THE IMPACT OF ASSESSMENT PROCEDURES AND NEED FOR COGNITION ON FRAUD RISK ASSESSMENTS

By

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the dissertation of PAILIN TRONGMATEERUT find it satisfactory and recommend that it be accepted.

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Abstract

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Due to the increasing awareness of fraudulent financial reporting, auditors’ responsibility to conduct quality fraud risk assessments has been raised by a current audit standard, Statement on Auditing Standard No. 99: Consideration of Fraud in a Financial Statement Audit (SAS No. 99). The dissertation seeks to investigate the impact of fraud risk assessment requirements and recommendations under SAS No. 99 on the quality of fraud risk judgment. Specifically, the standard requires auditors to consider information gathered along fraud triangle components—opportunity, incentive, and attitude. Prior research argued that separate consideration of fraud triangle components increased auditors’ sensitivity to the components (Wilks & Zimbelman, 2004a). SAS No. 99, additionally, recommends auditors consider the fraud risk attributes—significance, likelihood, and pervasiveness.

Two assessment procedures, categorization of fraud risk factors along the fraud triangle components and consideration of fraud risk attributes, are conjectured to induce systematic processing, which in turn improve the quality of overall fraud risk assessments. The assessment procedures are compared against the Wilks and Zimbelman (2004a) decomposition assessment (W&Z decomposition). Employing the procedure including both assessment procedures is posited to reduce the assessment variation
among auditors low in need for cognition (NFC). To test the propositions, a $3 \times 2$
between-participants experimental design with three levels of assessments procedures
and two levels of fraud risk (lower and higher) is employed.

Fifty audit seniors anonymously participated in the study. The analyses reveal that
the categorization procedure coupled with W&Z decomposition does not significantly
improve the quality of the assessments. The significant effect of using both requirement
and recommendation under SAS No. 99 is conditional upon fraud risk levels. The
combination of these procedures results in more accurate assessments and lower
dispersion of assessments among low in NFC auditors. The findings suggest that the
requirement and recommendation under SAS No. 99 can effectively increase the quality
of fraud risk assessments when both are considered together and when the situation
presents low fraud risk.
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CHAPTER ONE
INTRODUCTION

1.1 Motivation and Theoretical Framework

According to Statement on Auditing Standards (SAS) No. 99, Consideration of Fraud in a Financial Statement Audit, auditors are responsible to plan and perform audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether any misstatement found is intentional or not (AICPA, 2002). SAS No. 99 requires auditors to explicitly consider fraud risk factors in making the required fraud risk assessment when planning the audit scope. Auditors must exercise their professional judgment in determining whether fraud risk factors\(^1\) are present, identifying and assessing the risk of fraudulent financial reporting (AICPA, 2002).

Although fraud detection is not a major audit objective, the public expects auditors to detect and report material fraud and irregularities (Nusbaum, 2007; Sacks, 2004; Sikka, Puxty, Willmott & Cooper, 1998). Due to the current investment environment, the expectation has grown that auditors will do more to detect fraud (Nusbaum, 2007).

The 2008-2009 KPMG Integrity Survey reported that 74% of managers and employees\(^2\) responding to the survey personally observed or had firsthand knowledge of

\(^1\) The terms fraud risk cues, fraud risk factors, and red flags are used interchangeably.
\(^2\) Total respondents of 5,065 working adults are: 16% in consumer markets, 14% in government and public section, 9% in healthcare, 8% in automotive, 7% in aerospace and defense, 7% in banking and finance, 7% in electronic, software and services, 7% in pharmaceuticals and life sciences, 6% in insurance, 6% in communication and media, 6% in energy and natural resources, 5% in chemicals and diversified industrials, and 2% in real estate and construction.
misconduct within their organizations during the previous 12 months (KPMG, 2008). This proportion remains largely unchanged from the 2000 and 2005 surveys. Furthermore, 46% of respondents indicated that what they observed could cause a significant loss of public trust if discovered. Additionally, the Securities and Exchange Commission (SEC) Report, served pursuant to Section 7043 of the Sarbanes-Oxley Act of 2002, revealed some of the common auditor judgment errors associated with recent fraud cases. These included failure to obtain sufficient understanding of the client’s business, failure to sufficiently corroborate management’s representations and explanations, failure to exercise professional skepticism on unusual, last minute, or related party transactions, and failure to conduct adequate fraud risk assessments (SEC, 2003).

The audit profession has responded by proposing audit procedures to improve fraud assessment and detection. However, more research addressing alternative audit procedures to enhance fraud detection and minimize errors is needed to cope with the dynamic business environment (Mock & Turner, 2005; Peecher, Schwartz & Solomon, 2007). Decomposition and holistic assessments were investigated in past research (Jiambalvo & Waller, 1984; Norman, Rose & Rose, 2010; Wilks & Zimbelman, 2004a; Zimbelman, 1997). A decomposition approach requires auditors to separately consider and evaluate three components of the fraud triangle—opportunities, incentives, and management’s attitudes—prior to aggregating them and making an overall fraud risk assessment. Wilks and Zimbelman (2004a) found that the decomposition of fraud risk

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3 SOX Section 704, Study of Enforcement Actions, requires that the SEC shall review and analyze all enforcement actions involving violations of reporting requirements imposed under the securities laws, and restatements of financial statements, over the 5-year period preceding the date of enactment of this Act, to identify areas of reporting that are most susceptible to fraud, inappropriate manipulation, or inappropriate earnings management, such as revenue recognition and the accounting treatment of off-balance sheet special purpose entities.
increased auditors’ sensitivity to opportunity and incentive risks, relative to a holistic
assessment. They concluded that separate consideration of the three components of the
fraud triangle allowed auditors to better anticipate management’s action, which should
help deter and detect fraud. Norman, Rose and Rose (2010) examined the effect of
reporting lines and replicated Wilks and Zimbelman (2004a) decomposition assessment
with internal auditors. When internal auditors used holistic assessment, the attitude
component was not significantly related to the overall fraud risk assessment. In contrast,
using a decomposition assessment led internal auditors to pay attention to incentive,
opportunity and attitude cues. For internal auditors, decomposition results in increased
attention to different components of the fraud triangle compared to external auditors
(Wilks & Zimbelman, 2004a). This suggests that further research is needed to gain more
understanding of how decomposing fraud risk assessment interacts with other
antecedents, such as, fraud risk levels and individual factors. The improvement in fraud
risk assessments from extending the decomposition approach to cover more dimensions
or attributes of fraud risk may be beneficial.

1.2 Purposes of the Study

Factors influencing auditors’ fraud risk judgments can be classified as
environmental and individual factors (Benford & Hunton, 2000; Libby & Luft, 1993;
Libby & Tan, 1994; Nelson & Tan, 2005). The dissertation focuses on how assessment
procedures as an environmental factor and need for cognition (NFC) as an individual
factor influence the quality of the overall fraud risk assessment. There are three
objectives in this study.

The first objective of this study is to examine the effect of categorization of fraud risk factors along attitudes, opportunities, and incentives on the accuracy of fraud risk assessments. According to SAS No. 99, auditors must explicitly consider specific fraud risk factors in the context of the fraud triangle. Prior research in fraud risk assessments has not empirically investigated the effect of categorizing fraud risk factors as required under SAS No. 99 (Webber, Sinason, Apostolou & Hassell, 2006; Wilks & Zimbelman, 2004a; Zimbelman, 1997). Categorizations may help auditors think more broadly about fraud risk factors and be sensitive to each of the components of the fraud triangle. It is expected that auditors who follow the categorization procedure will provide more accurate assessments than auditors who do not.

The second objective is to examine the impact of auditors’ consideration of fraud risk attributes, namely significance, likelihood and pervasiveness, as recommended under SAS No. 99, on the accuracy of fraud risk assessments. This procedure requires auditors to engage in more systematic processing which should result in more accurate fraud risk assessments (Chaiken & Trope, 1999; De Dreu, Nijstad & van Knippenburg, 2008; Kleinmuntz, Fennema & Peecher, 1996). The amount of cognitive processing in judgment tasks has been found to be highly related to accuracy in complex cognitive tasks (Arkes, Shaffer & Dawes, 2006; Cacioppo, Petty, Feinstein & Jarvis, 1996). Likewise, performing systematic information processing has been found to reduce biases found in judgment and decision making (Jonas, Schulz-Hardt, Frey & Thelen, 2001; Lerner & Tetlock, 1999; McCaffery & Baron, 2003; Wheeler & Arunachalam, 2008). Therefore, the consideration of attributes of fraud risk factors will likely enhance the
accuracy of fraud risk assessments.

The last objective of this study is to investigate the effect of individual characteristics on fraud risk assessment. NFC, as a trait, is associated with information processing and is likely to play a role in complex decision making (Levin, Huneke & Jasper, 2000; Petty & Cacioppo, 1986). Individuals high in NFC are more likely to pay close attention to relevant cues and employ systematic information processing, while individuals low in NFC tend to rely on heuristics or peripheral cues (Petty, Tormale, Hawkins, & Wegener, 2001). The categorization of fraud risk cues along the components of the fraud triangle and consideration of fraud risk attributes are expected to increase the extent to which auditors low in NFC exert their cognitive processing. The effect of NFC is predicted to be lessened by the effect of assessment procedures. Individuals scoring low in NFC engage in as much mental effort as those scoring high in NFC when the issue is important or an incentive is provided for thinking (Petty, Briñol, Loersch & McCaslin, 2009). An assessment procedure that activates deeper cognitive processing should increase assessment accuracy among individuals low in NFC and reduce the variation in assessments between auditors high in NFC and auditors low in NFC (Arkes et al., 2006; Cacioppo et al., 1996).

1.3 Overview of Method and Major Findings

This dissertation uses a \( 3 \times 2 \) between-subject experimental design with three levels of assessment procedures and two levels of fraud risk. The three levels of assessment procedures are: (1) Wilks and Zimbelman’s decomposition assessment (W&Z
decomposition), (2) SAS No. 99 categorization of fraud risk cues, and (3) comprehensive assessment. Three assessment treatments are manipulated as follows. Firstly, the W&Z decomposition treatment replicates the procedure investigated in Wilks and Zimbelman (2004a) study. Secondly, the SAS No. 99 categorization treatment includes W&Z decomposition and SAS No. 99 categorization of fraud risk factors along fraud triangle components. Lastly, the comprehensive assessment embraces all procedures: W&Z decomposition, SAS No. 99 categorization of fraud risk cues, and SAS No. 99 consideration of fraud risk attributes. The two levels of fraud risk are high and low. The case scenario adapted from Knapp (2006) describes a hypothetical client in the fashion industry.

Fifty audit seniors participated in the experimental study. All passed the manipulation check question. Consistent with expectations, auditors under the comprehensive assessment spent more time to complete the experimental task. The assessments from auditors using the W&Z decomposition and the SAS No. 99 categorization are not significantly different. The results fail to support the effectiveness of the SAS No. 99 categorization. Under the low fraud risk scenario, auditors in the comprehensive assessment provide the most accurate assessment compared to those in the W&Z decomposition and the SAS No. 99 categorization. However, in the high risk condition, auditors using the comprehensive assessment do not perform significantly better than other assessment procedures. The results partially support that the comprehensive assessment effectively increases the quality of fraud risk assessment. The significant interactive effect between assessment procedures and fraud risk levels indicates that the use of categorizing fraud risk factors along fraud triangle components
and considering fraud risk attributes is effective when the scenario suggests low risk. Subsequently, participants are grouped into low in NFC and high in NFC, using median split criteria. The study tests whether assessment procedures can mitigate the main effect of NFC. Variances of low in NFC responses are relatively lowest when using the comprehensive assessment. Variances of high in NFC responses are not significantly different among three assessment procedure treatments. In particular, the comprehensive assessment appears to be successful to reduce dispersion of fraud risk assessment for low in NFC auditor but not for high in NFC auditors. Moreover, supplemental analyses show that low in NFC auditors are attentive to only incentive component. High in NFC auditors are attentive to all three components of fraud triangle.

1.4 Contributions and Implications

The study contributes to the existing research in assessments of financial reporting fraud in several ways. First, auditors are responsible to conduct effective fraud risk assessments as a part of financial statement audit. Practitioners (Nusbaum, 2007; PCAOB, 2004) call for research addressing questions regarding which audit procedures really detect financial fraud, what steps empirically and historically have detected material financial fraud, and what behavioral and other indicators help detect material financial fraud. Therefore, research that helps auditors better understand antecedents influencing fraud risk assessments is beneficial in order to improve methodologies to achieve higher quality of assessments. Second, prior research provides the evidence that relative to holistic assessment, decomposition assessment is effective in certain
circumstances and for certain professions (Messier, 1995; Norman et al., 2010; Wilks & Zimbelman, 2004). The present study replicates the decomposition assessment treatment with audit seniors and finds that the effect of decomposition assessment depends on whether fraud risk factors are observed, i.e. the manipulation of fraud risk factors. Third, the study builds upon prior research findings that the concept of decomposition is usable in assessing fraud risk. The study operationalizes SAS No. 99 requirements and extends the W&Z decomposition assessment to incorporate attributes of fraud risk. The results suggest that the comprehensive assessment increases the quality of fraud risk assessment as well as reduces the dispersion of fraud risk assessments under the low risk condition. Fourth, instead of using overall assessment as the dependent variable as in prior studies, the present study derives a measure of judgment quality by comparing the auditors’ overall assessment against the expert consensus. Using expert consensus is appropriate to judge audit decision quality and reveals the effect of fraud assessment procedures. Finally, the study measures and tests the effect of NFC which is relevant to the tendency to engage in effortful cognitive tasks. In this study, the influence of NFC can be decreased when suitable procedures are in place to encourage the exertion of cognitive effort.

1.5 Organization of the Dissertation

The remainder of this dissertation is organized as follows. Chapter 2 reviews literature and prior research findings on fraud risk assessments followed by hypotheses development (Chapter 3) regarding the effects of fraud risk assessment procedures and
NFC. Chapter 4 describes the research methodology and experimental design. Chapter 5 explicates data analysis and results. The last chapter discusses implications, directions for future research, and limitations.
CHAPTER TWO
LITERATURE REVIEW

The chapter reviews the literature in fraud risk assessments, quality of audit judgments, heuristics and biases, information processing, the impact of decomposition approach on fraud risk assessments, and individual factors influencing audit judgments. The literature and prior research findings discussed are background for hypotheses development in Chapter 3.

2.1 Overview

Fraud risk assessments are auditors’ responsibilities according to SAS No. 99. To carry out this task, auditors perform multiple steps and inevitably encounter heuristics and biases which decrease the quality of audit judgment. Although heuristics and biases cannot be completely eliminated, audit researchers have attempted discovering and validating approaches to improve the quality of audit judgment (e.g., Brazel, Carpenter, & Jenkins, 2010; Libby & Libby, 1989; Wilks & Zimbelman, 2004a). Audit judgment quality is conceptualized as a multidimensional construct (Ashton, 1974; Bonner, 2008). This chapter discusses the operationalization of audit judgment quality.

To make fraud risk assessments, auditors may engage in heuristic or systematic information processing modes (Chen & Chaiken, 1999; Eagly & Chaiken, 1993). The heuristic-systematic information processing model (HSM) hypothesizes that when
individuals use a systematic information processing mode, they can achieve quality social judgment by reducing heuristics and biases. On the other hand, when individuals employ the heuristic processing mode, they likely process information selectively and may disregard information relevant to the social judgment. The decomposition, or divide-and-conquer approach, allows auditors to be more attentive to each fraud risk factor (Wilks & Zimbelman, 2004a). The decomposition aligned with SAS No. 99 requirements and recommendations instructs auditors to decompose information gathered from clients into a series of judgments. That is, auditors are required to examine each fraud risk factor and consider fraud risk factors along the fraud triangle components—attitudes, opportunity, and incentive. Additionally, auditors should consider attributes of fraud risk factors—significance, likelihood, and pervasiveness. Consequently, a series of fraud risk judgments are integrated to form overall fraud risk assessments.

Individual difference is a factor contributing to auditors’ judgments and behaviors. Need for cognition (NFC) is a trait relating to the degree which an individual’s desire to engage in and enjoy effortful thinking (Cacioppo & Petty, 1982). High in NFC individuals tend to exert more effort and exhibit higher decision quality when performing complex judgment tasks. Likewise, fraud risk assessments require auditors to expend sensible cognitive effort in identifying relevant fraud risk factors, evaluating them, and integrating a series of judgments to form overall assessments. Note that the NFC scale taps the motivational view of cognitive effort but is not a measure of cognitive ability. Following the NFC research, the variation of cognitive effort exerted as well as quality of fraud risk assessments can be attributed to levels of NFC.
This chapter is organized as follows: fraud risk assessments, audit judgment quality, heuristics and biases in individual judgments, information processing, decomposition approach, and individual differences affecting auditors' judgments. Section 2.8 closes Chapter 2 with a summary.

