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# Analysis of Capabilities Attributed to the Fraud Diamond

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**Acct 4018- Senior Honors Seminar**

**Austin Shelton  
4/22/2014**

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# *Chapter One: Literature Review*

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## Introduction

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### Fraud and its Affects

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Fraud has been an issue since the formation of businesses began. This includes bribes, skimming money from the company, and stealing product; just to name a few examples. Types of fraud are split into three categories: asset misappropriation, financial statement fraud, and corruption. The main focus of this research will be on the form of fraud known as asset misappropriation. (Associate of Certified Fraud Examiners, 2012)

Because of the recent recession, fraud has increased more rapidly than ever before. In 2009, “one in three companies around the world reported they were the victims of business fraud during the past 12 months.” (Gillentine, 2009) This rate has since increased, according to Kroll, 70% of companies are suffering from at least one type of fraud in 2013. (Kroll, 2013) These statistics are from the fraud cases that have been confirmed and reported. There are many instances where fraud will never be caught and if it is, depending on the type of fraud committed, could take from one year to three years to confirm.

Asset misappropriation is the most common form of fraud, with approximately 86.7% of fraud cases reported being a form of asset misappropriation. (Associate of Certified Fraud Examiners, 2012) Why is this so much higher than the other two types of fraud? This is because it is the easiest form of fraud to commit, with financial statement and corruption usually involving multiple individuals and this makes it harder to conceal. The relieving factor of asset misappropriation is that even though it is committed most often, it has the lowest mean loss, \$120,000 in 2012, compared to the other types of fraud. With the average price of loss and the percentage of frequency, asset misappropriation has cost companies more than \$10 million. That is approximately \$2 million more than the next closest type of fraud, corruption. (Associate of Certified Fraud Examiners, 2012)

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### How People Commit Fraud

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Originally there were thought to be three different factors contributing to a person deciding to commit an act of fraud. These three factors are included in the Fraud Triangle. The three different factors are pressure, opportunity, and rationalization. Pressure is the motivation of the person to commit fraud, usually a financial burden. Next is opportunity, which is the method by which the crime could be committed. Finally is the rationalization, this is how the person justifies, in their own mind, committing the crime. These factors were first defined by the criminologist Donald Cressey. (Fraud Triangle, 2010) This research will not focus on the theory itself, but on the addition of a fourth factor, capabilities.

The Fraud Diamond is a new theory that adds a capabilities factor to the original three. Authors David Wolfe and Dana Hermanson were the first people to propose this fourth element in a 2004 CPA Journal article. (Wolfe & Hermanson, 2004) Capability is a trait of the individual committing the fraud, which drives them to seek an opportunity and exploit it. This brings in a factor other than the original environmental factors, now considering behavioral predictors. (Hay, 2013)

Capabilities has six supporting traits: positioning, intelligence, ego, coercion, deceit, and stress management. Fraudsters could have all six traits or any combination of them. The first trait is positioning, which means that the individual is in a position not available to others, allowing them to create or exploit an opportunity. Intelligence is that the individual is creative and smart enough to understand and exploit the weakness to their advantage. Ego means the fraudster has the confidence in their abilities to not be caught. Next is coercion, where the individual can influence others to assist or conceal the fraud that is occurring. Then deceit, the fraudster probably will be able to lie or divert convincingly. Lastly there is stress management, committing and the ongoing concealing of the fraud will cause continuous stress and, therefore, the fraudster can appropriately manage the stress. (Hay, 2013)

## Contribution to the Literature

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There has not been an extensive amount of research done on the aspects of the capabilities of the fraud diamond. Since the capabilities trait came to light, most people have just bypassed it and stuck with the original fraud triangle. What these people are misunderstanding is that capabilities goes into depth of what it takes mentally to commit fraud. With this understanding owners, managers, and any other employee can better understand fraudsters and their traits. With this knowledge everyone could help prevent fraud from occurring in their places of work.

In this research the objective is to perform a statistical analysis; by mapping the capabilities attribute to the form of fraud known as asset misappropriation. The reason for using asset misappropriation is the high amount of occurrences giving more cases to use for statistical testing. Also, there are more ways of committing asset misappropriation fraud than the other two forms; therefore there is a greater variety of traits that will arise from the different cases.

