree of motivation to sell stock. However, when a trader has access to insider information that the stock will go down, the loss is not yet assured and can be prevented by current trading. It is expected that greater loss avoidance will provide a greater motivation to illegally trade based on insider information. To test this effect, the following hypothesis is used:

**H3:** As the amount of loss that can be avoided increases, individuals will be more likely to take part in insider trading.
Based on prospect theory, loss avoidance may provide a greater motivation for insider trading than achieving an abnormal gain. Some individuals may not be willing to break the law to earn an illegal gain but may be more willing to do so to protect what they already have. It is expected that individuals will be more willing to break the law to avoid a loss on stock they currently own than to achieve an abnormal gain from buying a new stock. The following hypothesis will test this effect:

**H4:** Individuals will be more apt to use insider information to prevent a loss on stock they currently own than to buy a stock to achieve an abnormal gain of equal value.

### III. Methodology

Five cases were designed with specific examples of insider trading and given to a group of subjects to test the insider trading hypotheses.

**Subjects**

Due to the seriousness of the crime, a sample of subjects who have illegally used insider information is not available. Furthermore, they could not be expected to answer honestly about having illegally traded in the past. A sample of graduate level business students are used in the study. Masters level business students have a relatively sophisticated understanding of the business environment and they are likely candidates to have access to insider information in the future. Additionally, since they are not at risk, they should be less apt to bias their responses. Graduate business students are the most likely candidates for management positions, and as such, they should have similar behavioral traits as those individuals already in management positions.

One hundred and five graduate business students participated in the study. The subjects were from multiple classes with different instructors and none of the subjects were students of the researchers. Table 1 shows the demographic profile of the participants. The ages of the participants range from twenty to forty-six with an average age of 24.6 years. Sixty-seven (63.8%) of the participants are male and thirty-eight (36.2%) are female. Forty-eight (45.7%) of the subjects had prior trading experience. Seventy-six (72.4%) of the subjects had lived in the United States for over ten years. The majority of the subjects had discussed insider trading in prior classes so it appeared they were knowledgeable about the subject. [see Table 1, pg 269]

The experiment was conducted over a three-day period in a behavioral lab on a university campus. The instrument was given out to subjects in groups of six subjects at a time. The subjects were compensated ten dollars each for their time completing the instrument. The subjects were not told what the study was about prior to the experiment. The subjects did not put their names on the instruments and were assured that their responses would remain anonymous.

**Within-Subjects Experimental Design**

The subjects were given five realistic cases one at a time that presented different situations that contained an opportunity to buy or sell stock based on insider information. The subjects were asked at the end of each case to estimate the probability that they would buy or sell the stock based on the information in the case and to rate their likelihood of getting caught. Each subject completed all five cases. After each case, the subjects are asked to answer the following two questions concerning the case.

What is the probability you would consider trading based on the information in the case?

______ %

If you chose to trade based on the information in the case, what is the likelihood you would get caught?

______ %
Hypotheses 1, 2, and 3 are tested with the first four cases in a 2x2 within-subject design. The first four cases present different opportunities to take part in insider trading and vary the amount of loss that can be avoided and vary the source of insider information between information received as a tip and information that is obtained through direct knowledge from work. Each of the first four cases involves a decision to sell a stock that is expected to decrease in value. Table 2 panel A, shows the 2x2 within-subject design.

Hypothesis 1 tests whether the subjects perceive the likelihood of being caught is lower when insider information is received from a tip than when it is obtained from direct knowledge through work. It is expected that the tip would be perceived as lower risk because the information is harder to trace. The dependent measure question to test Hypothesis 1 is the responses to the question: “If you chose to trade based on the information in the case, what is the likelihood that you would get caught?” Cases 1 and 4 involve information received as a tip and therefore are expected to have a lower perceived likelihood of getting caught than cases 2 and 3 which involve direct knowledge of the insider information through work. Since each subject is answering the same question after each case, a repeated measures design is used. The repeated measures analysis of variance accounts for differences between subjects.

Hypothesis 2 will test whether individuals who receive insider information from a tip are more likely to trade based on insider information than those who receive the information through direct knowledge through work. Hypothesis 3 will test whether individuals are more likely to trade based on insider information when the amount of their potential loss is greater.