2.2 Fraud Risk Assessments

The first section provides background related to fraud risk assessments. It describes the auditors' responsibilities in fraud risk assessments, financial statement fraud, fraud risk factors, characteristics of fraud risk assessments, and consideration of fraud risk attributes according to SAS No. 99.

2.2.1 Auditors' Responsibilities in Fraud Risk Assessments

Fundamentally, auditors are responsible to plan and perform audits with due professional care to obtain reasonable assurance but not absolute assurance about whether the financial statements are free of material misstatement (AICPA, 1972). Their concern is that financial statements be stated fairly in all material aspects. Auditors are charged with making appropriate, reasonable efforts to detect material misstatements and causing management to correct material misstatements or misrepresentations before the financial statements are disclosed to the public.

SAS No. 99 establishes standards and guidance relating to fraud in financial statement audits (AICPA, 2002) to improve audit practice. It requires auditors to pay
more attention to fraud and fraud risk during the audit process than does its predecessor, SAS No. 82. According to SAS No. 82, auditors must make and document planning-stage assessments of fraud risk separate from assessments of audit risk, whilst SAS No. 99 requires auditors to assess fraud risks throughout audit fieldwork and into the final stages of the audit. Moreover, SAS No. 99 requires auditors to gather and consider more information in assessing fraud risks. Fraud risk factors must be considered according to the fraud triangle. The fraud triangle is a framework of three components—attitude, incentive, and opportunity—which provide explanations of fraud incurrences. More details are discussed in Section 2.2.3. Auditors exercise professional judgment in determining whether a fraud risk factor is present and should be considered in identifying and assessing the risks of fraudulent financial reporting (AICPA, 2002, AU 230.32). The processes of identification and evaluation of fraud risk factors should be implemented continuously through the audit. The new information updating their assessment may emerge during planning and risk assessment, in discussion among management and employees, or as a result of controls testing or substantive analytic or detailed testing at the review or audit completion stage.

Specifically, auditors must use information gathered to identify risks that may result in a material misstatement due to fraud, to evaluate the client’s internal controls addressing the identified risks of material misstatement due to fraud and error, and to assess fraud risks. Auditors do not make a legal determination whether fraud has occurred (AICPA, 2002, paragraph 5). Should fraud be suspected or discovered, the audit committee retains special counsel to hire a different audit firm or fraud examiner to
2.2.2 Financial Statement Fraud

Financial statement fraud, a type of fraud, is an intentional act committed by corporations in order to deceive or mislead financial statement users (Rezaee, 2005; AICPA, 2002; Nieschwietz, et al., 2000; Webber, et al., 2006). Intent is a primary factor used to distinguish fraud from errors (AICPA, 2002). In accordance with the fraud literature, financial statement fraud schemes include: (a) deception, alteration, or manipulation of accounting records, supporting documents, or transactions; (b) purposeful material misstatements, omissions, or misrepresentations of transactions, accounts, significant information or financial reporting disclosures; and (c) deliberate misapplication, intentional misinterpretation, and wrongful execution of accounting standards, policies and methods for measuring, recognizing, and reporting financial information (AICPA, 2002; Rezaee, 2005; Skalak et al., 2006; Nieschwietz, et al., 2000; Webber, et al., 2006).

To avoid potential misperception and distinguish earnings management from financial statement fraud which is the focus of the dissertation, these two phenomena are elaborated. Earnings management and financial statement fraud result in distorted pictures of companies’ economic performance. Both mislead some stakeholders and diminish public trust in the accounting profession. Financial statement fraud is different from earnings management in terms of the degree of conformity with accounting

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4 A fraud audit is different from financial statement audit in terms of purpose, scope, methodology, procedures, timing, reason for testing controls, reliance on management, certification and training, and frequency of fraud exposures (Albrecht et al., 2008).
standards. Financial accounting standards permit managers to exercise their knowledge and judgment to select accounting treatments, estimates and disclosures to match and present the firms’ business economics. Earnings management occurs when managers discretionarily choose financial reporting policies and estimates that do not truly reflect their firms’ underlying economic performance (Healy & Wahlen, 1999). For instance, management decisively chooses specific accounting policies or changes accounting estimates to manage accruals and net income in order to meet analysts’ expectation. High discretionary accruals may indicate aggressive or opportunistic reporting, but be not necessarily suggestive of fraud (Hogan, Rezaee, Riley, & Vulery, 2008). Though exploiting the spirit of financial reporting and information usefulness, earnings management is not necessarily illegal but considered as gray-area management decisions, which comply with the generally accepted accounting principles. If incumbent auditors find that the amount is significant, they are more likely to require adjustment. Thus, firms who manage earnings can receive unqualified audit reports as long as the accounting treatments used are acceptable. On the contrary, fraudulent financial reporting is classified as misconduct and illegal because it involves intentional manipulation, falsification, and misrepresentation of accounting records (AICPA, 2002). If fraudulent financial reporting is uncovered during an audit engagement, a fraud audit needs to be pursued in order to gather sufficient evidence.

2.2.3 Fraud Triangle

The fraud triangle is a framework providing explanations of why financial statement fraud occurs. When financial statement fraud as dishonest acts are committed,
three elements of the fraud triangle are present in varying degrees (AICPA, 2002, paragraph 7; Albrecht et al., 2008; Bell & Carcello, 2000; Hernandez & Groot, 2007; Rezaee, 2005). The first element, incentives and pressures, is a perceived pressure to commit fraud or a perceived benefit from committing financial statement fraud (AICPA, 2002, paragraph 7). Management or employees may work under nonfinancial and financial pressure to commit financial statement fraud. Pressure may arise from the unrealistic earnings expectations of analysts, compensation and incentive structures, the need for external financing, or poor performance (Hogan et al., 2008). The second element, opportunities to commit fraud, results from conditions that allow management or employees to easily commit financial statement fraud (AICPA, 2002, paragraph 7). Absent or ineffective internal controls, lack of supervision, improper segregation of duties, or a poor working environment provide opportunities. Such opportunities can tempt perpetrators to behave dishonestly. On the other hand, individuals are under pressure and subject to incentives to perpetrate a fraud will not threaten an organization unless an opportunity exists for them to behave unethically. The third element, attitudes and rationalizations allow an individual to justify why he or she should commit financial statement fraud (AICPA, 2002, paragraph 7). Fraud risk factors regarding rationalization and attitude are the least tangible or measurable and by nature difficult to observe. Ethical behavior is motivated both by an individual's character and by external factors. Some individuals are more prone than others to commit fraud because the propensity to commit fraud depends on their ethical values as well as on personal circumstances (AICPA, 2002; Kenyon & Tilton, 2006). External factors may include job insecurity, or a work environment that triggers resentment.
SAS No. 99 requires auditors to explicitly consider opportunities, attitudes, and incentives that can influence employees or managers to commit financial statement fraud. Fraud risk assessment should consider the interaction of these elements (Loebbecke, Eining, & Willingham, 1989). Theoretically, they occur in varying degrees but are closely related (Bell & Carcello, 2000). In general, the greater the extent to which all three conditions are present, the greater the likelihood that fraud will occur.

Practitioners-based literature discusses some instances in which one of the fraud triangle elements may trigger or increase the financial statement fraud risk of the other element. When incentives to commit financial statement fraud are strong, it is likely to be easier for perpetrators to rationalize their actions (AICPA, 2002). If internal controls are ineffective, an employee may conclude that misconduct will not be caught and penalized. In the case that management fails to demonstrate management integrity and ethical values to its employees when fraud occurred, employees may conclude that the misconduct is not taken seriously and they can get away with it (Kenyon & Tilton, 2006).

The perceived importance of fraud triangle elements is varied from different perspectives. Corresponding to the recent 2008-2009 KPMG Integrity Survey, incentives or pressures related to inadequate resources and job uncertainty were major drivers\(^5\) of corporate fraud and misconduct (KPMG, 2008). The Webber et al. (2006) study revealed that auditors reported higher fraud risk assessment when either an incentive or opportunity for fraud was present. Auditors also increased their fraud risk assessment

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\(^5\) Root causes of misconduct are that managers and employees: (a) feel pressure to do whatever it takes to meet targets, (b) believe they will be rewarded for results not the means, (c) believe that code of conduct is not taken seriously, (d) lack familiarity with the standards applying to their jobs, (e) lack resources to complete the job, (f) are afraid of losing jobs if do not achieve targets, (g) believe policies are easy to override, and (h) are seeking to bend the rules or steal for personal gains (KPMG, 2008).
when both incentive and opportunity were present, compared to either incentive or opportunity alone. Without referring specific contextual factors, it is difficult to identify which fraud triangle elements are more important predictors of financial statement fraud. Examples of contextual factors are business size, ownership, and geographical locations.

Even though one or more fraud triangle elements are not observable or noticeable, financial statement fraud risk is not diminished. The observability of all three elements is not a prerequisite to the existence of a significant risk of financial statement fraud. To maintain objectivity, the auditor should neither assume that management is dishonest nor unquestionably honest (AICPA 2002, AU 230). For example, when an auditor identifies an opportunity to commit fraud, the probability of financial statement fraud perpetrated increases. SAS No. 99 suggests that even if an incentive or rationalization has not yet been indicated, the auditor must make a fraud risk assessment as to whether these elements might be present. Because intent and deception are major factors of fraudulent financial reporting, fraud perpetrators will attempt to cover up their incentives, opportunities, or attitudes (AICPA, 2002; Knapp & Knapp, 2001). Management has the unique ability to directly and indirectly manipulate accounting records, influence the preparation of financial reports and disseminate fraudulent financial information (AICPA, 2002). Management override of controls can happen in unpredictable patterns. Auditors must anticipate how the financial statement fraud would be concealed and maintain an attitude of professional skepticism (Ramos, 2003).
2.2.4 Fraud Risk Factors

SAS No. 99 discusses three main categories of fraud risk factors under the fraud triangle components related to fraudulent financial reporting: management characteristics, industry characteristics, and operating characteristics and financial stability. (1) Management characteristics concern management’s abilities, pressures, style, and attitude as they have to do with internal control and the financial reporting process. These embody management's incentives to engage in fraudulent financial reporting, for instance, a compensation plan that is contingent on meeting unrealistic financial targets. Non-financial management excessively involved in the selection of accounting principles is another example. Furthermore, the high turnover of senior management, counsel, or board committee can point to potential conflict of interests. (2) Industry characteristics consider the economic and regulatory environment in which the business entity operates, ranging from the stable features of that environment to changing features, such as new accounting or regulatory requirements, increased competition, market saturation, or adoption of more aggressive accounting policies to keep pace with the industry. (3) Operating characteristics and financial stability include factors such as the nature and complexity of the entity and its transactions, the geographic areas in which it operates, the number of locations where transactions are recorded and disbursements are made, the entity's financial condition, and its profitability. Potential fraud risk factors relevant to financial stability are, for example, significant pressure on the company to acquire additional capital, threats of bankruptcy, or hostile takeover.

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6 SAS No. 99 fraud risk factors as illustrative cover a broad range of situation. The standard discusses that “..Not all fraud risk factors in the SAS No. 99 appendix are relevant in all circumstances. Some may be of greater or less significance in entities of different size or different ownership characteristics or circumstances. The order of fraud risk factors provided does not reflect their relative importance (AICPA, 2002, paragraph 33).”
Auditors face challenges in trying to identify and assess fraud risk factors. Assessing and interpreting fraud risk factors are difficult because of the following reasons (Hogan et al., 2008; Kenyon & Tilton, 2006). First, fraud risk factors themselves are not evidence of fraud. Fraud risk factors point to an environment or circumstance in which there is an increased risk of material misstatement due to fraud might occur either generally or in a specific functional or geographic sector of the entity's operations. For instance, a domineering characteristic of the CEO may indicate a high risk of material misstatement in general. Second, fraud risk factors may indicate the existence of risks other than fraud. Many fraud risk factors are not exclusively indicative of fraud risk. They may also suggest a heightened risk of material misstatements due to human or process errors. For example, deficiencies in internal controls are regarded as fraud risk factors. They pose the risk that errors may occur and be undetected because weak internal controls sometimes fail to identify accounting or reporting mistakes. Third, fraud risk factors can be ambiguous and susceptible to both unintentional and intentional misstatement. Fourth, the relationship between the number of fraud risk factors and the level of fraud risk is not linear. Merely the total of present fraud risk factors is not a perfect measure of fraud risk. Fifth, fraud risk factors are of limited significance in isolation. Fraud risk factors need to be considered as a whole. It is difficult to assess and weight fraud risk factors to assess overall fraud risk and formulate an audit plan (Patterson & Noel, 2003). Auditors should interpret evidence of potential fraud risk factors within the wider context of other observations about the company, its management, and the business environment. The identification of an anomaly can lead to the identification of multiple fraud risk factors or actual instances of fraudulent financial
reporting. Lastly, some fraud risk factors are very difficult to observe. Partly, because perpetrators attempt to conceal their acts, few fraud risk factors may be observed (Hogan et al., 2008). Certain fraud risk factors are essentially states of mind or related to an individual's private or personal financial affairs (Kenyon & Tilton, 2006). They may be impossible to observe directly. Auditors nonetheless may become aware of indirect signs that relevant states of minds or private-life factors may exist.

SAS No. 99 distinguishes between fraud risk factors relevant to the risk of material misstatement due to fraudulent financial reporting and those relevant to the risk of misappropriation of assets (AICPA, 2002). In practice, many fraud risk factors are potentially common to both types of misstatement (Kenyon & Tilton, 2006). Fraud risk factors related to weaknesses in control or supervision may be equally applicable to either type of fraud. Fraud risk factors need to be properly evaluated in context as auditors must have an understanding of the business, its relationship with business partners, general economic conditions, and the market environment in which it operates. Facts or circumstances that may constitute fraud risk factors in one context may be less significant in another. Adequate awareness and understanding of the client entity, the industry, and the environment ensure auditors’ capability to distinguish what is abnormal in the context of the entity, such as unusual transactions, questionable financial ratios, and implausible explanations by management or others (Kenyon & Tilton, 2006). The auditors should consider the accumulation of fraud risk factors. As an illustration, a significant portion of management's compensation in the form of stock options linked to aggressive earnings target is listed as a fraud risk factor in SAS No. 99. Should the fraud risk factors be considered separately, this form of remuneration is commonly used and can be viewed as
effective ways to align the management's interests with the stockholders' interest and the earnings target is not easily judged as aggressive. Thus, the fraud risk factors separately may not indicate a possible severe fraud. But if the auditor found that the audit committee was not effective in monitoring the entity's accounting reporting process and accounting practices, the cumulative effect of these circumstances might be more persuasive of the potential financial statements fraud committed.

Fraud risk factors according to the three main categories (management characteristics, industry characteristics, and operating characteristics and financial stability) are also classified into three fraud triangle components. This suggests that fraud risk factors embody multiple attributes. As an illustration of a fraud risk factor, management excessively involves in the preparation of financial reporting. This fraud risk factor is one of management characteristics and classified as the attitude element. Moreover, management compensation plan is contingent to earnings. This fraud risk factor is one of management characteristics and viewed as the incentive component. Excessive interest in earnings by management can be viewed as a consequence of compensation plan tied to financial figures. That is, fraud risk factors provided in SAS No. 99 appendix are multi-dimensional and interrelated. The standard provides a list of fraud risk factors as examples under each fraud triangle component.

SAS No. 99 requires that considering fraud risk factors along three conditions of fraud triangle— incentives, opportunities, and attitudes—be one of auditors’ responsibilities for detecting risk of material misstatement due to fraud. In spite of that, the effectiveness of considering fraud risk factors along the fraud triangle components has not been experimentally investigated. This study examines the effect of the
SAS No. 99 requirement on audit judgment quality.