The purpose of the statistical test is to determine if there is a significant difference in the proportions of cases possessing each of between the six traits of capabilities. If there is a difference, then employers and managers have criteria that they can look for when evaluating current and prospective employees. With this they can focus on the main contributing factors and even implement psychological testing to identify these areas among potential employees, to further prevent fraud occurrences in their organization.

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# *Chapter Two: Research Methodology*

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## Introduction

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The purpose of this study is to evaluate the fourth aspect of the fraud diamond, capabilities, which is the newest manner to look at fraudsters' traits. Within this capabilities aspect this study is going to determine if there is a significant difference in the prevalence of the six traits of capabilities. The data for this study came from two sources, Donwycoff and Audit Executive Board. In contribution to this data the Ohio Society of CPA's website was used to analyze the data and put the fraud cases into categories and map into the attributes of capabilities. Other sources were examined for this purpose, but the same basic format and information was used as the Ohio Society of CPA's website. The Ohio Society had the most detail, therefore was the one used to obtain the best analysis, also to avoid being redundant. This chapter discusses the research design, hypotheses, population, research instrument, data collection, and data analysis.

## Research Design

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The point of this study is to evaluate the capabilities aspect of the fraud diamond for asset misappropriation. There will be 25 fraud cases mapped to the six traits of

capabilities and a statistical analysis performed. The cases will be carefully mapped by using extensive detail acquired about the six individual traits. After the cases are carefully mapped, the statistical analysis will be performed on the preceding results.

The type of statistical analysis that is going to be performed is a Chi-squared Test of the Equality of Proportions. This test analyzes categorical types of data and the difference of more than two proportions, which fits the data set and parameters of this study. This test is being performed on the mapping of the cases, to determine if there is a significant difference in the presence of the six traits. After the test is conducted, if there is a significant difference then further testing will have to be performed to determine which trait or traits are significantly different.

## Hypothesis

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### *Hypothesis and Testing*

Hypothesis 1: Is there a difference in the existence of the six factors?

Below is the hypothesis of the initial testing of the mapped fraud cases.

Ho: All proportions are equal.

(Ho:  $\pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5 = \pi_6$ )

Ha: At least one proportion is different.

$\pi_1$  = the proportion of trait, Positioning

$\pi_2$  = the proportion of trait, Intelligence

$\pi_3$  = the proportion of trait, Ego

$\pi_4$  = the proportion of trait, Coercion

$\pi_5$  = the proportion of trait, Deceit

$\pi_6$  = the proportion of trait, Stress Management

For testing the proportions of the attributes the hypothesis above will be used. A Chi-squared Test of the Equality of Proportions will be used in deciding to reject or accept the null hypothesis.

If the initial testing rejects the null, then additional testing will need to be performed to acquire the appropriate results of this study. The hypothesis and testing procedures are as follows:

Hypothesis 2: Which factors are different?

$H_0$ : All individual attributes' proportions are equal.

( $H_0$ :  $\pi_1 = \pi_2$ ,  $\pi_1 = \pi_3$ ,  $\pi_1 = \pi_4$ ,  $\pi_1 = \pi_5$ ,  $\pi_1 = \pi_6$ ,  $\pi_2 = \pi_3$ ,  $\pi_2 = \pi_4$ ,  $\pi_2 = \pi_5$ ,  $\pi_2 = \pi_6$ ,  $\pi_3 = \pi_4$ ,  $\pi_3 = \pi_5$ ,  $\pi_3 = \pi_6$ ,  $\pi_4 = \pi_5$ ,  $\pi_4 = \pi_6$ ,  $\pi_5 = \pi_6$ )

$H_a$ : At least one individual attributes' proportions are different.

The testing of individual proportions will be conducted by the Marascuilo Procedure. The results will show which individual attributes' proportions are significantly different.