Hypotheses 2 and 3 are tested with cases 1 through 4 and also use the 2x2 design as shown in Table 2, but these two hypotheses test individual’s likelihood of trading so they are tested with the following dependent measure question: “What is the probability that you would consider trading based on the information in the case?”

A repeated measures two-factor analysis of variance is used to test these hypotheses. This analysis will test for the main effects to the different levels of loss avoidance and different levels of traceability of the information—tipping (low traceability) vs direct knowledge (high traceability). This analysis also tests for an interaction effect.

Table 2 panel B lists the four cases used to test Hypotheses 1, 2, and 3 and the fifth case, which is used to test Hypothesis 4 concerning prospect theory. The amount of loss that can be avoided is varied from a high of thirty-two percent of the individual’s total wealth to a low of the equivalent of one month’s salary. The manipulation is accomplished by changing the amount of money invested and the magnitude of change expected in the stock price. The amount of loss avoidance is expressed as a percentage of salary and a percentage of wealth to help alleviate the problem of different degrees of motivation caused by the same dollar amount of gain or loss. [see Table 2, pg 270]

Tipping vs direct information tests the degree to which the information is traceable to the individual. For the information to be less traceable, the individual receives the information indirectly from a friend about a company the friend works for. For the information to be more traceable, the individual has knowledge of the insider information through his/her own work.

The order of the cases are systematically varied to reduce the risks of order bias associated with a within-subjects design. The cases are given to the subjects one at a time. All subjects in each group of six have to finish one case before the second case is given out. This adds a small amount of time between the cases and prevents subjects from looking back at previous cases. Each case varies two factors and does so by varying different cues for each factor. Adding time between cases and varying multiple items between cases makes it more difficult for subjects to discern the hypotheses (Schepanski et al., 1992).
Test of Prospect Theory

Many insider trading cases identify situations where individuals use insider information to sell a stock they own prior to the release of negative public information about the stock. Prospect theory indicates that individuals tend to place greater importance on avoiding losses than achieving equivalent gains (Kahneman and Tversky, 1979). Therefore, the intent to trade based on insider information may be greater for cases that involve selling a stock to avoid a loss than for cases involving buying a stock to achieve an abnormal gain. A fifth case is used to test whether individuals are more likely to use insider information in this way.

The fifth case matches the fourth case in terms of the magnitude of benefit and source of information (tipping), but is presented in terms of buying a stock to achieve an abnormal gain instead of selling a stock to avoid a loss. The dollar amount of gain is equal to the amount of loss that can be avoided in the fourth case. For both cases, 4 and 5, the insider information comes from a friend and would be difficult for authorities to detect. A paired t-test is run on the dependent measure question (“What is the probability that you would consider trading based on the information in the case?”) from these two cases to determine if subjects are more likely to trade based on insider information to avoid a loss than to achieve a gain.

Test of Order Bias

Because the subjects are responding to multiple cases, it is necessary to vary the order of the cases to prevent an order bias. The cases are arranged in five different orders with one fifth of the subjects receiving the cases in each order. One-way analysis of variance with order as the categorical independent variable is used to determine if order has an effect on the dependent variable for any of the five cases.

IV. Results

Hypotheses 1, 2, and 3 are tested with the first four cases by manipulating loss avoidance and source of insider information (tipping vs direct knowledge). Hypothesis 4 is tested with cases 4 and 5 because the difference between case 4 and 5 is that one is framed in terms of loss avoidance and the other is a gain.

Because subjects are answering the same question from each case, it was necessary to test for order bias. One-way analysis of variance with order as the categorical independent variable was run to test for order bias. The results indicate no significant effects to the order of the cases. Therefore, the results were not driven by the order that the cases were given out.

In the tipping cases, individuals receive insider information from a trusted friend. By receiving the information from a friend, the information is less traceable to the subject. In the direct knowledge cases, the individuals possess insider information about the company for which they work. In these cases, the information is more directly traceable to the subjects.

The first hypothesis proposes that subjects will perceive a lower likelihood of being caught when the information is from a tip than when it is from direct knowledge. To test this hypothesis, the subjects are asked what they believe is the probability of being caught if they trade based on the insider information in each of the cases.