2.2.5 Characteristics of Fraud Risk Assessments

Fraud risk assessment is a multi-attribute, high-level judgment task that requires knowledge, experience, and reasoning (Loebbecke, et al., 1989). The auditors’ goal is to assess, or to synthesize, the identified risks to determine what areas are most vulnerable to fraud. Then, auditors must assess the types of fraud that are most likely to occur and how they are likely to be concealed (Ramos, 2003). Risk identification involves bringing together these factors from memory and recorded data, and documenting those risks that should be considered in planning the extent of audit procedures. It is primarily a search for negative, risk-increasing information. In identifying the risk of material misstatement due to fraud, auditors must consider the information gathered in the context of the three components of the fraud triangle (AICPA, 2002). Assessing the degree of fraud risk present and identifying the areas of highest risk are critical initial step in detecting financial statement fraud. The auditors specifically evaluate fraud risk factors when assessing the degree of risk and approach this risk assessment with a high level of professional skepticism, setting aside any prior beliefs about management’s integrity. Risk assessment involves combining and weighting these factors to develop risk judgments (Bedard & Graham, 2002). To reiterate, auditors should be able to synthesize individual risk factors and assemble them into a combined overall risk assessment (Ramos, 2003) to determine the extent of material misstatements to fraud. The current study examines how auditors make fraud risk assessments after considering fraud risk factors along the fraud triangle components.
2.2.6 Consideration of Fraud Risk Attributes

Professional judgment is emphasized in SAS No. 99 when auditors consider the following attributes of fraud risk: type, significance, likelihood and pervasiveness. First, type of risk that may exist, is an assessment as to whether it involves fraudulent financial reporting, asset misappropriation, and/or corruption (AICPA, 2002, paragraph 40). The type of risk has a significant impact on the nature of the responses to a particular risk. Secondly, significance of the risk is the magnitude that fraud risk factors could result in a possible material misstatement (AICPA, 2002, paragraph 40). A risk is significant if it could potentially lead to a material misstatement in the financial statements. This attribute is closely related with pervasiveness. Thirdly, the likelihood of fraud risk factors will result in a material misstatement due to fraud (AICPA, 2002, paragraph 40). The assessment of this attribute may not be accurate and influenced by a personal assessment of internal controls. Auditors should not solely rely on a general belief in management integrity or on the fact that material misstatement occur relatively rarely. Fourth, the pervasiveness of the potential risk relates to the financial statements as a whole or specifically to particular accounts, class of transactions, or assertion (AICPA, 2002, paragraph 40). In assessing whether a material misstatement exists, the impact of both balance-sheet and income-statement accounts should be considered.

The attributes of fraud risk factors mentioned will influence both the extent to which auditors will plan audit procedures to approach a particular risk factor and the nature of steps taken (Kenyon & Tilton, 2006). The range of possible responses is substantial. At one end, after considering the attributes, the auditor may conclude that no specific steps are needed. At the other end, the auditor may have serious reservations and
be unable to form an opinion. Considering attributes of fraud risk factors facilitates auditors in planning and implementing audit procedures. However, consideration of how the attributes relates to audit judgment quality has not been understood (Hogan, et al., 2008). One of objectives in this study is to examine the effect of considering fraud risk attributes on the fraud risk assessment performance.

2.3 Quality of Audit Judgment

Judgments in accounting settings can be classified into two types (Bonner, 2008). The first type of judgments is the probability of future events or states, e.g., tax professionals' judgment about the probability of clients being audited, or the probability that that aggressive tax deduction could be defended (e.g., O’Donnell, Koch, & Boone, 2005). The second type of judgment is the estimate of future quantities or current but unknowable quantities, e.g., auditors' estimates of the dollar misstatement in clients' financial statements, assessment of clients’ going concern, recommendations of the amount of the audit adjustment (e.g., Ng & Tan, 2003; Shelton, 1999). For any given judgment task, multiple relevant dimensions of quality are defined in the accounting research literature (Bonner, 2008). In order to be consistent with research focused on the determinants of judgment quality, the current study characterizes judgment quality in terms of outputs. That is, the performance view of judgment quality will be adopted; thus, the final answers or judgment outputs are evaluated corresponding to some sort of standards or right answers (e.g., Hunton & McEwan, 1997; Asare & Wright, 2004).

Determining decision outcomes and relating the quality of decision processes to
outcomes are challenging tasks in most accounting settings. In most auditing research contexts, an objective external criterion is absent (Ashton, 1985). For judgment researchers, the central empirical questions concern the processes by which as-yet-obscure events, outcomes, and consequences could be inferred or perceived: How do people integrate multiple, fallible, incomplete, and sometimes conflicting cues to infer what is happening in the real world? The most popular models have been derived from statistical algebraic principles developed originally to predict uncertain events. Specifically, linear or averaging models seem to fit to behavioral data using multiple regression techniques (Cooksey, 1996). The primary standards for the quality of judgment are based on the accuracy of the correspondence between a judgment, and the criterion condition that was the target of the judgment (Hammond, 1996; Hastie & Rasinski, 1987; Hastie, 2001).

Fraud risk assessments are made on the basis of a continuum of fraud risk factors that could range from low to high risk (Bonner, 2008; Wilks & Zimbelman, 2004a). Exact measures of fraud risk assessment accuracy are unknown until after fraud is uncovered (Asare & Wright, 2004; Bonner, 2008). Although material misstatement due to fraud may be detected later, it is difficult to tie the outcomes to the assessment of fraud risk factors. To the best attempt, several measures as proxies of the quality of audit judgment discussed in the extant literature include consensus, agreement, cue usage, and consistency (Ashton, 1974; Trotman, 2010).
2.3.1 Consensus

Judgment quality can be measured by investigating the extent to which an individual's judgment corresponds to the judgment of peers or experts (Leung & Trotman, 2005; Leung & Trotman, 2008). Comparing individuals' judgments to an expert panel or peers is referred to as consensus. The measures can be the number of judgments or decisions that match those by an expert panel or the signed or absolute differences between individual's judgments and those of other persons. Consensus can be calculated as the mean pairwise correlation for each auditor's decisions with the decisions of the other participants in the same treatment group (Ashton, 1974). Higher correlations indicate higher consensus (Pennington & Tuttle, 2007).

2.3.2 Agreement on Process

Measures comparing one person's judgment process to other persons' are referred to as agreement on the process element. The degree of agreement among auditors (of peers or comparison to an expert panel) is commonly used and measuring cue usage is still a critical issue in most audit judgment studies (Ashton, 1985; Trotman, 2010; Pincus, 1990). To derive measures, individuals and other person's measures of processes are correlated. Various measures of processes include cue weights, the number of cue weights match, and the number of processes matched. Cue weighting is the representation of each auditor's judgments via analysis-of-variance and the estimation of statistical cue weights via the omega-squared statistic (Ashton, 1974). In an internal control evaluation task, the statistic measures the extent to which each auditor used each of internal control questions
in formulating his or her internal control judgments (Ashton, 1974).Greater or lesser degrees of consistency in overall judgments could be related to differences in the auditors' weighting of the available cues. *Cue usage* is a measure of how much information should be incorporated into a decision so that the amount of information reflected in the decision is a measure of decision quality (Pennington & Tuttle, 2007). Ideally, all relevant information should be incorporated into a judgment so the amount of information reflected in the judgment is a measure of judgment quality (Ashton, 1974).

2.3.3 Consistency

Consistency refers to the individual's ability to evaluate the same information in the same manner and is viewed as a desirable quality in auditing decisions (Dilla & Stone, 1997). Consistency or judgment stability is the intra-individual consistency of judgment quantified by correlating each individual's judgments across times. This measure was investigated by Pennington and Tuttle (2007). They found that information systems auditors who spent less time processing the project risk factors were less consistent.

The measures of audit judgment quality employed in this study include consensus by comparing the participants' judgment to an expert panel (Asare & Wright, 2004; Leung & Trotman, 2008; Martinov-Bennie & Pflugrath, 2009) and by comparing the judgment among peers (Ashton, 1974; Bonner, 2008). Consensus can be computed as the mean absolute expert difference by comparing individual’s judgment to a mean experts’ judgment (Leung & Trotman, 2005; Leung & Trotman, 2008). This is the
measure used in the current study.

It is worth to note the limitations and rationalizations of using these measures as proxies of audit judgment quality. Consistency and consensus are most often used in auditing because of difficulties in using actual outcomes and interpreting professional standards (Bonner, 2008; Pincus, 1990). Importantly, to evaluate professional due care as a key part in audit litigation can be determined by reference to the judgments and decisions other auditors would have made under the same situations (Bonner, 2008). They are useful measures when it is not feasible to find an outcome directly associated with judgment and decision making. The measures of audit judgment accuracy, especially for fraud risk assessments, are remained unknown. Actions and decisions may have to be based on the imperfect consensus criterion when use of the preferable accuracy criterion is not available (Einhorn, 1974). Consensus or consistency is a necessary but not sufficient condition for accuracy among a group of expert decision makers (Einhorn, 1974). Consensus represents a desirable quality of decisions, because a lack of consensus may suggest arbitrary behavior on the part of the decision maker (Dilla & Steinbart, 2005). While lack of consistency among a group of experts implies that at least some of the experts are not accurate, strong consistency or consensus does not essentially imply accuracy. In other words, people who agree with each other may all be incorrect. Therefore, the use of consensus in fraud risk assessments in this dissertation should be interpreted with the noted limitations.
2.4 Extant Heuristics and Biases

Auditors as decision makers generally face a wealth of potentially relevant and irrelevant information from the external environment and from their memory. Increased information availability is intuitively expected to enhance decision-making quality and speed (Bendoly & Speier, 2008). However, a large amount of information causes information overload, and consequently reduce decision-making quality because of human cognitive limitations. The psychology literature highlights that individuals can meaningfully integrate and analyze information based on the sheer amount of available cues due to cognitive limitations (Rubenfeld et al., 1994). Additionally, research has indicated that auditors use a range of heuristics, or simplified judgmental rules in making fraud risk assessments (Hackenbrack, 1992a; Nelson & Tan, 2005; Smith & Kida, 1991; Trotman, 1998; Tversky & Kahneman, 1974). Auditors as decision makers may subconsciously use heuristics to complete audit tasks and then are subject to unintentional errors and biases, such as the dilution effect7 (Hackenbrack, 1992b; Hoffman & Patton, 1997; Waller & Zimbelman, 2003), halo effect8 (O'Donnell & Schultz, 2005), and anchoring effect9 (Chapman & Johnson, 2002; Kowalczyk & Wolfe, 1998; Switzer & Sniezek, 1991).

Although auditors acknowledge the complexity of fraud triangle components and

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7 The dilution effect is the tendency of nondiagnostic evidence to dilute the predictive power of diagnostic evidence. It occurs when auditors unintentionally incorporate irrelevant information in to judgments of fraud risk (Hoffman & Patton, 1997).

8 The halo effect has been defined as “a marked tendency to think of a person in general as rather good or rather inferior and to overshadow the judgments of the person’s specific performance attributes by this general feelings” (Thorndike, 1920, p. 25). The effect was found that holistic strategic assessments influence the extent to which auditors adjust account-level risk assessments (O'Donnell & Schultz, 2005).

9 The anchoring effect is the tendency to anchor on an estimate for one event and adjust to take into account the other events as well. Adjustments are typically insufficient (Chapman & Johnson, 2002).
fraud risk factors, the quality of fraud risk assessments can be compromised. When auditors perform fraud risk assessments, they may tend to identify incentives and opportunities, yet fail to pursue the issue because they have not seen a corresponding attitude or rationalization conducive to fraud (Ramos, 2003; Wilks & Zimbelman, 2004b). Research shows that auditors rely heavily on their perceptions of management’s attitudes, or character when predicting the likelihood of fraud (Nieschwietz et al., 2000; Wilks & Zimbelman, 2004a). Auditors rate management’s characteristics, such as integrity and honesty, and influence over the control environment as highly important when compared with factors related to financial/operating stability or industry conditions (Apostolou, Hassell, Webber & Sumners, 2001). Auditors also assess a lower risk of fraud when positive client characteristics related to management integrity are present (Graham & Bedard, 2003). They often anchor a belief on certain information, and fail to adjust that belief appropriately when new information is obtained (O'Donnell & Schultz, 2005; Payne & Ramsay, 2005). This implies that the initial perception of management’s integrity or attitude, as an evidence of employing heuristics, cannot be easily displaced by the presence of incentives or opportunities.

Prior research documents that heuristics are induced, when the task is information intensive and information overload is present (Stocks & Harrell, 1995). As a consequence, the quality in decisions often decreases. Auditors may have difficulty identifying fraud risk factors due to the relatively large number of positive client characteristics present even among fairly risky clients (Bedard & Graham, 1994). Intensive information can lead to less information being used (Lusk, 1973; Tuttle & Burton, 1999). The apparent inability of auditors to identify and react appropriately to
fraud risk factors in controlled experimental conditions raises doubts as to the effectiveness of current procedures on actual audit practice (Mock & Turner, 2005).

2.5 Information Processing

Because fraud risk assessment involves multiple steps of information processing, this section is devoted to the literature in information processing: heuristic-systematic model and cue weighting. The heuristic-systematic model provides the assumption of how people employ two different modes of processing which require differential levels of cognitive resources to accomplish judgment tasks. This section discusses judgment processes. One of the processes, evaluation, involves cue weighting to form the judgment. A simple weighted additive model can be used to explore the weight of fraud triangle components that implies the degree of its influence on overall fraud risk assessments.

2.5.1 Heuristic-Systematic Model

According to the heuristic-systematic model (HSM), individuals determine their attitudes and other social judgments by the systematic and heuristic modes of processing (Eagly & Chaiken, 1993). Systematic processing involves deliberate, effortful information processing using rule-based inferences (Chaiken, 1987; Petty & Cacioppo, 1986). Systematic processing occurs when individuals use a decomposition strategy to make a judgment by carefully examining, comparing, and relating arguments. As such,
this systematic strategy is a “bottom-up” process that requires the exertion of cognitive effort to reflect on and examine the stimulus (Moskowitz, Skurnik & Galinsky, 1999). Judgments formed on the basis of systematic processing are thus responsive to the actual content of judgment-relevant information (Chen & Chaiken, 1999).

On the other hand, individuals may solve logical problems, evaluate new information, and make judgments through a fast, automatic and heuristic processing of information that rests on well-learned prior associations (Chaiken, 1980; Chaiken & Trope, 1999; Evans, 2008). They can lean on prior knowledge, heuristics, stereotypes, expectancies, scripts, and schemas to impose structure and order on new situations. Heuristic processing entails the activation and application of judgmental rules or heuristics that are presumed to be learned and stored in memory (Chen & Chaiken, 1999). Individuals arrive at their sense of knowing through a “top-down” process whereby a preconception is imposed on new information (Moskowitz et al., 1999). For instance, simple decision rules might manifest as agreement with expert opinion, source credibility, a tendency to agree with perceived social consensus, or a willingness to rely on currently held information. This mode requires less effort and fewer cognitive resources. While the use of decision heuristics may help individuals make satisfactory and relatively quick decisions most of the time, relying on generalized and simplified strategies may produce erroneous judgments when decisions are more complicated (Chen & Chaiken, 1999).

Heuristic processing has evolved as a default processing strategy since in general individuals are not aware of biases, are not motivated to debias, or are not in possession of sufficient cognitive capacity (Moskowitz et al., 1999). To mitigate heuristics when
making judgments, heuristic processing can be suppressed by exerting greater cognitive investment (Bruner, 1957; Moskowitz et al., 1999). Utilizing systematic processing to control cognition has been shown to be successful at reversing the effects of heuristic processing (Gollwitzer & Moskowitz, 1996; Moskowitz et al., 1999).

Systematic intervention may be cued by strong deductive reasoning instructions and may be more likely when individuals have high cognitive ability or a disposition to think reflectively or critically (Cacioppo et al., 1996; De Dreu et al., 2008; Evans, 2008; Harackiewicz, Sansone & Manderlink, 1985). Knapp and Knapp (2001) found that explicit instructions in the form of an audit procedure intended to improve the likelihood of detecting fraud resulted in more effective fraud risk assessments when using analytical procedures. The combination of greater audit experience and explicit fraud risk assessment instructions resulted in the most effective fraud risk assessments (Knapp & Knapp, 2001).

Systematic information search and processing may help individuals prevent erroneous decision making and may lead to higher-quality decision making (De Dreu & Carnevale, 2003; De Dreu et al., 2008; Janis & Mann, 1977). Systematic processing is conceived of as effortful, conscious and capable of debiasing judgment from the effects of automatic responses, rather than preventing such responses from occurring. Taken together, investing in systematic processing potentially provides high quality judgments but does not achieve the efficiency goal. The current study focuses on the provision of deliberate instructions using more-detailed decomposition approaches. More-detailed decomposition is expected to stimulate auditors to attentively consider fraud risk factors
which results in the decreasing likelihood of heuristics interfering with fraud risk assessment. Therefore, the quality of audit judgment should be enhanced.