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## Population

Fraud is being committed every day, but is not caught nearly as often as it is committed. The population for this research, therefore, is based on a small portion of

the asset misappropriation cases that have been caught, and are available to the public. The reason for more cases not being available to the public is the private nature of the matters, legality of the fraud cases, or the high cost of obtaining more cases.

For the purposes of this study, the cases used provided a sufficient number for testing. Also, the cases provided necessary details to create maps on the individual attributes of the capabilities aspect.

## Data Collection

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The data used in this study is strictly secondary data, provided by multiple sources, Donwycoff and Audit Executive Board. Donwycoff is an individual who has worked in the accounting field for 25 years and currently holds licensures including: CMA, CIA, and CFE. Donwycoff conducts independent studies and surveys of companies and then relays the data to the public for their awareness. The Audit Executive Board is an accredited agency that many companies subscribe to for updates in the audit field of accounting. It also provides results of fraud studies to these companies for their knowledge and use.

## Data Analysis

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For testing the hypotheses stated above, in regards to the six traits of the capabilities aspect, a Chi-squared Test of the Equality of Proportions will be used. This

test was selected because this study's goal is to see if there is one, or more, trait that is more or less significant to companies when evaluating employees and potential hires.

The data used for the testing is categorical. That is the data, cases, are put into categories for the purpose of the testing. The data will be put into a contingency table for easy comparison between the individual attributes and the total occurrences. The cases will be mapped to the six attributes of capabilities in the contingency table.

## Conclusions

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Chapter Two describes the research methodology used to evaluate the six attributes of the capabilities aspect of the fraud diamond. The research design, hypotheses, population, research instrument, data collection methods, and data analysis measures relating to this study have been discussed preceding this conclusion. The following chapter will present study results and details about these results.

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# *Chapter Three: Research Results*

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The research results are based on statistical testing done on 25 fraud cases. These fraud cases were mapped to the six attributes of capabilities. This was done with details about the attributes provided through Ohio Society of CPA's website and the information that came along with the cases from the sources: Donwycoff and Audit Executive Board.

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## Testing of Mapped Cases

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This study seeks to evaluate the six attributes of capabilities using real fraud cases of asset misappropriation. The literature around fraud stated that asset misappropriation is the most often committed form of fraud. Also, that there haven't been many studies conducted into the attributes of capabilities, therefore this study is trying to depict if there are significant differences of occurrences of the attributes. In doing this, it should allow employers to better understand a person's ability or lack thereof to commit fraud.

To evaluate the attributes on the mapped cases, Chi-Squared tests were conducted. For testing the null hypothesis, a Chi-squared test for equality of proportions was used. The results of the testing of the mapped cases, Table 1, by using a significance level of 0.05, a p-value of 0, having a critical value of 11.07, and the

calculated test statistic of 14.679. This concluded in the null hypothesis being rejected meaning that there are differences in the prevalence of the six attributes.

<b>Table 1: Summary Results of Mapped Cases*</b>
<b>Chi-Squared Test for Equality of Proportions</b>
<b>Critical Value: 11.07</b>
<b>X<sup>2</sup> Test Statistic: 14.677924528</b>
<b>P-Value: 0</b>
<b>Decision: Reject the null Hypothesis</b>

\*The full testing of the mapped attributes and the results are located in Appendix 4.

The second step of testing consists of determining which of the attributes occur more or less commonly. This is done by testing each attribute against all others.

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## Testing of Individual Attributes

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To test if there are differences between individual attributes, additional tests were performed. These tests were performed on each attribute being paired with another attribute until all attributes have been paired with one another. Then the Marascuilo Procedure was run to determine what attributes are different from each other.

The summary of the 15 tests are listed in Table 2. For the full look at the testing and its results, refer to Appendix 5.