It was expected that subjects would respond that their likelihood of being caught is lower in cases 1 and 4 because these present situations where the insider information is received from a trusted friend and does not concern the company the subject works for. Cases 2 and 3 present situations where the insider information is about the company the subject works for—the direct knowledge cases. Table 3 panel A shows the expected likelihood of being caught for case 2 is 49.3% and case 3 is 52.3. In the cases where

1 The p-value for the tests of order bias resulted in p-values ranging from .13 to .81 for the five cases. Order bias was not significant in any of the five cases.
the information is received by a tip, cases 1 and 4, the expected likelihood of getting caught is 26.8% for case 1 and 28.4% for case 4.

A two factor repeated measures analysis of variance is used to confirm the differences in likelihood of being caught are significant. The two factors are the level of loss and the traceability of the information (tipping vs direct knowledge). The significance of the tipping variable (p< .001) confirms Hypothesis 1 that subjects perceived a lower likelihood of being caught when the information is received from a tip. Level of loss was not predicted to have an effect on likelihood of being caught and this factor was not significant with a p-value = .20.

These results support Hypothesis 1 that subjects perceived the likelihood of getting caught is lower in cases 1 and 4 when the information is received from a tip from a trusted friend than for cases 2 and 3 where the insider information concerns the company that the subject works for. [see Table 3, pg 270]

Hypotheses 2 and 3—Effect of Loss Avoidance and Tipping on Probability of Trading

Hypothesis 2 states that individuals who receive information from a tip will be more likely to take part in insider trading. This follows from Hypothesis 1. If individuals perceive their likelihood of being caught is lower, they are expected to be more likely to use the insider information. Hypothesis 3 states that as the amount of loss to be avoided increases, the intent to take part in insider trading will increase. The dependent measure for Hypotheses 2 and 3 is the likelihood of the individual taking part in insider trading. Loss avoidance and source of information (tipping vs direct knowledge) are manipulated in a 2x2 factorial design with the first four cases. The factors are the same as Hypothesis 1; however, the dependent measure is now likelihood of trading based on the insider information.

A within-subject design is used to test Hypotheses 2 and 3. Similar to Hypothesis 1, a two factor repeated measures analysis of variance is used to analyze the effect that the manipulations have on probability of trading. Table 4 panel A shows the cell means for the 2x2 factorial design.

To test Hypothesis 2, the mean response for the probability of trading for case 1 which is 61.4%, is compared to the mean probability of trading for case 2 which is 42.6%. This difference is in the expected direction. The level of loss avoidance is the same for the two cases but the information is acquired through work making it more traceable for case 2. Similarly, the mean for case 4 is 71.3% which is higher than case 3 of 53.8%. The level of loss avoidance is the same, but in case 4 as in case 1, the information is received from a tip and therefore subjects are more likely to trade based on the insider information. The higher likelihood of trading in cases 1 and 4 than cases 2 and 3 provides support for Hypothesis 2. Table 4 panel B confirms that the tipping factor in the cases is significant at p<.001.

To test Hypothesis 3, the level of loss is compared between cases. It is expected that the potential from greater loss avoidance will lead to greater likelihood of trading. This result was expected despite the findings of Kaustia (2010) which found that magnitude of loss did not increase investors’ likelihood to sell a stock. In the Kaustia (2010) study, the loss had already taken place and selling the stock would have no effect on changing the loss. However, in the current study, the loss has not yet taken place and the subjects have the opportunity to avoid the loss by choosing to trade based on the insider information. To compare the effect of level of loss on probability of trading, cases 1 and 2 are compared to cases 4 and 3, respectively. The mean response for case 3 is 54.8% which is higher than case 2 of 42.6% and case 4 is 71.3% which is higher than case 1 of 61.4%. Since the source of information is the same between cases 2 and 3 (both direct knowledge) and between case 1 and 4 (both tipping) these differences imply that the level of loss avoidance does have an impact on the decision to trade based on the insider information.