Regarding the tradeoff between efficiency and effectiveness, this study emphasizes the effectiveness viewpoint which likely reduces audit failures. Moroney (2007) found that the relationship between efficiency measures and performance was significant and inversely related. Auditors, both when working in and out of their specialization, tended to perform better when they were less efficient, i.e. taking more time and steps (Moroney, 2007). As compared to the default heuristic processing, systematic processing may impede potential biases during fraud risk assessments and may enhance audit outcomes (Gollwitzer & Moskowitz; 1996). These include attention and sensitivity to fraud risk factors, judgment quality and consensus, modification of audit plans, memory of the audit evidence, propensity to seek consultation from fraud specialists, and audit documentation. Engaging in a systematic processing mode will improve the quality of audit planning as well as audit documentation which is more defensible against litigation (Francis, 1994; Lys & Watts, 1994). As a consequence, investing in systematic processing may help reduce the risk of audit failure. How differential fraud risk assessment procedures, which stimulate systematic processing, will influence the accuracy of fraud risk judgments remain an open question.

2.5.2 Cue Weighting in Judgment Tasks

Judgment refers to the components of the larger decision making process that are concerned with assessing, estimating, and inferring what events will occur and what the
decision-maker’s evaluative reactions to those outcomes will be (Hastie, 2001). Russo and Leclerc (1994) postulate three stages in the choice process: (a) orientation and screening, (b) evaluation, and (c) verification. Orientation corresponds to the initial looking at alternatives in order to sample and screen the available information. Evaluation is extensive comparison among the alternatives. Verification includes examination of previously unexamined alternatives in order to verify that the tentatively selected alternative is better than all other alternatives. The evaluation stage can be applied to judgment because in judgment tasks there is no need to eliminate alternatives and there are no other competing alternatives. Therefore, Wedell and Sedell (1997) predict that the evaluative process would occur within the very first information access and extend throughout the examination of stimulus cues. Likewise, audit judgment tasks require auditors to evaluate audit evidence (Ashton, 1974) and then accurately integrate the various dimensions of financial statement fraud risk into an overall risk assessment (Libby & Luft, 1993; Solomon & Shields, 1995; Pennington & Tuttle, 2007). When auditors evaluate fraud risk factors presented (Wedell & Senter, 1997; Bonner, 2008) before combining fraud risk factors, those fraud risk factors are processed and given weight. Weight describes the relative influence of a piece of information on judgment (Wedell & Senter, 1997).

From the impression literature, in order to evaluate an object, several dimensions describing the object are judged (Anderson, 1981). Similarly, fraud risk assessments require auditors evaluate several dimensions of financial statement risk. To gain more understanding of fraud risk factor weighting, this dissertation adopts the notion of structural models, weights describe the relative influence of a piece of information. A
A constant weighted averaging model can be represented as follows with the weights ($\beta_0, \beta_1, \beta_2$):

$$Y_j = \beta_0 X_0 + \beta_1 X_{j1} + \beta_2 X_{j2}$$

If let $X_i$ be the fraud triangle components, greater weight for a component ($\beta_i$) means that values exert greater influence on the overall fraud risk assessment than values on other dimensions. The study intends to explore the relationship between weights given to the fraud triangle components and the overall fraud risk assessments by using the constant weighted averaging model.

### 2.6 Decomposition Approach

Research has investigated the use of audit procedures to enhance the auditor’s assessments of fraud risk factors and responses to those factors (Asare & Wright, 2004; Bedard & Graham, 2002; Pincus, 1989). Decomposition and holistic assessment approaches have been studied in the decision analysis and audit literature (Daniel, 1988; Jiambalvo & Waller, 1984; Libby & Libby, 1989; Messier, 1995; Raiffa, 1968; Wilks & Zimbelman, 2004a; Zimbelman, 1997). The decomposition approach is suggested to improve judgment accuracy by decomposing a decision into smaller components, separately considering each element, and then recombining the components to make the global judgment or decision (Einhorn, 1974; Kleinmuntz, et al., 1996; MacGregor & Lichtenstein, 1991; Raiffa, 1968; Wilks & Zimbelman, 2004b). An intuitive justification for decomposition is that the process of identifying and assessing components induces a
more thoughtful and reflective assessment (Kleinmuntz et al., 1996). There are many ways to break down a particular assessment. The best decomposition approach is the one that is easiest to think about and that presents the most visible view of the uncertainty in the decision problem (Clemen, 1991). On the other hand, the holistic approach results when auditors assess misstatement risk without detailed documentation of risk assessments (Zimbelman, 1997).

Decomposition, or divide-and-conquer, can enhance the quality of cognitive processes in several ways (Bonner, 2008; Jiambalvo & Waller, 1984). First, when the information cues are available to complete a task, decomposition—requiring auditors to make a series of several judgments instead of an overall global judgment—can aid auditors in retrieving and searching for a complete set of relevant information. Auditors are able to consider all relevant information. This can serve to mitigate the negative effects of heuristics used by increasing the likelihood that the individual attends to relevant information. Second, decomposition allows the individual to focus on small subsets of information separately rather than all the information at once. Consequently, by decreasing the information load at a given time, decomposition can reduce cognitive strain, task complexity and lend to the likelihood to employ compensatory processing\(^\text{10}\), which is associated with high quality judgment. When individual uses compensatory processes, it means cues can compensate for each other (Bonner, 2008); the individual explicitly determine how to trade off conflicting attributes (Einhorn & Hogarth, 1981). Third, decomposition with a mechanical combination rule can assist in the evidence

\(^{10}\) Compensatory processes are called “conflicting confronting” (Einhorn & Hogarth, 1981). That is, the processes allow decision makers take available cues to compensate to other cues in their problem space. Employing a weighted additive rule, a compensatory process, decision maker weights each cues and then multiplies the cue’s value by weight, then add the weighted values. Using noncompensatory processes, cues are not allowed to compensate to each other. This process is to avoid conflict.
aggregation by forcing the employment of the proper cue signs and weights combination in an appropriate manner, and consistent combinations across people and situations. The decomposition approach is expected to result in increased consistency (Messier, 1995). Fraud risk assessments can be improved under decomposition conditions guiding auditors to systematically process and synthesize information to form a global judgment (Einhorn, 1972). This is the assumption for formulating hypotheses in the current study.

Audit research has experimentally examined decomposition as a decision aid technique. Generally, decomposition tends to improve judgment and decision making quality, particularly when a mechanical combination ¹¹ is also used¹². Jiambalvo and Waller (1984) studied auditors' assessments of the risk of incorrect acceptance for the planned substantive test of details using the audit risk model through either holistic or decomposition. The overall assessments using a holistic approach were not significantly different from the assessments using decomposition and intuitive combination. Jiambalvo and Waller (1984) used the algorithmic combination equation based on the audit risk model to derive overall risk assessments found that the judgments are different from those constructed from the intuitive combination. Jiambalvo and Waller (1984) concluded that auditors' intuitive combination of risk judgments was not consistent with the audit risk model. Extending from Jiambalvo and Waller’s study, Daniel (1988) included inherent risk as a separate component and asked auditors to assess audit risk for accounts

¹¹ A mechanical combination is an algorithmic rule for aggregating a series of judgments. Mechanical combination may be developed by regressing the component judgments on the criterion (Libby & Libby, 1989) For instance, in the audit risk model, audit risk is defined as a multiplication of inherent risk, control risk and detection risk. That is, Audit Risk = Inherent Risk × Control Risk × Detection Risk. A mechanical combination is an aid aimed to facilitate and improve audit judgments.

¹² Not all decomposition approaches lead to the systematic use of mechanical combination. The effectiveness of mechanical combination is subject to how the rules are implemented as well as whether the rules fit task characteristics (Libby & Libby, 1989; Messier, 1995).
receivable and decompose the audit risk assessment into the various risk components. She found that the audit risk assessments using either the formulas from SAS No. 39 or 47 were lower than the auditors’ holistic (intuitive) assessment of audit risk (Daniel, 1988). As a result, the decomposition strategy did not appear to be effective in the case of the audit risk model (Daniel, 1988).

Although audit research discussed negative effects from the strategy, Libby and Libby (1989) argued that with proper structure and training, decomposition may improve auditors’ decisions. As an exemplary use of decomposition with appropriate aids, Libby and Libby (1989) applied Einhorn’s expert measurement/mechanical combination approach (Einhorn, 1972). The approach uses human judgment to measure cue values and combines the component judgments with a mathematical model to determine global control reliance. The approach is introduced to reduce the control overreliance bias. The findings suggest that the proportionate use of both human judgment and decision aids can lead to optimal solutions. From Libby (1985), control reliance decision is conceptualized as a function of three attributes: process susceptibility, control risk, and compliance risk. Libby and Libby (1989) found that auditors whose decomposed internal control judgments were mechanically combined were more in agreement with an expert panel's judgments, than auditors making global judgments. Kachelmeier and Messier (1990) found that the non-statistical sample size equation and tables provided with the audit sampling guide led to higher variability (less consensus) in sample size judgments than intuitive sample size judgments. In the Bonner (1996) study, auditors made substantial errors when estimating the probability of violating an audit objective conditional on a particular transaction cycle. When such probability judgments were decomposed into
components and the estimates were aggregated mechanically, errors were reduced.

Eining, Jones and Loebbecke (1997) showed that auditors with a decomposition aid were better at discriminating between fraud and no-fraud cases than were both unaided auditors and auditors with a list-type aid. Auditors with a decomposition aid had the highest level of consensus.

In the context of fraud risk assessments, Zimbelman’s (1997) study considered the effects of decomposition of fraud risk cues on attention and behavior, but not on the accuracy of the fraud risk assessments. The two approaches examined were holistic and decomposed risk assessments. In the holistic risk assessment group, auditors were told that inherent risk was the risk of a material misstatement in the client’s accounts independent of internal controls and audit tests. Then, auditors assessed misstatement risk without documenting whether an unexpected misstatement was intentional or unintentional. For the decomposition group, auditors received two definitions: inherent risk of unintentional misstatement and intentional misstatement. Auditors were explicitly instructed to separately assess the risk of intentional and unintentional misstatements. Relative to auditors who assessed misstatement risk holistically, auditors who assessed fraud risk separately spent more time reading fraud cues. The results suggested that SAS No. 82 would lead to increases in total budgeted hours for both high- and low-fraud risk cases.

Wilks and Zimbelman (2004a) extended Zimbelman’s (1997) study by examining the decomposition approach based on the fraud-triangle categorization in SAS No. 99. The assessment methods (either the decomposition or holistic judgment), levels of opportunity, and incentive fraud risk were manipulated. They expected that a fraud-
triangle decomposition should add a logical, simplifying structure to the lengthy checklists of fraud risk factors. In the decomposition strategy group, Wilks and Zimbelman (2004a) prompted audit managers to evaluate the risk of fraud attributable to management’s attitude, opportunities, and incentives prior to assessing the overall risk of financial statement fraud (hereafter W&Z decomposition). Auditors in the holistic assessment group reviewed a lengthy checklist of forty fraud-risk factors and made an overall fraud risk assessment without making component assessments for attitude, opportunity, and incentive risk. Participants in the holistic group had more difficulty assimilating the components into a coherent story.

The results showed that, in the low risk scenario, auditors in the W&Z decomposition setting were more sensitive to opportunity and incentive risks than those in the holistic setting (Wilks & Zimbelman, 2004a). When opportunity and incentive fraud risk factors suggested high fraud risk, auditors were equally sensitive to those fraud risk factors whether they used a decomposition or holistic approach. The analysis also suggested that the W&Z decomposition may lead auditors to focus on perceptions of high management integrity and offset any concerns raised by the increased sensitivity to high risk opportunity and incentive fraud risk factors. Wilks and Zimbelman (2004a) concluded that separate consideration of the three components of the fraud triangle allowed the auditor to anticipate management’s action, which should help deter and detect fraud. Hence, auditors should perform a separate risk assessment for each element of the fraud triangle, rather than using fraud risk checklists since conventional checklists are known to managers and can be subverted (Asare & Wright, 2004; Fogathy, Graham & Schubert, 2006). In the high risk condition, Wilks and Zimbelman (2004a) found that the
overall fraud risk assessments were not different between decomposition and holistic approaches. They attributed the results to the ineffectiveness of decomposition, the risky business environment sensitizing auditors' perception, and a ceiling effect. Wilks and Zimbleman (2004a) stressed the importance of gaining more understanding of fraud risk decomposition in the standard setting process and audit practice. The study leaves several unanswered questions: will the categorization required by SAS No. 99 effectively increase auditors' sensitivity to low risk attitude fraud risk factors which may offset the increased attention to opportunity and incentive fraud risk factors? What further steps should be taken in keeping auditors focus on relevant fraud risk cues? Low risk attitude fraud risk factors are discussed in this study because auditors have a tendency to over rely on managements’ attitude and characteristics (Apostolou et al., 2001). Among fraud risk factors, management attitudes can be subverted and are not readily observable (AICPA, 2002; Wilks & Zimbelman, 2004a).

Norman et al. (2010) conducted an experimental study with internal auditors. They manipulated internal reporting lines (management vs. audit committee), assessment types (decomposition vs. holistic), and risk conditions (low vs. high). The results showed that when requiring internal auditors to report to the audit committee, fraud risk assessments were lower than when requiring them to report to management. The study compared the effect of decomposition and holistic assessments on fraud risk assessments made by internal auditors, replicating Wilks and Zimbelman's (2004a). The decomposition method was found to lower overall fraud risk assessments as compared to holistic assessments in both low and high risk conditions. The main effect of attitude risk assessment on the overall assessment was not significant, while the interaction between
assessment types and attitude risk assessment was significant. They further explored the relationships between component assessments and overall assessment and found that the overall assessment depended on the assessment methods. In the holistic assessment condition, incentive and opportunity risk components, except the attitude component, were significantly related to the overall assessment of fraud risk. Under the decomposition assessment condition, all component assessments were significantly related to the overall assessment of fraud risk. Additionally, for internal auditors, decomposition of fraud risk assessments resulted in increased attention to management attitude cues across all levels of risk without a corresponding increase in attention to incentive or opportunity cues (Norman, et al., 2010). Given the different roles and pressures perceived by internal auditors and external auditors, the effectiveness of the decomposition approach has yet been conclusive.

The conclusion here is that findings from previous studies call for more research to address what predictors result in increased attention to fraud triangle components, and under which conditions is decomposition effective. In spite of convincing evidence from prior research reviewed, it is still not certain whether decomposition approach actually leads auditors to use mechanical combination rule, and how participants internally follow the decomposition and aggregation instructions. The prior studies provide some evidence that a detailed decomposition strategy potentially enhances fraud risk assessments since it leads auditors to be more sensitive to fraud risk factors. Moreover, deliberate instructions for aggregation should encourage auditors to measure and combine component judgments to make global judgments (Arkes et al., 2006; Jiambalvo & Waller, 1984; Knapp & Knapp, 2001). The aggregation approach facilitating the recombination of component
judgments is likely to reduce the tendency to overly rely on one of the three components (Libby & Libby, 1989). Additionally, the current study investigates the quality of judgment instead of sensitivity or attention to fraud risk components. The decomposition assessment, with instructions for decomposition and aggregation strategies, is likely to improve the quality of fraud risk assessment. The dissertation views the decomposition approach as a decision aid with a structure of a series of judgments to be followed and does not provide mechanical combination rules for fraud risk assessments to participants. Additionally, the relationships among the fraud triangle components, fraud risk factors, and their attributes have not been well researched in the literature possibly because of their dynamic and complex associations.