**Table 2: Summary of Individual Attribute Testing**

Attributes Compared	Critical Value	Test Statistic (Difference in Proportions)	Decision
Positioning Vs. Intelligence	0.435744	0.2	Accept
Positioning Vs. Ego	0.284195	0.24	Accept
Positioning Vs. Coercion	0.401912	0.52	<b>Reject</b>
Positioning Vs. Deceit	0.284195	0.24	Accept
Positioning Vs. Stress Management	0.420856	0.08	Accept
Intelligence Vs. Ego	0.330312	0.44	<b>Reject</b>
Intelligence Vs. Coercion	0.435744	0.32	Accept
Intelligence Vs. Deceit	0.330312	0.44	<b>Reject</b>
Intelligence Vs. Stress Management	0.453276	0.12	Accept
Ego Vs. Coercion	0.284195	0.76	<b>Reject</b>
Ego Vs. Deceit	0	0	Accept
Ego Vs. Stress Management	0.310408	0.32	<b>Reject</b>
Coercion Vs. Deceit	0.284195	0.76	<b>Reject</b>
Coercion Vs. Stress Management	0.420856	0.44	<b>Reject</b>
Deceit Vs. Stress Management	0.310408	0.32	<b>Reject</b>

To evaluate the individual attributes, the Marascuilo Procedure was conducted on the paired attributes. For testing the null hypothesis, a Chi-squared test for equality of proportions was used. The testing used a significance level of 0.05; this is the same as the initial Chi-square test. The critical value from initial hypothesis test was used to calculate the critical value for this individual pairs in the Marascuilo Procedure.

As the summary depicts above, out of the 15 tests, there were eight rejections of the null hypothesis. In these rejections four out of the eight had the attribute, coercion. The results show that coercion is statistically different from the other attributes, with the exception of intelligence. The other four rejections consisted of stress management and intelligence being statistically different when paired with ego and deceit. Table 3 shows a summary of the rejections.

**Table 3: Summary of Rejections**

Attributes Compared	First attribute's Proportion	Second Attribute's Proportion	Test Statistic (Difference in Proportions)
Positioning Vs. Coercion	.76	.24	.52
Intelligence Vs. Ego	.56	1	.44
Intelligence Vs. Deceit	.56	1	.44
Ego Vs. Coercion	1	.24	.76
Ego Vs. Stress Management	1	.68	.32
Coercion Vs. Deceit	.24	1	.76
Coercion Vs. Stress Management	.24	.68	.44
Deceit Vs. Stress Management	1	.68	.32

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# *Chapter Four: Conclusions and Recommendations*

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The purpose of this study was to take the new aspect of a fraudster from the fraud diamond, capabilities, and evaluate the attributes that composes it. This was achieved through examining, mapping, and testing the asset misappropriation fraud cases accumulated for this study. The testing for this study was to determine whether there were significant differences among the attributes of capabilities.

Two stages of testing had to be performed in this study; one to determine if there was a significant difference among the six different attributes and the second was to determine which attributes were significantly different. The first test consisted of taking the mapped cases to the attributes and testing the total occurrences. Because this test rejected the null, the second stage of testing was performed. The Marascuilo Procedure was performed to determine which attributes where significantly different from the others.

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## **Conclusion**

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The research showed that there is a significant difference in the attributes of capabilities in the 25 fraud cases represented. There were a variety of different values for each attribute category, which caused the significant difference. This range spanned from the least with six occurrences in coercion, to the high of 25 for both ego and deceit. This first stage of testing does not show which attributes are significant from the others.

The significant difference from the first stage of testing forced an additional stage of testing. This stage of the Marascuilo Procedure was to test the individual attributes compared to one another to further determine the significant attribute or attributes. In conclusion, eight of the tests did reject the null hypothesis: positioning versus coercion, intelligence versus ego, intelligence versus deceit, ego versus coercion, ego versus stress management, coercion versus deceit, coercion versus stress management, and deceit versus stress management.

The rejections occurred because of the difference of the proportions of the paired attributes. These proportions are based on the occurrences divided by the number of possible occurrence for each attribute. These results show that there are significant differences between the attributes, where coercion occurred most but was not the only one that occurred multiple times. Therefore the other factors are significant as well.