Table 4 panel B shows the results of the multivariate tests. Loss avoidance is significant at p<.001 and source of information (tipping vs direct knowledge) is significant at p< .001. There is no significant interaction effect between the two variables. When an individual’s gain or loss avoidance is higher, he is
more willing to take the risk of being caught in both the high and low risk situations. [see Table 4, pg 271]

Prospect Theory

The fifth case is designed to test prospect theory and is similar to the fourth case in terms of amount of benefit and likelihood of being caught. However, the fourth case is framed in terms of using insider information to sell a stock to prevent a loss whereas the fifth case presents an opportunity to use insider information to buy a stock that is expected to achieve an abnormal gain. The amount of gain in case 5 is similar to the amount of loss avoided in case 4. A t-test is used to confirm that the perceived likelihood of being caught between the two cases was similar. Although not shown in a table, the subjects perceived the likelihood of being caught for case 4 was 28.4% and the perceived likelihood of being caught for case 5 was 25.3%. The t-test indicates that this difference in the perceived likelihood of being caught is not significant (p=.106). This confirms that the subjects viewed the likelihood of being caught similarly for the two cases.

To test Hypothesis 4 that individuals are more likely to use insider trading to avoid a loss than to achieve an abnormal gain, a paired T-test is run on the difference between the probability of trading from case 4 and the probability of trading from case 5. Table 5 shows that the mean probability of trading to achieve an abnormal gain is 53.8% (case 5) while the mean probability of trading to avoid a loss in the same amount with similar perceived likelihood of getting caught is 71.3%. This difference is significant at p < .001. Even though the likelihood of being caught is similar and the amount of change in wealth is the same, subjects are more likely to use the insider information when it allows them to avoid a loss than to obtain a gain. This finding is consistent with the findings of Beams et al., (2003). [see Table 5, pg 271]

V. Conclusion

Insider trading continues to be concern for investors and regulators. The results of this study show that the greatest risk of insider trading is from tipping (or leaking) of insider information to individuals outside the company. The study finds that subjects perceive the likelihood of being caught to be less when the insider information is received as a tip from a friend than when the subjects have direct access to the insider information. Additionally, subjects are more willing to trade based on the insider information when it is a tip from a friend than when they have direct knowledge of insider information from their work.

These results are important because detection efforts are more complicated when insider trading involves second hand knowledge. The higher likelihood of insider trading from tipped information also suggests that the incidence of insider trading may be higher than current detection efforts indicate because these cases are harder to detect. These results are consistent with the greater sophistication of both insider trading criminals and more extensive detection efforts including wire taps used by enforcement officials.

Identifying what situations are more likely to lead to insider trading allows policymakers to design more efficient detection efforts. This study finds that subjects are more inclined to trade based on insider information in situations where they already own the stock and are faced with the possibility of losing some of that value, than they are when faced with the opportunity to achieve an abnormal gain by purchasing a stock that they do not currently own. The most aggressive and greedy traders will likely be willing to use insider information to avoid losses or to achieve abnormal gains. However, the results here suggest that more individuals are willing to take advantage of insider information when it will prevent a loss on stock that they currently own.
References


Ma, Y.L. and Sun, H.L. (1998). Where should the line be drawn on insider trading ethics?. *Journal of Business Ethics, 17 (Jan)*, 67-75.


### Table 1: Descriptive Statistics

<table>
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<tr>
<th>Prior Trading Experience</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Past trading experience</td>
<td>48</td>
<td>45.7%</td>
</tr>
<tr>
<td>No past trading experience</td>
<td>57</td>
<td>54.3%</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Times Insider Trading was Discussed in Classes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Never Discussed</td>
<td>24</td>
<td>22.9%</td>
</tr>
<tr>
<td>Discussed 1-2 times</td>
<td>28</td>
<td>26.7%</td>
</tr>
<tr>
<td>Discussed 3-5 times</td>
<td>32</td>
<td>30.5%</td>
</tr>
<tr>
<td>Discussed 5-10 times</td>
<td>13</td>
<td>12.4%</td>
</tr>
<tr>
<td>Discussed over 10 times</td>
<td>8</td>
<td>7.6%</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of Time Subject Lived in United States</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>13</td>
<td>12.4%</td>
</tr>
<tr>
<td>1-2 years</td>
<td>10</td>
<td>9.5%</td>
</tr>
<tr>
<td>2-5 years</td>
<td>6</td>
<td>5.7%</td>
</tr>
<tr>
<td>5-10 years</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Over 10 years</td>
<td>76</td>
<td>72.4%</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Table 2: Manipulation of Variables between Cases