2.7 Individual Factors Affecting Auditors’ Fraud Risk Judgments

Auditors work in complex economic, legal, and regulatory environments which influence audit practices (Wilks & Zimbelman, 2004b). Not only do audit standards and procedures gear auditors toward desired practices, individual factors potentially contribute to changes in auditors’ behaviors and judgments. The influence of individual difference factors on audit judgment and decisions (e.g. personality traits) is a research area suggested by audit researchers (Kachelmeier, 2010; Nelson & Tan, 2005; Solomon & Trotman, 2003). The individual difference variable, NFC, has a noteworthy role in complex cognitive tasks and may explain discrepancy in some audit judgments. High in NFC and low in NFC auditors potentially approach and pursue cognitive tasks in a different way.
NFC is a personality trait reflecting the extent to which people engage in and enjoy effortful cognitive activities (Petty & Cacioppo, 1986). NFC is likely to play a role in decision making and especially in complex decisions that require multiple steps like fraud risk assessments (Levin et al., 2000). Individuals high in NFC are more likely to form their attitudes by paying close attention to relevant arguments whereas people low in NFC are more likely to rely on peripheral cues, such as source credibility, the number of arguments, and appearance (Cacioppo et al., 1996; Cacioppo, Petty & Kao, 1984; Cacioppo, Petty, Kao & Rodriguez, 1986). Those low in NFC derive little enjoyment from thinking or from understanding of events. They have a tendency to avoid effortful cognitive processing and may therefore place a greater reliance on heuristic approaches.

Research has reinforced the view that individuals high in NFC engage in greater information processing than those low in NFC (Cacioppo et al., 1996). NFC plays a key role in information evaluation and search when making decisions. High in NFC individuals are more highly motivated to process and incorporate more pieces of information cues. Individuals high in NFC on average expended more effort (acquire more information) and showed higher decision quality than did individuals low in NFC when they were instructed to form their problem set with several attributes selected from a long attribute list (Levin et al., 2000). In addition, subjects high in NFC were more likely than subjects low in NFC to exhibit more alternative-based search during the final choice stage than they had used in the problem-set formation stage. They put forth greater effort in exchange for improved accuracy (Cacioppo et al., 1996; Payne, Bettman & Johnson, 1993).

In the accounting literature, Ford (2006) investigated the effect of NFC and need
for closure on audit sampling behavior. She found that auditors with a relatively high NFC spent more time per audit sampled item and made more significant adjustments to their ex ante planned sample as they proceeded through the sampling task (Ford, 2006). Auditors with a low NFC are less motivated intrinsically to be mentally involved in complex audit decision making (Ford, 2006). Ford and Pasewark (2007) indicated that auditors who are high in NFC used less information but spent longer time to make a decision on an audit task; low in NFC auditors gathered more data, but spent less time analyzing each item collected. The studies suggested NFC leads to different amount of time and explains the variation in information evaluation.

Fraud risk assessments as, one of vital audit tasks, demand auditors’ attention and cognitive effort. When all else are equal, NFC is a measure that can attribute to the variation of effort levels exerted to make complex judgments. When certain amount of information is available, auditors high in NFC likely exert more effort in assessing fraud risk factors than auditors low in NFC. The study measures NFC and investigates an effect of NFC on fraud risk assessments.

2.8 Summary of Chapter Two

This chapter reviews both practice-based and academic research literature relevant to the dissertation. The preceding practice-based literature discussed the heightened auditors’ responsibilities to conduct fraud risk assessments as a crucial step for financial statement audit. Specifically, SAS No. 99 seeks to improve audit practice and requires auditors to pay more attention to fraud risk. Although SAS No. 99 clearly explicates the
categories of fraud risk factors related to fraudulent financial reporting, the requirements and categories pose difficulties in identifying and evaluating fraud risk factors discussed.

By nature, fraud risk assessments involve gathering information, evaluating those fraud risk cues, and reaching the overall fraud risk judgment. Prior academic research has confirmed the challenges faced by auditors when making the fraud risk assessments. Findings reviewed in Section 2.3 show a spectrum of heuristics and biases in audit literature which decreases the quality of audit judgment. Measurement and quantification of fraud risk factors demand high-quality judgment. In turn, high quality judgment can be raised by requiring more resources and efforts. The hypotheses are developed based on information processing literature. Relative to the heuristic information processing mode, the systematic information processing mode is expected to increase the quality of judgment by applying the bottom-up careful processing strategy. By providing deliberate instructions in the more detailed decomposition, auditors are more likely to engage in systematic mode of information processing. These research areas are deemed to be relevant to the fraud risk assessments.

Some audit research proposes assessment approaches and decision aid to mitigate the effect of heuristics and biases. The decomposition approach has been investigated in many audit contexts, as discussed in Section 2.5. Extending from the decomposition approach, this study focuses on certain aspects of SAS No. 99, including the effect of considering the fraud triangle elements and the attributes of fraud risk factors which have not been empirically examined. While prior studies have implications to improve auditors’ fraud risk assessment, they have compared the overall assessments across treatments to test for the differences. The current study contributes to the existing
research body by measuring judgment quality. From audit and applied judgment and
decision making studies, consistency is derived by comparing participants’ judgments to
an expert panel’s. Higher consistency has been found to be significantly correlated with
higher accuracy (Ashton, 1985).

Additionally, when auditors are exposed to the same environment, they may reach
different audit judgments and enact different behavioral responses. Although past audit
research assumes no clear significant impact of individual factors, some research has
found the evidence that personality trait explains variance in auditors’ judgments and
decision making (Bonner, 2008). Ford and Pasewark (2007) found the effort exerted to
complete an audit task was associated with NFC. Auditors may exert varied levels of
effort because of NFC when evaluating fraud risk factors. Therefore, in addition to the
examination of assessment procedures, the study measures and examines the influence of
NFC as a personality trait on auditors’ fraud risk assessments. The research hypotheses
corresponding to the study objectives are formulated in Chapter 3.
CHAPTER THREE
HYPOTHESES DEVELOPMENT

This chapter presents research hypotheses drawn from theories and prior research reviewed in Chapter 2. The first section develops a pair of hypotheses which examines the effect of categorization of fraud risk factors and consideration of attributes of fraud risk factors. The HSM model and prior research provide support for including the two procedures in the assessment procedure. The second section proposes a hypothesis concerning the NFC as an individual variable.

3.1 The Effect of Assessment Procedures

The awareness of fraudulent financial reporting and the auditors’ responsibilities for detecting fraud have been elevated due to the incidence of financial scandals recently discovered (Hogan, et al., 2008). Assessing the risk of misstatements due to fraud is a critical step for audit planning and testing. Auditors need to understand antecedents affecting financial statement fraud at an organization. SAS No. 99 states that the three components of fraud triangle— incentives, opportunities, and attitudes—are generally present when fraud occurs (AICPA, 2002). Research has consistently provided support for the existence of the fraud triangle in financial fraud companies (Bell & Carcello, 2000; Hogan, et al., 2008; Loebbecke et al., 1989).

SAS No. 99 provides guidance to auditors in assessing financial statement fraud.
Fraud risk factors are mentioned as symptoms of fraud and further classified in three components: incentives, opportunities, and attitudes. Shelton et al. (2001) discovered that all audit firms included all fraud risk factors from SAS No. 82, which is superseded by SAS No. 99, in their audit practice aids. Both SAS No. 82 and SAS No. 99 have influenced how audit firms conduct fraud risk assessments. Academic research has investigated the impact of both standards (e.g. Asare & Wright, 2004; Glover, Prawitt, Schultz, & Zimbelman, 2003; Wilks & Zimbelman, 2004a; Zimbelman, 1997).

Research addresses factors and interventions enhancing fraud risk assessments. Zimbelman (1997) conducted an experiment with auditors and found that separate assessment of the risk of misstatement due to errors and fraud led to increasing time reviewing fraud risk factors. In spite of increased budgeted hours, the nature of audit plans did not significantly change. Wilks and Zimbelman (2004a) examined whether decomposing fraud risk assessments into attitudes, opportunities and incentives (henceforth W&Z decomposition) outperformed holistically assessing fraud risk. By requesting auditors to separately evaluate the fraud triangle components, the auditors were more sensitive to incentives and opportunities under the scenario suggesting low fraud risk. Their study suggested that decomposition assessment may not increase auditors’ sensitivity to high risk opportunity and incentive cues. There were several potential explanations of the insensitivity under high risk condition (Wilks & Zimbelman, 2004a). First, auditors were already sensitized by heightened risk. Second, the hypothetical vignette presented too many high risk cues and a ceiling effect resulted. Finally, the decomposition assessment may lead auditors to focus low risk attitudes that offset the effect of high risk incentive and opportunity cues.
Norman, Rose and Rose (2010) examined the impact of internal reporting line and assessment procedures on the fraud risk assessments. An experiment was conducted with internal auditors. The results were consistent with the results in Wilks and Zimbelman (2004a) in that, scores of fraud risk assessments from the decomposition treatment were lower than scores from the holistic treatment. The findings confirmed that attitude fraud risk factors had substantial influence on overall fraud risk assessments.

Findings from Wilks and Zimbelman (2004a) and Norman et al. (2010) are pertinent to the current study. They indicate that decomposition can be advantageous in increase auditors’ attention and sensitivity when incentive and opportunity cues suggest low risk. Several points from prior studies are noteworthy to be discussed. The fraud risk assessments were investigated at the aggregate level—collections of fraud risk factors by attitude, opportunity, and incentive. In conjunction with SAS No. 99 requirement, auditors must consider the information gathered in the context of the three dimensions of fraud triangle present (AICPA, 2002). The effect of categorizing fraud risk factors in terms of opportunity, incentive and attitude on fraud risk assessments has not been investigated experimentally. Wilks and Zimbelman (2004a) suggested that comparing the effects of categorization with decomposition would be helpful to audit practice. Accordingly, the current study seeks to answer this question whether categorization of fraud risk factors, as required under SAS No. 99, is effective in promoting the quality of fraud risk assessments relative to the W&Z decomposition.
3.1.1 Categorization of Fraud Risk Factors

Categorization is a core psychological process that is central to decision making (Hamilton, Puntoni, & Tavassoli, 2010). Extensive research in marketing has demonstrated that externally imposed categories influence important decision outcomes, such as choice, decision difficulty and time, satisfaction, and amount of consumption (e.g., Poynor & Diehl, 2007; Kahn & Wansink, 2004). Categories can be used to promote inferences and the ability to use relevant cues in categorizing given circumstances of interest gives auditors their lead time in adjusting to the circumstances (Turkson & Riley, 2008; Weber & Johnson, 2009). Categorizers must identify relationships among items and differentiate among items (Rosch, 1978). Categorization may help auditors think more broadly about fraud risk factors and be incrementally sensitive to each component of the fraud triangle (Wilks & Zimbelman, 2004b). Consequently, auditors may better assimilate and focus more on fraud risk factors that are naturally underweighted (Heiman-Hoffman, Morgan & Patton, 1996; Wilks & Zimbelman, 2004b). An explicit and deliberate instruction to categorize fraud risk factors along the fraud-triangle components likely induce auditors to engage in systematic processing (De Dreu & Carnevale, 2003; De Dreu et al., 2008).

In accordance with SAS No. 99 requirement, when information for fraud risk assessments is being gathered and reviewed, auditors should have sufficient knowledge of factors affecting financial fraud and consider the information in the context of the fraud triangle. Auditors need to understand the categories of fraud triangle components, consider the relationship of fraud risk factors and then identify their similarities and dissimilarities to categorize fraud risk factors along the components of the fraud
triangle—opportunities, incentives, and attitudes. As a result, the categorization is likely to mitigate systematic biases by focusing on relevant factors and consequently enhance auditors’ judgment quality. In contrast, the W&Z decomposition asks auditors to evaluate fraud risk factors at the aggregate level, that is, opportunity, incentive, and attitude. Auditors are not required to evaluate every fraud risk factor presented to complete the W&Z decomposition. The systematic processing mode stimulated by the SAS No. 99 categorization, as a result, is predicted to increase the quality of fraud risk judgments vis-à-vis the W&Z decomposition assessment alone. In particular, when auditors follow the SAS No. 99 categorization and follow the W&Z decomposition procedure, their assessment quality should be higher, relative to those who follow only the W&Z decomposition. The following alternative hypothesis results:

H1a: Auditors performing the categorization procedure required by SAS No. 99 prior to overall fraud risk assessment will exhibit higher quality of judgment, relative to auditors who do not perform the categorization procedure required by SAS No. 99.

3.1.2 Consideration of Attributes of Fraud Risk Factors

In addition to requirements to conduct fraud risk assessments, consideration of the attributes of fraud risk cues including significance, likelihood, and pervasiveness, is recommended in SAS No. 99 (AICPA, 2002; Ramos, 2003). In considering the attributes of fraud risk factors, fraud risk factors are perceived as multidimensional cues. Fraud risk
factors may contribute to financial reporting fraud in different spectrum depending on their magnitude, likelihood, and pervasiveness. The relationship of the attributes and fraud risk assessments is not well understood. The scarcity of empirical evidence supporting the usefulness of considering fraud risk attributes hinders the inclusion of the consideration of the attributes in standard audit practice. It is important to address the question of whether the considerations of fraud risk factors are helpful to the auditor in detecting financial statement fraud (Hogan, et al., 2008).

Once auditors are instructed to attentively focus on the attributes of fraud risk, deliberate, systematic information processing shall be provoked (Cacioppo et al., 1996; De Dreu et al., 2008; Evans, 2008). Auditors must pay close attention to each fraud risk factor and evaluate its attributes. Particularly, auditors should not only consider the presence or absence of fraud risk factors but also contemplate the attributes of fraud risk factors. For example, when auditors found that the management compensation plan was tied to earnings per share, auditors further evaluated whether this fraud risk factor indicated the magnitude of impact on material misstatement, the likelihood resulting in material misstatement due to fraud, and the pervasiveness relating the financial statements as a whole, particular accounts, class of transactions or specific assertion.

To investigate the effect of consideration of attributes of fraud risk factors recommended under SAS No. 99, a comprehensive assessment procedure is proposed. The comprehensive assessment procedure illustrated in Figure 3.1 entails both decomposition and aggregation approaches: (a) SAS No. 99 categorization, (b) consideration of fraud risk attributes, (c) component assessment, and (d) overall fraud risk assessments, respectively. The first two steps require disaggregating, directing
attention and evoking systematic information processing. The component assessment aids auditors to aggregate their evaluation of each fraud risk factor into three components, which are attitudes, opportunities, and incentives, and they will then proceed to make the overall fraud risk assessment. The last step, the overall fraud risk assessment, involves the aggregation process, which is affected by the following two important issues. First, decision makers often encounter conflicting opinions and judgments, externally and internally (Moskowitz et al., 1999; Yaniv, 1997). Second, judgments are often expressed with a measure of uncertainty. Auditors thus have to reconcile inconsistencies among judgmental estimates and determine their influence on the overall aggregate judgment (Yaniv, 1997). In other words, aggregation instructions will lead auditors to compare, evaluate and reconcile the different pieces of information prior to overall fraud risk assessments.

Moreover, when auditors are cued to adopt the comprehensive assessment procedure, they are likely to use systematic processing rather than the processing modes activated by the SAS No. 99 categorization or the W&Z decomposition assessment alone. The procedures as reasoning motivate auditors to invest their attention to accomplish the fraud risk assessment task as auditors generally have control over their internal state (De Dreu et al., 2008; Weber & Johnson, 2009). A systematic information processing strategy is activated since auditors consider attributes of fraud risk factors before aggregating to higher level of attributes and then financial statement fraud risk judgments. By considering fraud risk attributes with more systematic processing, auditors will pursue fraud risk factors resulting in a greater effect on judgments (Nelson & Tayler, 2007; Payne & Ramsay, 2008). More specifically, auditors who employ the SAS No. 99
categorization, consideration of fraud risk attributes, as well as the W&Z decomposition should provide higher quality fraud risk assessments relative to auditors who do not consider of fraud risk attributes. Accordingly, the following research hypothesis is posited.

H1b: Auditors who consider the attributes of fraud risk factors prior to making overall fraud risk assessments will exhibit higher judgment quality in overall fraud risk assessments, relative to auditors who do not consider the attributes of fraud risk factors.
Figure 3.1

Comprehensive Assessment Procedure

Categorization of fraud risk factors along the fraud triangle dimensions

- Review fraud risk factors
- Categorize fraud risk factors along opportunity, incentive and attitude cues

Consideration of attributes of fraud risk factors

- Significance
- Likelihood
- Pervasiveness

Component assessment

- Attitude
- Opportunity
- Incentive

Overall Fraud Risk Assessment
3.2 Influence of Need for Cognition

The extent of thinking obviously plays an important role in determining the outcome of interest. Thinking is influenced by individual and situational factors. NFC refers to an individual’s propensity to engage in and enjoy effortful cognitive activities (Cacioppo & Petty, 1982). NFC is considered as a relatively stable individual difference underlying individuals’ willingness to engage in effortful cognitive processes. It is a need to structure relevant situations in meaningful, integrated ways to increase understanding of the situation and the experiential world (Cohen, Stotland, & Wolfe, 1955). High in NFC individuals are motivated to put in effort to think, acquire, and reflect on information to make sense of stimuli, events, and relationships. In contrast, individuals with a low NFC are likely to depend on others and cognitive heuristics to make sense of situations. Low in NFC individuals are less likely to engage in careful information processing and more likely to be influenced by simple cues.