## Recommendations

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There are several recommendations that can be drawn related to these aspects of capabilities. The first is directly related to the results of the testing. Coercion may have occurred significantly less than the other attributes, but that does not mean that it is not any less important than the others. In fact, it may be more important to put more focus on this attribute. Coercion actually costs companies more than double, than if a person were to commit fraud alone. In 2012 the median loss for an individual person

committing fraud was \$100,000, compared to fraud being committed with coercion with multiple perpetrators, \$250,000. (Associate of Certified Fraud Examiners, 2012)

In addition to the capabilities, these recommendations also apply to all the other rejected attributes. Whereas the other attributes are more emotional factors, they may not seem to be addressed but they are. With all these recommendations they will directly help deter the fraud from occurring or help identify the attributes in a person.

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### Internal Controls

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The coercion attribute can be incredibly hard to detect if the right internal controls are not in place. Even if there are controls, coercion between the right people can override them. Therefore, companies have to be extremely careful with their internal controls. One major internal control that benefits companies by deterring coercion is job rotation or mandatory vacation for all employees. With this control in place there is approximately a 62.5% reduction in the duration of fraud committed and a 33% reduction in the loss compared to not having this control in place. Another angle to look at it is instead of the fraud being committed for 24 months it only occurred 9 months and it only cost the company \$100,000 compared to \$150,000. (Associate of Certified Fraud Examiners, 2012)

For larger companies these amounts don't affect them as much, but for smaller companies these amounts could threaten their survival. Also, it is more likely that a large company already has these controls in place where as a small one may not. This increases their susceptibility of the fraud occurring in their organization. Another form of

internal control that may be easier and more beneficial for smaller companies is management review.

The internal control of management review is probably more applicable for a small business, because in small businesses the manager could very well also be the owner. This entails a greater liability and loss from the effects of fraud being committed in their business. In turn having this high level internal control can reduce the loss by about 46% and cut the duration of fraud down to 14 months instead of 24. (Associate of Certified Fraud Examiners, 2012)

These are just two examples of internal controls that can deter coercion and overall fraud being committed, but there are many others that could be implemented into companies. Just to name a few controls that companies could implement: tip hotlines, fraud training, and an internal audit function. All have their costs and benefits, and the benefits should outweigh the costs. Just as an illustration, if it takes \$100,000 to implement the control but it prevents \$500,000 worth of fraud it would be worth it. That is just hypothetical and no one could say for sure how effective an internal control will be.

Effective internal controls will help prevent and or catch fraud, no matter what attribute you are looking at. If the person is in the right position but is rotated to new position every few years or management review of their work, it will be extremely hard for them to commit the fraud. It is the same with the other attributes, it won't matter how big a person's ego, how intelligent, managing stress, or their deceiving abilities, effective internal controls should prevent the occurrence of fraud.

In addition of internal controls being added to a company, another suggestion is to give prospective employees pre-employment tests. Most pre-employment tests that a company can buy have multiple parts, such as evaluating the skills and aptitude in addition to an individual's personality. For the purpose of this research, the suggestion is about the personality aspect of the tests.

The idea for this suggestion is to concentrate on the attributes of capabilities, to identify people with high risk of fraud committing capabilities. With the results of the pre-employment test a manager could then compare all the candidates for a position not only on education and experience, but also on their fraud committing potential. To further expound, if two candidates are almost exactly equal but one is a higher risk, the manager may choose the candidate with the lower risk. If a candidate with the high risk results is chosen for the position, then the manager is aware of the potential fraud based on the personality test. With this knowledge the manager could better monitor the individual, which managers should do for all employees, and ensure the person's duties and responsibilities are rotated on a timely basis and ensure the mandatory vacation time is taken.

Some companies will be hesitant to start pre-employment testing because of the cost. The prices of these tests aren't readily available. No manager wants to spend more money than is necessary. Pre-employment test providers charge two different ways; they charge by each test provided or by a subscription based on how many tests will be needed in a year.

## Recommendations for Future Research

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The study of the capabilities aspect could be better evaluated with a larger data set. Although these 25 cases were sufficient, the more data, the better the results will be. The additional cases are available, but they can be costly to obtain. If additional research is done around this topic, all data should be updated to the most current information available.