Panel A – 2 x 2 Within-Subjects Design for Cases 1-4

<table>
<thead>
<tr>
<th></th>
<th>Low Loss</th>
<th>High Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tipping¹</td>
<td>Case 1</td>
<td>Case 4</td>
</tr>
<tr>
<td>Direct knowledge⁴</td>
<td>Case 2</td>
<td>Case 3</td>
</tr>
</tbody>
</table>

---

² The subjects consisted of 105 MBA and Masters of Accounting students at a public university.
³ Tipping represents insider information received as a tip from a trusted friend.
⁴ Direct knowledge represents insider information that the subject has access to through work.
Table 2: Manipulation of Variables between Cases (continued)

Panel B – Case Descriptions

<table>
<thead>
<tr>
<th>Benefit: Loss Avoidance or Gain</th>
<th>Source of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1 Low loss avoidance from selling stock – loss of one month’s salary</td>
<td>Tip from friend</td>
</tr>
<tr>
<td>Case 2 Low loss avoidance from selling stock – loss of one month’s salary</td>
<td>Direct knowledge</td>
</tr>
<tr>
<td>Case 3 High loss avoidance from selling stock – loss of 32% of wealth</td>
<td>Direct knowledge</td>
</tr>
<tr>
<td>Case 4 High loss avoidance from selling stock – loss of 32% of wealth</td>
<td>Tip from friend</td>
</tr>
<tr>
<td>Case 5 High gain from buying stock – gain of 32% of wealth</td>
<td>Tip from friend</td>
</tr>
</tbody>
</table>

Table 3: Effect of Loss Level and Tipping on Perception of Likelihood of Being Caught

Panel A – Cell Means for Perception of Likelihood of Being Caught

<table>
<thead>
<tr>
<th>Tipping – Low Traceability</th>
<th>Low Loss</th>
<th>High Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE 1 - Mean likelihood of being caught (n=105):</td>
<td>26.8%</td>
<td>28.4%</td>
</tr>
<tr>
<td>CASE 2 - Mean likelihood of being caught (n=105):</td>
<td>49.3%</td>
<td></td>
</tr>
<tr>
<td>CASE 3 - Mean likelihood of being caught (n=105):</td>
<td></td>
<td>52.3%</td>
</tr>
</tbody>
</table>

Panel B – Two-Way Repeated Measures Analysis of Variance

Test of Differences in Perception of Likelihood of Being Caught between Cases (n=105)

<table>
<thead>
<tr>
<th>Within Subjects Effects</th>
<th>Wilks' Lambda</th>
<th>F</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss</td>
<td>.984</td>
<td>1.663</td>
<td>.200</td>
</tr>
<tr>
<td>Tipping</td>
<td>.478</td>
<td>113.658</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Loss Avoidance x Tipping</td>
<td>.999</td>
<td>.150</td>
<td>.700</td>
</tr>
</tbody>
</table>

---

5 Within subject design with all subjects responding to all cases.

6 The cell means represent the subjects’ response to the question “If you chose to trade based on the information in the case, what is the likelihood that you would get caught? ____ %”

7 The low loss cases are equivalent to one month of the subject’s salary.

8 The high loss cases are the equivalent of thirty-two percent of the subject’s total wealth.

9 Tipping represents insider information received as a tip from a trusted friend and therefore would be less traceable.

10 Direct knowledge represents insider information that the subject has access to through work and therefore would be more traceable to the subject.
Table 4: Effect of Loss Level and Tipping on Probability of Trading\textsuperscript{11}

Panel A – Cell Means for Probability of Trading\textsuperscript{16}

<table>
<thead>
<tr>
<th>Tipping - Low Traceability\textsuperscript{14}</th>
<th>Low Loss\textsuperscript{12}</th>
<th>High Loss\textsuperscript{13}</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE 1 - Mean Probability of Trading (n=105):</td>
<td>61.4%</td>
<td>CASE 4 - Mean Probability of Trading (n=105):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>71.3%</td>
</tr>
<tr>
<td>Direct Knowledge – High Traceability\textsuperscript{15}</td>
<td>Low Loss\textsuperscript{12}</td>
<td>High Loss\textsuperscript{13}</td>
</tr>
<tr>
<td>CASE 2 - Mean Probability of Trading (n=105):</td>
<td>42.6%</td>
<td>CASE 3 - Mean Probability of Trading (n=105):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>53.8%</td>
</tr>
</tbody>
</table>