Accumulated findings show that NFC is positively related to the tendency to seek, evaluate, and use relevant information for decision making and problem solving (Venkatraman, Marlino, Kardes, & Sklar, 1990). In general, high in NFC individuals pay more attention to the quality of information available (Cacioppo & Petty 1982), make thoughtful judgments (Verplanken, 1989), generate a higher number of issue relevant thoughts (Axsom, Yates, & Chaiken, 1987; Verplanken 1993), and perform better on cognitive tasks such as doing arithmetic problems, solving anagrams, and performing college coursework (Cacioppo et al., 1996; Cacioppo et al., 1986). Unnikrishnan Nair and Ramnarayan (2000) found that individuals high in NFC were more successful in solving the problem, collected information and made decisions on more aspects of the problem,
and faced fewer crises during the problem-solving process. Studies demonstrate accumulated findings that levels of information processing positively associate with levels of NFC.

High NFC individuals enjoy thinking more deeply and engaging in more-developed thought processes on complex cognitive tasks like fraud risk assessments, compared to low NFC individuals. Some evidence supports the notion that processing ability positively relates to the levels of NFC. Higher in NFC is associated with greater knowledge in politics, better understanding of difficult coursework, and verbal intelligence (Cacioppo et al., 1996; Cacioppo et al., 1986; Leone & Dalton, 1988). As such, the main effect of NFC is anticipated in the context of fraud risk assessments, ceteris paribus. Auditors high in NFC are expected to engage in effortful processing and perform better fraud risk assessments than auditors low in NFC when all else equal. The positive association between NFC and information processing is explained by processing motivation. However, differential information processing effort cannot be attributed entirely to NFC since NFC taps the motivational construct of cognitive effort engagement. Research shows that contextual factors interact with NFC in explaining the extent of cognitive processing. The incentives for thinking can be created and situationally induced to modify the extent of thinking. When low in NFC individuals are provided with incentives for thinking, they engage in as much cognitive effort as do high in NFC individuals (Petty, et al. 2009). Low in NFC individuals are motivated to think when the issue is important or surprising, there are no salient cues available, or the source of messages is perceived as dishonest (Axsom, Yates, & Chaiken, 1997; Priester & Petty, 1995).
In the present study, auditors are motivated to engage in systematic information processing by using comprehensive assessment (Figure 3.1). The study posits that using the comprehensive assessment approach should induce low in NFC individuals to process information as much as high in NFC individuals. The intervention is intended to reduce the likelihood of using the heuristic processing mode, especially for auditors who are lower in NFC. As a result, specifically from low in NFC auditors, the outcome of using the comprehensive assessment should be higher quality judgment. For high in NFC auditors, using assessment procedures as an intervention is not expected to result in significant change in audit judgment quality because high in NFC individuals generally engage in effortful thinking even without external incentives. One proxy of high judgment quality is consistency among peers (Ashton, 1974; Trotman, 1998). Low in NFC auditors are likely to subconsciously use the heuristic mode when there is a lack of incentives for thinking. Low in NFC auditors may selectively process fraud risk factors. Their judgments are influenced by selective fraud risk factors. Among low in NFC auditors, the variation in fraud risk assessments should be related to the effect of assessment procedures. That is, among low in NFC auditors, the comprehensive assessment procedure should provide the most consistent fraud risk assessments, compared to the W&Z decomposition and the SAS No. 99 categorization procedures. The prediction is stated as follows:

H2: For auditors low in NFC, the dispersion of fraud risk assessments is smallest when using the comprehensive assessment compared to using the W&Z decomposition and SAS No. 99 categorization.
### 3.3 Summary of Chapter Three

This chapter proposes three research hypotheses. First, the study seeks to investigate the effect of categorization of fraud risk factors along fraud triangle components. Inclusion of the categorization of fraud risk factors in the assessment procedure is anticipated to increase quality of fraud risk judgment. According to HSM, auditors will process information more cautiously and form their judgment based on available fraud risk factors because of the deliberate instructions. H1a is depicted in Figure 3.2.
Figure 3.2

H1a: The Effect of Categorization of Fraud Risk Factors along the Fraud Triangle

Components

W&Z decomposition treatment

Review client information

Component Assessment

Overall Assessment

SAS No. 99 Categorization treatment

Review client information

Categorization of fraud risk factors along the fraud triangle dimensions

Attitude  Opportunity  Incentive

Component Assessment

Overall Assessment
H1b posits the effect of consideration of attributes of fraud risk factors on the fraud risk assessments. Including the consideration of fraud risk attributes in the assessment procedures enable the comparison of assessment procedures and reveal the relative impact of the specific procedure. The pictorial illustration of H1b is in Figure 3.3.

**Figure 3.3**

**H1b: The Effect of Consideration of Attributes of Fraud Risk**

![Diagram showing the procedure for considering attributes of fraud risk](chart.png)

- **SAS No. 99 Categorization treatment**:
  - Review client information
  - Categorization of fraud risk factors along the fraud triangle dimensions
  - Component Assessment
  - Overall Assessment

- **Comprehensive assessment treatment**:
  - Review client information
  - Categorization of fraud risk factors along the fraud triangle dimensions
  - Consideration of attributes of fraud risk factors
  - Component Assessment
  - Overall Assessment
Second, the study predicts that the comprehensive assessment procedure will reduce the main effect of NFC on fraud risk assessment performance. Auditors low in NFC perform the assessment consistent with peers regardless of the personality trait. That is, the comprehensive assessment procedure will reduce variation in fraud risk judgments for low NFC auditors which indicates higher quality of judgment because the procedure deliberately requires auditors to exert cognitive effort. However, the study expects that the effect of this assessment procedure will not be prominent for high in NFC auditors because they have natural tendency to engage in intense cognitive effort when performing complex tasks. That is, the variation of fraud risk judgments from high in NFC is not explained by the assessment procedures. The illustrative Figure 3.4 is presented as follows. The hypotheses are tested experimentally. The research design and methodology are described in Chapter 4.
Figure 3.4

H2: The Effect of NFC

Low in NFC

High in NFC

W&Z decomposition

SAS No. 99 categorization

Comprehensive assessment
CHAPTER FOUR
RESEACH METHODOLOGY

This chapter first describes a research methodology designed to determine the relative effect of assessment procedures and fraud risk levels. The section includes treatment manipulation and case materials followed by measured variables used in the study. To account for individual difference factors in the study, NFC, perceived skepticism and demographic factors are measured.

4.1 Research Design

The study employs a $3 \times 2$ between-subjects fully-crossed design in which the assessment procedures and the levels of risk are manipulated. The three levels of assessment procedures are (1) the W&Z decomposition assessment, (2) the SAS No. 99 categorization, and (3) the SAS No. 99 consideration of fraud risk attributes. Two fraud risk levels are manipulated as high and low.

4.1.1 Assessment Procedures

Four procedures include (1) categorization of fraud risk factors along fraud triangle components, (2) consideration of attributes of fraud risk factors, (3) decomposition assessment, and (4) overall assessment. The decomposition and overall
assessments are required for every treatment. The research design manipulates whether the categorization of fraud risk factors and consideration of fraud risk attributes procedures are present or absent.

*Categorization of fraud risk factors* along fraud triangle components asks participants to identify whether fraud risk factors fall into one of the three fraud triangle components. The list of fraud risk factors is reprinted in Table 4.1. The brief definition of incentive, opportunity and attitude from SAS No. 99 is reprinted in the instrument as follows. Incentive or motivation to commit fraud results from a perceived pressure to commit fraud or a perceived benefit from committing fraud. Opportunities to commit fraud result from internal control deficiencies or working conditions allowing fraud to occur. Attitudes or rationalizations allow a person to justify why he or she should commit fraud.

*Consideration of attributes of fraud risk factors* requires auditor to assess the degree of significance, likelihood, and pervasiveness of each fraud risk factor (see Table 4.1) on a ten-point scale. The instructions defined each attribute as follows. Significance is whether the magnitude of a fraud risk factor could lead to a possible material misstatement. The scale is anchored with inconsequential (1) and highly material (10). Likelihood is that the potential risk will probably result in a material misstatement. The scale is anchored with remote (1) and probable (10). Pervasiveness is defined in terms of whether the potential risk is pervasive to the financial statements as a whole or specifically related to a particular transaction. The scale is anchored with limited (1) and pervasive (10). Auditors then are asked to aggregate their evaluation into higher levels by responding to the questions as follows: (a) What is the significance of the fraud risk
factors resulting in possible fraudulent financial reporting? (b) How likely is it that the fraud risk factors will result in a material misstatement in financial reporting? (c) How extensive (pervasiveness) are the fraud risk factors on possible fraudulent financial reporting?
<table>
<thead>
<tr>
<th>Fraud risk factors</th>
<th>Fraud categorization according to SAS No. 99 Appendix.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>High vulnerability to rapid changes, such as changes in technology, product obsolescence, or interest rates.</td>
<td>Opportunity</td>
</tr>
<tr>
<td>A practice by management of committing to achieve aggressive or unrealistic forecasts.</td>
<td>Incentive</td>
</tr>
<tr>
<td>Domination of management by a single person or small group without compensation controls</td>
<td>Opportunity</td>
</tr>
<tr>
<td>Significant operations located or conducted across international borders in jurisdictions where differing business environments and cultures exist</td>
<td>Opportunity</td>
</tr>
<tr>
<td>Profitability or trend level expectations of investment analysts, institutional investors, significant creditors, or other external parties (particularly expectations that are unduly aggressive or unrealistic), including expectations created by management in, for example, overly optimistic press releases or annual report messages</td>
<td>Incentive</td>
</tr>
<tr>
<td>Excessive interest by management in maintaining LFY’s earnings trend.</td>
<td>Attitude</td>
</tr>
<tr>
<td>Inadequate monitoring controls, including automated controls and controls over interim financial reporting (where external reporting is required).</td>
<td>Opportunity</td>
</tr>
<tr>
<td>Rapid growth or unusual profitability especially compared to that of other companies in the same industry.</td>
<td>Incentive</td>
</tr>
</tbody>
</table>
Component assessment in the current study replicates the Wilks and Zimbelman (2004a) and Norman et al. (2010) studies. To complete the component assessment, auditors evaluate the risk of fraud attributable to management’s attitude, opportunities, and incentive on a ten-point scale of 1 (low) to 10 (high). The questions are: “What is the risk of financial statement fraud attributable to the (a) incentives faced by management, (b) opportunities available to management, (c) attitude or character?” The participants then make the overall fraud risk assessment on a ten-point scale.

Overall assessment asks participants to evaluate overall risk due to financial statement fraud on a scale from 1 (low) to 10 (high). The question is “Based on all the information you have reviewed in this case, what is the overall risk of material financial statement fraud for LFY?” This question was used in Wilks and Zimbelman (2004a).

Three treatments of assessment procedures in the current study are constructed based on the procedures described: W&Z decomposition, SAS No. 99 categorization, and comprehensive assessment. Figure 4.1 depicts the assessment procedure treatments. The W&Z decomposition first assesses fraud risk attributable to fraud triangle components and proceeds to an overall fraud risk assessment. The SAS No. 99 categorization consists of categorization of fraud risk factors along fraud triangle components, component assessments, and overall fraud risk assessment. The comprehensive assessment contains all steps discussed in Section 4.1.1. That is, auditors first categorize fraud risk factors, evaluate fraud risk attributes, assess fraud triangle components, and assess overall fraud risk.
Figure 4.1
Assessment Procedure Treatments

<table>
<thead>
<tr>
<th>W&amp;Z decomposition treatment</th>
<th>SAS No. 99 Categorization treatment</th>
<th>Comprehensive assessment treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review client information</td>
<td>Review client information</td>
<td>Review client information</td>
</tr>
<tr>
<td>Component Assessment</td>
<td>Component Assessment</td>
<td>Component Assessment</td>
</tr>
<tr>
<td>Overall Assessment</td>
<td>Overall Assessment</td>
<td>Overall Assessment</td>
</tr>
<tr>
<td></td>
<td>Categorization of fraud</td>
<td>Categorization of fraud</td>
</tr>
<tr>
<td></td>
<td>triangle dimensions</td>
<td>triangle dimensions</td>
</tr>
<tr>
<td></td>
<td>Consideration of fraud</td>
<td>Consideration of fraud</td>
</tr>
<tr>
<td></td>
<td>risk attributes</td>
<td>risk attributes</td>
</tr>
</tbody>
</table>

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4.1.2 Levels of Fraud Risk

Consistent with prior studies, the level of fraud risk is manipulated as high and low (Wilks & Zimbelman, 2004; Norman, et al., 2010). Both risk levels present the background information, competitive environment, and downturn economic condition. The manipulation of eight fraud risk factors is reprinted in Table 4.2. To present lower fraud risk, the scenario describes that the company is strengthen their control by implementing an enterprise resource planning (ERP) system. The significant amount of bad debts booked indicates that the company is relatively conservative and agreeable with the audit firm. The scenario discussed modest positive earnings forecast and very good debt covenant. In contrast, in the higher risk condition, the scenario describes significant higher risk from the bad debts and the inefficient inventory management system. The scenario further discusses management’s attempts to make sales with huge amount of rebates, unrealistic earnings forecast, and poor debt covenant.
## Table 4.2

### Fraud Risk Factor Manipulations

<table>
<thead>
<tr>
<th>Fraud risk factors</th>
<th>Lower risk</th>
<th>Higher risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management’s characteristics</td>
<td>-</td>
<td>Both CEO and CFO are ambitious and hard driving.</td>
</tr>
<tr>
<td>Financial statement preparation</td>
<td>Presently, the company is hiring an IT consulting firm to implement an ERP system to remedy the current problems.</td>
<td>-</td>
</tr>
<tr>
<td>Bad debts according to SEC 10-K form</td>
<td>The company estimated and booked significant bad debts according to the audit firm’s recommendation.</td>
<td>The company discussed the significant amount of debts as a result of leveraged buyouts or similar transactions.</td>
</tr>
<tr>
<td>Inventory management</td>
<td>-</td>
<td>The company cannot keep track of inventory effectively, and need to monitor sales by calling large customers on a weekly basis.</td>
</tr>
<tr>
<td>Sales revenues</td>
<td>-</td>
<td>Earlier in 2009, when summer orders had not picked up, Chris ordered price cuts across the board. The company began offering retailers rebates of millions of dollars if they had to slash prices on LFY’s apparel to move their inventory. The plan appears to have succeeded because LFY met its earnings goals for 2009. LFY reported that annual sales increased on average 15 percent in recent years, and the CEO contends that the company will be able to maintain the trend.</td>
</tr>
</tbody>
</table>
Table 4.2 (Cont.)

<table>
<thead>
<tr>
<th>Fraud risk factors</th>
<th>Lower risk</th>
<th>Higher risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings trend</td>
<td>EPS has been climbing, rising from $1.05 in 2005 to $1.30 by 2009.</td>
<td>EPS has been climbing, rising from $1.10 in 2005 to $1.90 by 2009.</td>
</tr>
<tr>
<td>Earnings Forecasts</td>
<td>LFY’s EPS may increase to $1.50 by 2010. Ed Johnson, a highly regarded retail industry analyst predicted that LFY’s stock would rise 5% during 2010.</td>
<td>LFY’s EPS may increase to $2.10 by 2010. Ed Johnson, a highly regarded retail industry analyst predicted that LFY’s stock would rise 15% during 2010.</td>
</tr>
<tr>
<td>Debt covenant</td>
<td>At year-end 2009, LFY’s unused existing lines of credit equaled $190 million, approximately 45% of total lines of credit.</td>
<td>At year-end 2009, LFY’s unused existing lines of credit equaled $190 million, approximately 10% of total lines of credit.</td>
</tr>
</tbody>
</table>

4.1.3 Tests of Hypotheses

In order to test H1a, the SAS No. 99 categorization treatment is compared against the W&Z decomposition treatment as illustrated on Figure 4.2. The relative effect of categorizing fraud risk factors along the fraud triangle components is expected to emerge. Furthermore, the comprehensive assessment is compared against the SAS No. 99 categorization and the W&Z decomposition treatment to test H1b as presented in Figure 4.3. It is expected that the comprehensive assessment will provide the most accurate fraud risk assessment.
Figure 4.2

Test of H1a:

Effect of Categorization of Fraud Triangle Components

W&Z decomposition treatment

Review client information

Component Assessment

Overall Assessment

SAS No. 99 Categorization treatment

Review client information

Categorization of fraud triangle dimensions

Component Assessment

Overall Assessment
The Effect of Consideration of Fraud Risk Attributes

**Figure 4.3**

Test of H1b:

SAS No. 99 Categorization treatment

1. Review client information
2. Categorization of fraud triangle dimensions
3. Component Assessment
4. Overall Assessment

Comprehensive assessment treatment

1. Review client information
2. Categorization of fraud triangle dimensions
3. Consideration of fraud risk attributes
4. Component Assessment
5. Overall Assessment
The median NFC was used to split the sample into two groups: low in NFC and high in NFC for each assessment procedures. Then, the variance of median-split responses by assessment procedures is used to test H2. The dispersion or variance of low-in-NFC responses using the comprehensive assessment is predicted to be smaller than that of low-in-NFC responses using the W&Z decomposition and the SAS No. 99 categorization. On the contrary, the distribution of high-in-NFC responses is predicted to be more homogeneous regardless of assessment procedures. The visual illustration of the predictions is presented in Figure 4.4.