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# Appendix:

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## Appendix 1- Comparison of costs of Fraud in 2012

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Type of Fraud	Asset Misappropriation	Financial Statement Fraud	Corruption
<b>Percent of cases*</b>	86.7%	7.6%	33.4%
<b>Mean cost</b>	\$120,000	\$1,000,000	\$250,000
<b>Total cost for 2012</b>	\$10,404,000	\$7,600,000	\$8,350,000

\*Cases equal more than 100% because of multiple types of fraud being committed in the same case.

(Associate of Certified Fraud Examiners, 2012)

## Appendix 2: List of Fraud Cases

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Corresponding Number	Fraud Title
1	Ghost Card
2	Gift Card
3	Purchasing card
4	Payroll file changes
5	Manipulating P.O.'s
6	Pocketing Maintenance Fees
7	"Accidental" Overpayments
8	Cashing In
9	Stealing Incentives
10	Land Purchases
11	Recruiter Fees
12	Weak Inventory Controls
13	Shipping Labels
14	Productivity Figures
15	Benefits System
16	Side Business
17	Baierl Acura
18	Receiving a Gratuity
19	Church Point Housing
20	San Jose Police Officers
21	Payroll Fraud
22	San Mateo Com. College
23	Giants P/R Manager
24	Auto Parts Manufacturers
25	Campaign Treasury Fraud

(Donwycoff, 2014) (Corporate Executive Board, 2014)

### Appendix 3: Fraud Cases Mapped to Capabilities' Attributes

Positioning	Intelligence	Ego	Coercion	Deceit	Stress management
3. Purchasing Card	2. Gift Card	1. Ghost Card	10. Land Purchases	1. Ghost Card	3. Purchasing Card
4. Payroll file changes	4. Payroll file changes	2. Gift Card	14. Productivity Figures	2. Gift Card	4. Payroll file changes
6. Pocketing Maintenance Fees	9. Stealing Incentives	3. Purchasing Card	18. Receiving a Gratuity	3. Purchasing Card	6. Pocketing Maintenance Fees
7. "Accidental"	10. Land Purchases	4. Payroll file changes	19. Church Point Housing	4. Payroll file changes	7. "Accidental" Overpayments
8. Cashing In	11. Recruiter Fees	5. Manipulating P.O.'s	22. San Mateo Com. College	5. Manipulating P.O.'s	8. Cashing In
9. Stealing Incentives	13. Shipping Labels	6. Pocketing Maintenance Fees	24. Auto Parts Manufacturers	6. Pocketing Maintenance Fees	9. Stealing Incentives
11. Recruiter Fees	14. Productivity Figures	7. "Accidental" Overpayments		7. "Accidental" Overpayments	11. Recruiter Fees
12. Weak Inventory	15. Benefits System	8. Cashing In		8. Cashing In	12. Weak Inventory Controls
14. Productivity Figures	16. Side Business	9. Stealing Incentives		9. Stealing Incentives	13. Shipping Labels
15. Benefits System	17. Baierl Acura	10. Land Purchases		10. Land Purchases	14. Productivity Figures
16. Side Business	19. Church Point	11. Recruiter Fees		11. Recruiter Fees	15. Benefits System
17. Baierl Acura	21. Payroll Fraud	12. Weak Inventory Controls		12. Weak Inventory Controls	16. Side Business
18. Receiving Gratuity	24. Auto Parts	13. Shipping Labels		13. Shipping Labels	17. Baierl Acura
19. Church Point	25. Campaign	14. Productivity		14. Productivity	19. Church Point
20. San Jose Police		15. Benefits System		15. Benefits System	23. Giants P/R Manager
21. Payroll Fraud		16. Side Business		16. Side Business	24. Auto Parts Manufacturers
22. San Mateo		17. Baierl Acura		17. Baierl Acura	25. Campaign
23. Giants P/R Manager		18. Receiving a Gratuity		18. Receiving a Gratuity	
25. Campaign		19. Church Point		19. Church Point	
		20. San Jose Police Officers		20. San Jose Police Officers	
		21. Payroll Fraud		21. Payroll Fraud	
		22. San Mateo		22. San Mateo	
		23. Giants P/R		23. Giants P/R	
		24. Auto Parts		24. Auto Parts	
		25. Campaign		25. Campaign	