Panel B – Two-Way Repeated Measures Analysis of Variance
Tests of Differences in Probability of Trading between Cases (N=105)

<table>
<thead>
<tr>
<th>Within Subjects Effects</th>
<th>Wilks’ Lambda</th>
<th>( F )</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss</td>
<td>.822</td>
<td>22.58</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Tipping</td>
<td>.635</td>
<td>59.91</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Loss x Tipping</td>
<td>.999</td>
<td>.141</td>
<td>.708</td>
</tr>
</tbody>
</table>

Table 5: Test of Effect of Gain versus Loss Avoidance (Prospect Theory)
The cell means represent the subjects’ response to the question “What is the probability that you would consider trading based on the information in the case?____ %”

<table>
<thead>
<tr>
<th>Probability of Trading Loss Situation Case 4(n=105)\textsuperscript{17}</th>
<th>Probability of Trading Gain Situation Case 5(n=105)\textsuperscript{18}</th>
<th>Difference</th>
<th>T-stat</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>71.3</td>
<td>53.8</td>
<td>17.5</td>
<td>6.585</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

\textsuperscript{11} Within subject design with all subjects responding to all cases. 
\textsuperscript{12} The low loss cases are equivalent to one month of the subject’s salary. 
\textsuperscript{13} The high loss cases are the equivalent of thirty-two percent of the subject’s total wealth. 
\textsuperscript{14} Tipping represents insider information received as a tip from a trusted friend and therefore would be less traceable. 
\textsuperscript{15} Direct knowledge represents insider information that the subject has access to through work and therefore would be more traceable to the subject. 
\textsuperscript{16} The cell means represent the subjects’ response to the question “What is the probability that you would consider trading based on the information in the case?____ %” 
\textsuperscript{17} Case 4 presents a situation where the subject receives insider information from a friend that could prevent him/her from losing the equivalent of thirty-two percent of his/her total wealth. 
\textsuperscript{18} Case 5 presents a situation where the subject receives insider information from a friend that could allow him/her to gain the equivalent of thirty-two percent of his/her total wealth from buying a stock.
“Insider trading” can be used to refer to the legal form of insider trading, where officers or other insiders in a company trade stocks of their company without the use of privileged insider information. However, “insider trading” is usually used to refer to illegal insider trading, where individuals with privileged information use that information to gain an advantage in trading stocks. The following five cases will all present examples of illegal insider trading.

There are no right or wrong answers.
Please answer honestly.
Your responses will be completely anonymous.

Case 1
You have invested the equivalent of two months of your gross salary in stock of a medical research company that a friend works for. The company is reliant on a new cancer drug that it has been working on for several years. The drug has shown success in early stages of research. Your friend is someone that you grew up with and you trust completely. Your friend comes to visit you and after dinner you are catching up on old times and your careers. Your friend is in the upper management of the company. Your friend mentions that the accounting department is being asked to consider the effects of various layoffs because the company has just had a major setback in its cancer research testing on animals. The information has not been made public, but is going to be released at the end of the month when the results are published. You have complete trust in the authenticity of your friend’s story. Based on your knowledge of the stock market, you believe the stock price (and your investment) will drop by fifty percent when this information is released.

What is the probability that you would consider trading based on the information in the case?
______ %

If you chose to trade based on the information in the case, what is the likelihood that you would get caught?
______ %

Case 2
You have a fairly diversified portfolio though you recently invested the equivalent of four months’ salary in the stock of one company. You work in a law office and have just started working on a new case that involves the company that you have invested in. Upon reading the case you realize that the case involves a major environmental lawsuit against the company that you own stock in. The company’s stock price has been stable though you know that this lawsuit will hurt its stock price when the public finds out about it. No public information about the lawsuit has been released yet. Based on your knowledge of the stock market, you believe the stock price will decrease by twenty-five percent when this information is released.