**Figure 4.4**

Test of H2:

The Predicted Distribution of MAE

Low in NFC

High in NFC

W&Z decomposition

SAS No. 99 categorization

Comprehensive assessment
4.2 Participants

Fraud risk assessment is considered a multi-attribute, high-level judgment task that requires knowledge, experience, and reasoning (Loebbecke et al., 1989). Practicing audit seniors in public accounting are suitable participants because they have sufficient knowledge, experience and training to perform the experimental task (Tan & Kao, 1999; Webber et al., 2006). Discussion with audit partners confirmed that staff and senior auditors are appropriate proxies for testing hypotheses because they are responsible in conducting fraud risk assessment and have enough fraud-specific experiences but relatively less than do managers and partners who are considered experts.

4.3 Procedures

Solicitations were sent to audit firms for research participation. Audit partners reviewed the instrument to make sure that it did not involve ethical, political, or sensitive issues. After audit firms agreed to participate, the instruments and instructions with paid-postage and pre-addressed envelopes were delivered to the audit firms’ representatives. Before delivering the instruments to representatives, the cases and assessment procedures were randomly ordered to mitigate uncontrolled influences across treatment conditions (Rosenthal & Rosnow, 1991; Shadish, Cook & Campbell, 2001; Sweeney & Roberts, 1997). Office representatives distributed research instruments to audit seniors. Each instrument packet contained a cover letter explaining research objectives and instructions to complete the task, a hypothetical case, a questionnaire attached to the case.
A cover letter provided to participants contained an informed consent statement and instructions. The letter explained the research objectives and practical contributions. Participants were assured that their participation was voluntary and their responses were anonymous. Participants were informed that it took approximately 15 minutes to complete the task. The researcher asked participants not to discuss the materials with colleagues. After reading the case, auditors completed the fraud risk assessments according to their experimental treatments (see Figure 4.1 Assessment Procedure Treatments). The instrument also clarified that there was no absolute correct or incorrect answers for the questions. All participants responded to the NFC scale (Cacioppo et al., 1996) and a skepticism scale. The skepticism scale has been developed in this study (see section 4.5.3). At the end of the experimental task, participants provided their demographic information. Lastly, auditors responded to a manipulation check question. Participating auditors mailed the completed instrument in the pre-stamped and pre-addressed envelope directly to the researcher. The number of responses and response rate are discussed in Section 5.1.

4.4 Case Materials

A two-page scenario instructs the participant to assume the role of an auditor who is in charge on a client engagement (see Appendix B). The in-charge auditor is performing an evaluation of the control environment and assessing fraud risk. The scenario was adapted from Knapp (2006) and discusses a hypothetical client with its background and current business environment. The client is a women’s apparel company.
subject to rapid changes and serious competition in the fashion industry. The case was chosen because the nature of business does not require industry-specific knowledge and was based on an actual fraud case. The description of management adopted from Wilks and Zimbelman (2004a) indicates positive management characteristics. The company has reported a positive auditor-client relationship. The scenario discusses the complications of financial statement preparation due to the inefficiency of the current accounting systems. The company is facing competition in the fashion industry coupling with the recent economic downturn. The company reported steady sales growth even though key competitors reported slowing sales and large inventory write-down. In addition, the company reported high in-transit inventory as a general course of business. Earnings forecasts from analysts and debt covenants are included.

As mentioned in Section 4.1.2, eight fraud risk factors are manipulated (Table 4.2), such as weak internal controls and excessive pressure on management to meet financial targets. To ensure that the case was realistic, a pilot test was conducted with 25 graduate accounting students who had some audit experience (Asare & Wright, 2003; Hammersley, 2006; Moroney, 2007). The overall assessment of the higher risk scenario ($M = 7.67, SD=0.256, n = 12$) is marginally higher than that of the lower risk scenario ($M = 7.00, SD=0.376, n = 13$), $t = 1.442$, $df = 23$, $p = .082$. The pilot test also asked participants what they thought about the scenario and instrument. Minor revisions were completed based on participants’ comments from the pilot test.
4.5 Measurement

4.5.1 Dependent Variable

The measured dependent variable is the quality of fraud risk judgments. The participants assessed the likelihood of management fraud on a 10-point scale anchored with 1 (Low) and 10 (High). To establish a benchmark for gauging quality, an expert panel voluntarily reviewed the cases and assessed the fraud risk of the hypothetical client. Six audit partners and six audit senior managers agreed to perform the fraud risk assessment task anonymously. Table 4.3 presents the descriptive statistics. The average age is 38.64 years old ($SD = 6.961$). Six experts reported the number of fraud incidents discovered ranging from 1 to 3; the other six reported that they never experienced fraud during their engagements. Between high and low risk conditions, Mann-Whitney tests indicated that there was no significant difference in the number of fraud incidents discovered ($U = 17, p = .863, r = -.05$) as well as by rank (partners vs. managers; $U = 10, p = .575, r = -.16$).

The consensus of the auditors’ assessments with experts’ assessments is a proxy for the quality of fraud risk judgments (Solomon & Shields, 1995; Trotman, 1998; Ashton, 2010; Trotman, 2010). The closer participants’ assessment is to the expert panel consensus assessment, the more accurate their judgment. The mean absolute error/difference (MAE) is a measure of judgment performance (Leung & Trotman, 2005; Leung & Trotman, 2008). MAE is derived from the following formula.

$$MAE = |\text{Participant’s overall assessment} - \text{Experts’ average overall assessment}|$$
The smaller MAE scores indicate the closer to the experts’ assessments suggesting the more accurate assessment; the higher MAE scores indicate less accurate the assessment is. The mean overall assessments for the higher risk and lower risk conditions, $M = 6.67$ ($SD = .516$) and $M = 7.33$ ($SD = .816$), respectively ($t = -1.69$, $df = 8.5$, $p = .06$). These averages are used as benchmark in the aforementioned formula to derive MAE.

MAE is the feasible measure of audit judgment quality for this study. Several drawbacks of the MAE are discussed. Firstly, the reference point for this measure is an average fraud risk assessments from a group of experts, audit partners and audit senior managers. There is no way to determine whether this referent group of experts provides the most accurate responses. However, this is the reference available in the experimental setting and is suitable to achieve the objectives of the dissertation. Secondly, the measure is unable to present whether the fraud risk assessments, as a result of treatment manipulation, are significantly lower or higher than the expert panel. The lower or higher scores, from practical standpoints, may influence how audit procedures are planned and conducted considerably. The use of MAE is useful when the degree of deviation from an expert panel is the variable of interest in this study.
Table 4.3
Descriptive statistics from Expert Respondents
Means and standard deviation in parentheses

<table>
<thead>
<tr>
<th></th>
<th>Low risk</th>
<th>High risk</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Age</td>
<td>38.17 (8.424)</td>
<td>39.20 (5.630)</td>
<td>38.64 (6.961)</td>
</tr>
<tr>
<td>Overall assessment</td>
<td>6.67 (.516)</td>
<td>7.33 (.816)</td>
<td>7.00 (.739)</td>
</tr>
<tr>
<td>Opportunity</td>
<td>6.83 (.408)</td>
<td>8.00 (1.095)</td>
<td>7.42 (.996)</td>
</tr>
<tr>
<td>Incentive</td>
<td>7.17 (.983)</td>
<td>6.83 (1.169)</td>
<td>7.00 (1.044)</td>
</tr>
<tr>
<td>Attitude</td>
<td>5.33 (1.966)</td>
<td>5.67 (1.633)</td>
<td>5.50 (1.732)</td>
</tr>
</tbody>
</table>

4.5.2 NFC

NFC is measured using the 18-item short-form version of the NFC scale (Cacioppo et al., 1996; Cacioppo et al., 1984) reprinted in Table 4.4. The scale is a well validated, single-factor, individual-difference measure assessing individuals’ intrinsic enjoyment of thinking (Cacioppo et al., 1996). The responses to each item are reported on a scale of 1 (extremely uncharacteristic) to 7 (extremely characteristic). Nine of the 18 items in the scale were reverse coded. It possessed high internal consistency (Cronbach’s $\alpha = .90$) and high test-retest reliability with the test-retest correlations of .88 and .66 in prior studies confirming the temporal stability of people’s scores on the NFC (Cacioppo et al., 1996). The Cronbach’s $\alpha$ of NFC in the current study is .868.13

13 The Cronbach’s alpha based on the standardized items is .876.
<table>
<thead>
<tr>
<th>Item</th>
<th>Reverse Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would prefer complex to simple problems.</td>
<td></td>
</tr>
<tr>
<td>I like to have the responsibility of handling a situation that requires a lot of thinking.</td>
<td></td>
</tr>
<tr>
<td>Thinking is not my idea of fun. (R)</td>
<td></td>
</tr>
<tr>
<td>I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. (R)</td>
<td></td>
</tr>
<tr>
<td>I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something. (R)</td>
<td></td>
</tr>
<tr>
<td>I find satisfaction in deliberating hard and for long hours.</td>
<td></td>
</tr>
<tr>
<td>I only think as hard as I have to. (R)</td>
<td></td>
</tr>
<tr>
<td>I prefer to think about small, daily projects than long-term ones. (R)</td>
<td></td>
</tr>
<tr>
<td>I like tasks that require little thought once I’ve learned them. (R)</td>
<td></td>
</tr>
<tr>
<td>The idea of relying on thought to make my way to the top appeals to me.</td>
<td></td>
</tr>
<tr>
<td>I really enjoy a task that involves coming up with new solutions to problems.</td>
<td></td>
</tr>
<tr>
<td>Learning new ways to think doesn’t excite me very much. (R)</td>
<td></td>
</tr>
<tr>
<td>I prefer my life to be filled with puzzles that I must solve.</td>
<td></td>
</tr>
<tr>
<td>The notion of thinking abstractly is appealing to me.</td>
<td></td>
</tr>
<tr>
<td>I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.</td>
<td></td>
</tr>
<tr>
<td>I feel relief rather than satisfaction after completing a task that required a lot of mental effort. (R)</td>
<td></td>
</tr>
<tr>
<td>It’s enough for me that something gets the job done; I don’t care how or why it works. (R)</td>
<td></td>
</tr>
<tr>
<td>I usually end up deliberating about issues even when they do not affect me personally.</td>
<td></td>
</tr>
</tbody>
</table>

(R) Reverse coded items
4.5.3 Perceived Skepticism

This dissertation develops a skepticism measure, which differs from the purpose of the Hurtt’s professional skepticism scale (Hurtt, 2010). It is noteworthy to discuss Hurtt’s (2010) operationalization of professional skepticism. Due professional care requires the auditor adopt a skeptical mind set on their engagement (Ramos, 2003). Skepticism is an attitude that includes a questioning mind and a critical assessment of audit evidence (AICPA, 2002). Hurtt (2010) has developed and validated the scale measuring the skepticism construct emphasized in the auditing standards. The Hurtt’s scale taps six characteristics of professional skepticism: questioning mind, suspension of judgment, search for knowledge, interpersonal understanding, autonomy, and self-esteem. The scale developed in this study was designed to measure one dimension of skepticism; that is how individuals view themselves in terms of what knowledge and common perceptions they have about general environment. The current study concentrates on the global form. The scale does not refer to any context-specific information. It is deemed to be appropriate for the current study because the measure does not sensitize participants to be overly skeptical about the experimental task. To distinguish the skepticism scale developed in this dissertation from the recent work, it is worth discussing the philosophy work relevant to the general skepticism construct.

According to the skeptical tradition, a skeptic inquires into various topics which distinctively focus upon the question of whether or not we can have knowledge of the topic under examination and concludes either knowledge is possible or not (Landesman, 2002). Furthermore, even if individuals are in possession of knowledge, they cannot establish that they are. Landesman (2002) pointed the need to distinguish global from
local varieties. Global or radical skepticism questions the very framework within which particular inquiries occur and purports that we fail to have the knowledge we think we have. Skepticism involves making arguments whether any justification is possible at all, no matter what the subject matter. Local skepticism has arguments to restricted domains of human inquiry and interest, such as, religions, common-sense belief, ethical value and the self.

Landesman (2002) critically discussed the problem of knowledge and elements of skepticism: truism, realism and idealism. Truism claims that in order for us to gain knowledge of any object, the object must enter into our relation mediated by our senses. That is, we can establish our knowledge of the external world upon and limit by our perceptual access to objects. Based on the truism, human cannot gain any knowledge of objects that cannot be accessed via perceptual route. The transcendental realist claims that inquiry attempts to gain knowledge of objects as they are independently of our sensory perceptions and forms of thought. It is assumed that the mind adds features to the appearances, which fail to be exemplified by things-in-themselves. To accomplish the tasks of inquiry, individuals must determine fact about mental processing and to subtract those additions added by the mind to attain an adequate and true presentation of the object. The third view, transcendental idealism, assumes that objects must conform to our knowledge. Although the inference from the sensory data to the existence and character of the object is valid, idealism adopts the idea that such inference is not necessary for inquiry in the first place. The point of view of idealism allows individuals to have genuine knowledge of the external world which does not depend upon the inference from the ways things appear.
Elicited from the Landesman’s (2002) work, thirty-two items of the skepticism measure were initially drafted and refined. Please see Appendix A for the pilot test instrument. Items are anchored with 1 (strongly disagree) and 7 (strongly agree). Then, a pilot study was conducted with 118 undergraduate students with average age at 22 years old (49 women and 69 men). Undergraduate students are suitable for the pilot test of the scale since the scale aims to assess the skepticism in general, not in domain-specific settings. Ten items with corrected item-total correlations below .2 were eliminated. In Table 4.5, an exploratory factor analysis with the Principal Component Analysis and Promax rotation indicates three components extracted using SPSS version 16. Total variance explained was 43.59%. Items with loadings below .4 were excluded. The 13 items were retained with adequate reliability, Cronbach’s $\alpha = 0.798$, above a value of .70 as a lower acceptable bound of $\alpha$ (Nunnally & Bernstein, 1994).
<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>I usually question the validity of what I am told.</td>
<td>.854</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am questioning even when a position or viewpoint is quite persuasive.</td>
<td>.751</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to challenge conventional wisdom.</td>
<td>.746</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I get a piece of information, I usually think about the credibility of the source.</td>
<td>.733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am not easily convinced.</td>
<td>.570</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to thinks about the possible reasons underlying human behavior.</td>
<td></td>
<td>.871</td>
<td></td>
</tr>
<tr>
<td>I like to observe why people behave in a certain way.</td>
<td></td>
<td>.800</td>
<td></td>
</tr>
<tr>
<td>I always try to reconcile conflicting messages from different people.</td>
<td></td>
<td>.595</td>
<td></td>
</tr>
<tr>
<td>I am curious about what I experience and learn.</td>
<td></td>
<td>.448</td>
<td></td>
</tr>
<tr>
<td>I don’t like it when people say something vague or unclear.</td>
<td></td>
<td>.706</td>
<td></td>
</tr>
<tr>
<td>I cannot observe all dimensions of things.</td>
<td></td>
<td>.661</td>
<td></td>
</tr>
<tr>
<td>I like to know what people are thinking.</td>
<td></td>
<td>.567</td>
<td></td>
</tr>
<tr>
<td>I feel irritated when I don’t know the reason why an event happens in my life.</td>
<td></td>
<td>.506</td>
<td></td>
</tr>
</tbody>
</table>

*Principal Component Analysis and Promax rotation
1 = general skeptical
2 = skeptical about human behavior
3 = curiosity about unobservable things
4.5.4 Experience

Experience provides knowledge that helps auditors assign appropriate decision weights to the evidence they acquire because experience helps them develop more comprehensive knowledge structures and improves their ability to use that knowledge more effectively (Bonner, 1996; Kaplan et al., 2008; Libby & Luft, 1993). Professional experience likely influences auditors’ evaluative judgment (Kaplan et al., 2008). Irrelevant information did not significantly influence experienced auditors’ judgment (Shelton, 1999). Audit experience was associated with differences in identifying and assessing risks (Graham & Bedard, 2003). Audit seniors with less experience were influenced to a greater extent by a rating of management’s characteristics that was congruent with management’s self-interest than were audit seniors with more experience (Kaplan et al., 2008). In one study, audit seniors identified fewer fraud risk factors than managers or partners, but seniors tended to assess fraud risk relatively higher than managers or partners (Graham & Bedard, 2003). Knapp and Knapp (2001) suggested that audit managers were more effective than audit seniors in assessing the risk of fraud with analytical procedures.