Appendix 4: Initial Chi<sup>2</sup> Test Results

Fraud Case	Positioning	Intelligence	Ego	Coercion	Deceit	Stress Management	Total occurrences
1			1		1		2
2		1	1		1		3
3	1		1		1	1	4
4	1	1	1		1	1	5
5			1		1		2
6	1		1		1	1	4
7	1		1		1	1	4
8	1		1		1	1	4
9	1	1	1		1	1	5
10		1	1	1	1		4
11	1	1	1		1	1	5
12	1		1		1	1	4
13		1	1		1	1	4
14	1	1	1	1	1	1	6
15	1	1	1		1	1	5
16	1	1	1		1	1	5
17	1	1	1		1	1	5
18	1		1	1	1		4
19	1	1	1	1	1	1	6
20	1		1		1		3
21	1	1	1		1		4
22	1		1	1	1		4
23	1		1		1	1	4
24		1	1	1	1	1	5
25	1	1	1		1	1	5
<b>Total Occurrences</b>	<b>19</b>	<b>14</b>	<b>25</b>	<b>6</b>	<b>25</b>	<b>17</b>	<b>106</b>

Title							Total Test Statistic
<b>Total Occurrences</b>	19	14	25	6	25	17	
<b>Expected</b>	17.667	17.667	17.667	17.667	17.667	17.667	
<b>Difference</b>	1.333	-3.667	7.333	-11.667	7.333	-0.667	
<b>Individual TS</b>	0.1006	0.7610	3.0440	7.7044	3.0440	0.0252	<b>14.67924528</b>

Data and Results	
Significance Level	5%
DF	5
Critical Value	11.07
Test Statistic	14.679
P-Value	0
<b>Reject the null hypothesis</b>	

### Appendix 5: Secondary Chi<sup>2</sup> Test Results

Pos Vs Int	Proprtions	Critical Value calculated	Decision
Positioning	0.76		
Intelligence	0.56		
<b>Difference</b>	<b>0.2</b>	<b>0.435743778</b>	<b>Accept</b>

Pos VS EGO	Actual	Critical Value calculated	Decision
Positioning	0.76		
Ego	1		
<b>Difference</b>	<b>0.24</b>	<b>0.284194863</b>	<b>Accept</b>

Pos VS Coer	Actual	Critical Value calculated	Decision
Positioning	0.76		
Coercion	0.24		
<b>Difference</b>	<b>0.52</b>	<b>0.401912229</b>	<b>Reject</b>

Pos VS Deceit	Actual	Critical Value calculated	Decision
Positioning	0.76		
Deceit	1		
<b>Difference</b>	<b>0.24</b>	<b>0.284194863</b>	<b>Accept</b>

Pos VS SM	Actual	Critical Value calculated	Decision
Positioning	0.76		
Stress Management	0.68		
<b>Difference</b>	<b>0.08</b>	<b>0.42085627</b>	<b>Accept</b>

Int VS Ego	Actual	Critical Value calculated	Decision
Intelligence	0.56		
Ego	1		
<b>Difference</b>	<b>0.44</b>	<b>0.330311853</b>	<b>Reject</b>

Int VS Coer	Actual	Critical Value calculated	Decision
Intelligence	0.56		
Coercion	0.24		
<b>Totals</b>	<b>0.32</b>	<b>0.435743778</b>	<b>Accept</b>

Int VS Deceit	Actual	Critical Value calculated	Decision
Intelligence	0.56		
Deceit	1		
<b>Difference</b>	<b>0.44</b>	<b>0.330311853</b>	<b>Reject</b>

Int VS SM	Actual	Critical Value calculated	Decision
Intelligence	0.56		
Stress Management	0.68		
<b>Difference</b>	<b>0.12</b>	<b>0.453276075</b>	<b>Accept</b>

Ego VS Coer	Actual	Critical Value calculated	Decision
Ego	1		
Coercion	0.24		
<b>Difference</b>	<b>0.76</b>	<b>0.284194863</b>	<b>Reject</b>