What is the probability that you would consider trading based on the information in the case?
______ %

If you chose to trade based on the information in the case, what is the likelihood that you would get caught?
______ %
Case 3
You have been working for the same publicly traded company since getting out of college and have been putting most of your money into stock. You have eighty percent of your savings invested in stock of the company that you work for. The company’s earnings have grown consistently over the last ten years. You have been working closely with the accountants and auditors during the past several months and have noticed a great deal of tension in the relationship with the external auditors. The auditors have found accounting irregularities and are requiring a restatement of past financial statements. The company's past profits will shrink considerably after the restatements. Analysts are expecting the usual profit growth from the company. News of the restatements will be released in the next few weeks. Based on your knowledge of the situation and the stock market, you believe the stock price (and your investment in the stock) will drop by forty percent when this information is released to the public.

What is the probability that you would consider trading based on the information in the case? 

_____ %

If you chose to trade based on the information in the case, what is the likelihood that you would get caught? 

_____ %

Case 4
Most of your personal wealth is invested in the stock market. You have invested sixty-four percent of your total wealth in the stock of a new company that a very close friend works for. Your friend’s uncle is a member of top management of the company. Your friend has just attended a family gathering and spoken with his uncle. To your shock, the friend informs you that his/her uncle has been considering taking an offer with another company because the company that he works for (and you have invested in) is about to have a devastating lawsuit brought against it. The information has not been made public yet. Your friend recommends that you sell your stock in the company because he/she estimates that the stock price will drop in half in the next few weeks after the lawsuit gets filed. You have complete trust in your friend and the authenticity of the information. Based on your knowledge of the stock market, you believe that your investment in the stock will in fact lose half of its value when the information is made public.

What is the probability that you would consider trading based on the information in the case? 

_____ %

If you chose to trade based on the information in the case, what is the likelihood that you would get caught? 

_____ %

Case 5
You have recently liquidated several stocks from your portfolio giving you substantial available cash. Your oldest and closest friend, who currently works for an investment banking firm stops by to stay with you for a few days while he/she is in town. After catching up on your respective careers, your friend informs you that he/she has been working on a merger/acquisition. A small publicly traded research company is being acquired by a much larger company. You and your friend both agree that based on the situation the small firm’s stock price will double in a few weeks when the acquisition is made public. He
informs you that he cannot trade based on the information because his investment activity is closely monitored due to his position. However, he suggests that you take advantage of the situation since no one knows you have access to the information. You have thirty-two percent of your total wealth available that you could invest in the stock that is expected to double. You have complete trust in your friend and the authenticity of the information.

What is the probability that you would consider trading based on the information in the case?
_____%

If you chose to trade based on the information in the case, what is the likelihood that you would get caught?
_____%

1. Gender    Male___  Female___
2. Age____
3. Have you ever traded stock before?   Yes____   No_____
If you answered no to the previous question you may skip the next 2 questions
4. How long have you been trading stocks?
  0-1 year___   1-2years___   3-5 years___   5-10 years___   Over 10 years___
5. How many times do you trade stocks per year?
  1-2 Trades/year___   2-5 Trades/year___   5-10 Trades/year___   Over 10 trades/year___
6. Approximate annual family income?
  Under $20,000___   $20,000 – $40,000___   $40,000-$80,000___   Over $80,000___
7. How many years of full time work experience do you have?
  Less than 1year _____    1-2 years____    2-5 years____    5-10 years____    over 10 years____
8. Are you currently a full time student? Yes____   No_____ 
9. Are you currently working? Full Time____ Part Time____ Not currently working____
10. In what area did you receive your undergraduate degree? Accounting Finance Management Marketing Information Systems Other Business Non-Business
11. What degree program are you in? (Circle One)
    MBA  MS in ACIS  MS in Accounting  Other _________
12. How many times have you read about or discussed insider trading in classes?
    0___ 1-2____ 3-5____ 5-10____ over 10____
13. How many times have you heard about or read about insider trading in the news media?
    0___ 1-2____ 3-5____ 5-10____ over 10____
14. How long have you lived in the United States?
    0-1 year____ 1-2 years____ 2-5 years____ 5-10 years____ Over 10 years____