Ego VS Deceit	Actual	Critical Value calculated	Decision
Ego	1		
Deceit	1		
<b>Difference</b>	<b>0</b>	<b>0</b>	<b>Accept</b>

Ego VS SM	Actual	Critical Value calculated	Decision
Ego	1		
Stress Management	0.68		
<b>Difference</b>	<b>0.32</b>	<b>0.310408247</b>	<b>Reject</b>

Coer VS Deceit	Actual	Critical Value calculated	Decision
Coercion	0.24		
Deceit	1		
<b>Difference</b>	<b>0.76</b>	<b>0.284194863</b>	<b>Reject</b>

Coer VS SM	Actual	Critical Value calculated	Decision
Coercion	0.24		
Stress Management	0.68		

<b>Difference</b>	<b>0.44</b>	<b>0.42085627</b>	<b>Reject</b>
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<b>Deceit VS SM</b>	<b>Actual</b>	<b>Critical Value calculated</b>	<b>Decision</b>
Deceit	1		
Stress Management	0.68		
<b>Difference</b>	<b>0.32</b>	<b>0.310408247</b>	<b>Reject</b>

## Appendix 6: Critical Value Chart

**Percentage Points of the Chi-Square Distribution**

Degrees of Freedom	Probability of a larger value of $\chi^2$								
	0.99	0.95	0.90	0.75	0.50	0.25	0.10	0.05	0.01
1	0.000	0.004	0.016	0.102	0.455	1.32	2.71	3.84	6.63
2	0.020	0.103	0.211	0.575	1.386	2.77	4.61	5.99	9.21
3	0.115	0.352	0.584	1.212	2.366	4.11	6.25	7.81	11.34
4	0.297	0.711	1.064	1.923	3.357	5.39	7.78	9.49	13.28
5	0.554	1.145	1.610	2.675	4.351	6.63	9.24	11.07	15.09
6	0.872	1.635	2.204	3.455	5.348	7.84	10.64	12.59	16.81
7	1.239	2.167	2.833	4.255	6.346	9.04	12.02	14.07	18.48
8	1.647	2.733	3.490	5.071	7.344	10.22	13.36	15.51	20.09
9	2.088	3.325	4.168	5.899	8.343	11.39	14.68	16.92	21.67
10	2.558	3.940	4.865	6.737	9.342	12.55	15.99	18.31	23.21
11	3.053	4.575	5.578	7.584	10.341	13.70	17.28	19.68	24.72
12	3.571	5.226	6.304	8.438	11.340	14.85	18.55	21.03	26.22
13	4.107	5.892	7.042	9.299	12.340	15.98	19.81	22.36	27.69
14	4.660	6.571	7.790	10.165	13.339	17.12	21.06	23.68	29.14
15	5.229	7.261	8.547	11.037	14.339	18.25	22.31	25.00	30.58
16	5.812	7.962	9.312	11.912	15.338	19.37	23.54	26.30	32.00
17	6.408	8.672	10.085	12.792	16.338	20.49	24.77	27.59	33.41
18	7.015	9.390	10.865	13.675	17.338	21.60	25.99	28.87	34.80
19	7.633	10.117	11.651	14.562	18.338	22.72	27.20	30.14	36.19
20	8.260	10.851	12.443	15.452	19.337	23.83	28.41	31.41	37.57
22	9.542	12.338	14.041	17.240	21.337	26.04	30.81	33.92	40.29
24	10.856	13.848	15.659	19.037	23.337	28.24	33.20	36.42	42.98
26	12.198	15.379	17.292	20.843	25.336	30.43	35.56	38.89	45.64
28	13.565	16.928	18.939	22.657	27.336	32.62	37.92	41.34	48.28
30	14.953	18.493	20.599	24.478	29.336	34.80	40.26	43.77	50.89
40	22.164	26.509	29.051	33.660	39.335	45.62	51.80	55.76	63.69
50	27.707	34.764	37.689	42.942	49.335	56.33	63.17	67.50	76.15
60	37.485	43.188	46.459	52.294	59.335	66.98	74.40	79.08	88.38