In terms of fraud-specific experience, Johnson et al. (1991) found that auditors who had never encountered management fraud were less able to detect it than auditors who had encountered it, despite industry-specific experience. While staff auditors demonstrated greater skepticism in thought and behavior than seniors (Payne & Ramsay, 2005; Shaub & Lawrence, 1999), auditors with no knowledge of fraud were less skeptical than those had been exposed to high or moderate fraud risk assessments (Payne & Ramsay, 2005). Choo and Tan (2004) found the interaction effect of fraud-specific
experience and auditing tasks on the fraud risk judgments in a multi-audit task setting. Choo and Tan (2004) argued that auditors used their fraud-specific experience to make fraud risk judgments whether the assessment of risk factors related to the possible occurrence of fraud would have an effect on the planning task, evidence gathering, and reporting/disclosure task. High fraud-specific experienced auditors stored more knowledge of fraud in their memory; therefore, they recognized the presence of fraud faster than low fraud-specific experienced auditors did (Choo & Tan, 2004). Low fraud-specific experienced auditors adjusted their fraud risk judgments to a greater extent than high fraud-specific experienced auditors did. Auditors with more fraud-specific experience were more likely to believe that intentional misstatement had occurred than were auditors with less fraud-specific experience (Rose, 2007).

In brief, prior research indicates significant roles of audit and fraud specific experience in assessing financial statement fraud risk. The instrument asks auditors to provide the number of years of full-time audit experience. Two questions assess the fraud-specific audit experience: (a) the number of audit engagements where material fraud was discovered, and (b) how long they have experienced in assessing the risk of fraudulent financial statements\(^1\).

### 4.5.5 Other Measures

Additional demographic variables in the instrument include age, gender, highest educational level, professional position, area of practice and professional certificates

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\(^1\) Experience in fraud risk assessments is measured in terms of the number of months, instead of the number of years, because the study intends to acquire only the amount of time that audit seniors were directly in charge of assessing financial statement fraud which may not equal the full-time work experience in audit.
held. The instrument requires auditors record the time duration they spend to complete the experimental task.

4.5.6 Manipulation check

A manipulation check question was performed at the end of the instrument. The question asked participants to identify the current and forecasted earnings per share of the hypothetical client. See Appendix B for the question used in the research instrument.

4.6 Summary of Chapter Four

The research study employs a $3 \times 2$ between-participant design with three levels of assessment procedures (W&Z decomposition, SAS No. 99 categorization, and comprehensive assessment) and two levels of fraud risk (higher and lower). The self-administered experimental instrument packets were distributed via audit firm representatives. The experimental instrument packet contains a hypothetical scenario, questionnaire and pre-addressed, postage-paid envelope. The scenario describes a client’s background, accounting systems, current competitive environment, earnings trend and earnings forecast. Then, participants perform fraud risk assessments based on available information and respond to questions measuring individual factors and demographics.

To ensure the effectiveness of the treatment manipulations, the instrument was pretested with graduate students. The higher risk scenario was perceived as riskier than the lower risk scenario. The measurements used in the instrument are a series of fraud
risk assessments, NFC, skepticism, self-report time duration, manipulation check, and demographic. Overall assessment of fraud risk is compared to experts’ assessment to derive MAE, the measure of assessment performance. The 18-item NFC scale possesses high validity and reliability. The study develops a scale measuring skepticism based on global skepticism and theory of knowledge from philosophy literature. Demographic factors including experiences, age, gender, education, and certification, are collected. A complete copy of the research instrument is included in Appendix B.

The next chapter presents the results of the study including preliminary analyses, hypothesis testing, and supplemental analysis.
This chapter presents the statistical analyses and results of the study. First, the demographics and descriptive statistics are presented, followed by manipulation checks and preliminary tests. To test research hypotheses, ANOVA, planned comparisons and F tests were executed. Supplemental analyses using multiple regression analyses are performed.

5.1 Responses, Demographics and Descriptive Statistics

Of the 210 instrument packets distributed to five participating audit firms, 50 auditors participated anonymously and returned a completed instrument, for a response rate of 24%. Figure 5.1 illustrates the proportion of participants from each audit firm. Due to the confidentiality agreement between the researcher and the firms, firm names are disclosed as Firm A, B, C, D, and E. Forty percent of total responses is from Firm A, a national-level audit firm. Auditors from Firm B contribute to 12% of total responses. Twenty-two percent is from Firm C. Firm D provides 4% of total responses. The responses from Firm E are 22%.

Table 5.1 presents the number of instrument packets delivered and returned as well as the response rate by firms.
Figure 5.1
Proportion of Responses by Firms

![Pie chart showing the proportion of responses by firms.]

Table 5.1
Response Rate

<table>
<thead>
<tr>
<th>Firm</th>
<th>Firm size</th>
<th>Number of instrument packets distributed</th>
<th>Response</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>National</td>
<td>90</td>
<td>20</td>
<td>22%</td>
</tr>
<tr>
<td>B</td>
<td>Big 4</td>
<td>30</td>
<td>6</td>
<td>20%</td>
</tr>
<tr>
<td>C</td>
<td>Big 4</td>
<td>30</td>
<td>11</td>
<td>37%</td>
</tr>
<tr>
<td>D</td>
<td>Big 4</td>
<td>30</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>E</td>
<td>Big 4</td>
<td>30</td>
<td>11</td>
<td>37%</td>
</tr>
</tbody>
</table>
The average age was 27.68 (SD = 3.04) with average 3.87 years of audit experience (SD = 1.01). Twenty-eight participants are female and 22 are male. Forty six participants have certification as a CPA. The demographics are printed in Table 5.2.

Table 5.2

Demographics

<table>
<thead>
<tr>
<th></th>
<th>Mean (Standard deviation)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>27.68 (3.04)</td>
<td>27</td>
</tr>
<tr>
<td>Experience:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audit (Years)</td>
<td>3.87 (1.01)</td>
<td>4</td>
</tr>
<tr>
<td>Fraud experience (Months)</td>
<td>25.10 (16.40)</td>
<td>24</td>
</tr>
<tr>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraud incidents discovered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>46 (92%)</td>
<td></td>
</tr>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>28 (56%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22 (44%)</td>
<td></td>
</tr>
<tr>
<td>Audit firms:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big-4</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>National</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
The first round of instrument distribution was conducted in December and resulted in the 28 complete responses returned (56%). The second wave of data collection was conducted in July and resulted in 22 complete responses (44%). Tests for response bias (Table 5.3) confirmed no significant differences in self-report time, demographics, NFC, and skepticism between the two rounds of data collection ($p > .05$). Response bias, therefore, is not a concern.

<table>
<thead>
<tr>
<th></th>
<th>Mann-Whitney $U$</th>
<th>Wilcoxon $W$</th>
<th>$Z$</th>
<th>$p^\dagger$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-report time</td>
<td>263.5</td>
<td>669.5</td>
<td>-.872</td>
<td>.383</td>
</tr>
<tr>
<td>Audit experience</td>
<td>249.5</td>
<td>655.5</td>
<td>-1.173</td>
<td>.241</td>
</tr>
<tr>
<td>Fraud experience</td>
<td>238</td>
<td>616</td>
<td>-1.208</td>
<td>.227</td>
</tr>
<tr>
<td>Fraud discovered</td>
<td>273.5</td>
<td>526.5</td>
<td>-.968</td>
<td>.333</td>
</tr>
<tr>
<td>Age</td>
<td>282</td>
<td>535</td>
<td>-.518</td>
<td>.605</td>
</tr>
<tr>
<td>Need for cognition</td>
<td>290</td>
<td>543</td>
<td>-.352</td>
<td>.725</td>
</tr>
<tr>
<td>Skepticism</td>
<td>279.5</td>
<td>685.5</td>
<td>-.558</td>
<td>.577</td>
</tr>
</tbody>
</table>

$^\dagger$two-sided $p$-values
Furthermore, Kruskal-Wallis tests were executed to examine the effect of audit firms. In Table 5.4, results show that the self-report time, demographic variables, NFC, and skepticism are not significantly different among five participating audit firms ($p > .05$).

<table>
<thead>
<tr>
<th>Independent variable: Audit Firms</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-report time</td>
<td>2.079</td>
<td>4</td>
<td>.721</td>
</tr>
<tr>
<td>Audit experience</td>
<td>6.470</td>
<td>4</td>
<td>.167</td>
</tr>
<tr>
<td>Fraud experience</td>
<td>3.462</td>
<td>4</td>
<td>.484</td>
</tr>
<tr>
<td>Fraud discovered</td>
<td>2.564</td>
<td>4</td>
<td>.633</td>
</tr>
<tr>
<td>Age</td>
<td>5.529</td>
<td>4</td>
<td>.237</td>
</tr>
<tr>
<td>Need for cognition</td>
<td>1.240</td>
<td>4</td>
<td>.871</td>
</tr>
<tr>
<td>Skepticism</td>
<td>1.785</td>
<td>4</td>
<td>.775</td>
</tr>
</tbody>
</table>

$^*$two-sided p-values
Table 5.5 presents descriptive statistics of measured variables of interest by
treatment manipulation. Under the W&Z decomposition and SAS No. 99 categorization
treatments, auditors in the lower risk condition rate the overall risk as lower compared to
auditors in the higher risk condition. An unexpected pattern of results is highlighted for
the comprehensive assessment treatment. Under the comprehensive assessment,
participants in the lower risk condition rate overall fraud risk as marginally higher than
those in the higher risk condition (lower risk: \( M = 7.25, SD = .96 \); higher risk: \( M = 6.00,
SD = 2.16 \)).

### Table 5.5

**Descriptive Statistics of Variables of Interest by Treatments**

<table>
<thead>
<tr>
<th>Variables</th>
<th>W&amp;Z Decomposition</th>
<th>SAS No. 99 Categorization</th>
<th>Comprehensive Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower</td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>Opportunity</td>
<td>5.46</td>
<td>7.00</td>
<td>5.50</td>
</tr>
<tr>
<td></td>
<td>(1.94)</td>
<td>(.67)</td>
<td>(2.07)</td>
</tr>
<tr>
<td>Incentive</td>
<td>6.38</td>
<td>7.30</td>
<td>5.67</td>
</tr>
<tr>
<td></td>
<td>(1.39)</td>
<td>(1.06)</td>
<td>(1.37)</td>
</tr>
<tr>
<td>Attitudes</td>
<td>3.62</td>
<td>4.30</td>
<td>3.50</td>
</tr>
<tr>
<td></td>
<td>(1.66)</td>
<td>(1.57)</td>
<td>(.84)</td>
</tr>
<tr>
<td>Overall assessment</td>
<td>5.62</td>
<td>6.70</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>(1.76)</td>
<td>(1.06)</td>
<td>(1.10)</td>
</tr>
<tr>
<td>NFC</td>
<td>83.54</td>
<td>96.80</td>
<td>91.67</td>
</tr>
<tr>
<td></td>
<td>(10.01)</td>
<td>(13.27)</td>
<td>(14.40)</td>
</tr>
<tr>
<td>Skepticism</td>
<td>64.69</td>
<td>62.60</td>
<td>60.33</td>
</tr>
<tr>
<td></td>
<td>(7.59)</td>
<td>(11.18)</td>
<td>(7.31)</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>
5.2 Manipulation Checks and Preliminary Results

All 50 participants passed the manipulation question. Therefore, all responses are included in the following data analyses. Assessment procedure manipulation is expected to influence the amount of time spent to complete the experimental task. As expected, the amount of time spent to complete the task positively correlates with the treatment manipulation (Pearson $r = .39$, $p = .005$). In particular, participants under the comprehensive assessment treatment on average spent more time ($M = 18.36$ minutes, $SD = 10.59$; see Table 5.6 Panel A) than other procedures (W&Z decomposition $M = 15.19$, $SD = 7.22$, and SAS No. 99 categorization $M = 10.74$, $SD = 5.70$). The results of the general linear model (GLM) printed in Table 5.6 Panel B show that the effects of firm factor, risk level, NFC and skepticism on self-report time are not significant. The interactive effect of procedure manipulation and risk level results in the different amount of self-report time spent to complete the experimental task, $F_{(2, 41)} = 3.24$, $p = .049$. 
Table 5.6

Self-Report Time Spent to Complete the Experimental Task

Panel A: Means and Standard Deviation in parentheses (in minutes)

<table>
<thead>
<tr>
<th>Assessment Procedures</th>
<th>Lower risk</th>
<th>Higher risk</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>W&amp;Z decomposition</td>
<td>8.62 (4.91)</td>
<td>13.50 (5.68)</td>
<td>10.74 (5.70)</td>
</tr>
<tr>
<td>SAS No. 99 categorization</td>
<td>13.83 (5.95)</td>
<td>16.00 (8.08)</td>
<td>15.19 (7.22)</td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td>24.00 (15.10)</td>
<td>15.14 (6.28)</td>
<td>18.36 (10.59)</td>
</tr>
</tbody>
</table>

Panel B: General Linear Model

Dependent variable: Self-report time spent to complete the experimental task

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>545.188</td>
<td>1</td>
<td>545.188</td>
<td>10.637</td>
<td>.002</td>
</tr>
<tr>
<td>Firm</td>
<td>18.800</td>
<td>1</td>
<td>18.800</td>
<td>.367</td>
<td>.548</td>
</tr>
<tr>
<td>NFC</td>
<td>21.622</td>
<td>1</td>
<td>21.622</td>
<td>.422</td>
<td>.520</td>
</tr>
<tr>
<td>Skepticism</td>
<td>45.294</td>
<td>1</td>
<td>45.294</td>
<td>.884</td>
<td>.353</td>
</tr>
<tr>
<td>Risk level</td>
<td>.268</td>
<td>1</td>
<td>.268</td>
<td>.005</td>
<td>.943</td>
</tr>
<tr>
<td>Procedures</td>
<td>417.179</td>
<td>2</td>
<td>208.589</td>
<td>4.070</td>
<td>.024</td>
</tr>
<tr>
<td>Procedures × Risk level</td>
<td>331.903</td>
<td>2</td>
<td>165.951</td>
<td>3.238</td>
<td>.049</td>
</tr>
<tr>
<td>Error</td>
<td>2101.490</td>
<td>41</td>
<td>51.256</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In addition, the correlation matrix in Table 5.7 shows that the demographic variables are not significantly correlated with the overall assessment, except the skepticism. The audit experience is positively related to the fraud risk assessment experience. Consequently, the GLM analysis was executed to determine whether demographic variables have a statistically significant effect on overall fraud risk assessments. Demographic variables are included as covariates in the model. The ANOVA results in Table 5.8 show that none of demographic variables is significant ($p > .05$). Skepticism and NFC are also not significant in the model. An interaction between assessment procedures and risk levels is significant, $F_{(2,31)} = 4.034$, $p = .028$. Therefore, the demographic variables, skepticism, and NFC scores are not included in the tests of hypotheses (H1a and H1b).

<table>
<thead>
<tr>
<th></th>
<th>Overall Assessment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1NFC</td>
<td></td>
<td>.129</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Skepticism</td>
<td>.292$^a$</td>
<td>.487$^b$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Audit Experience</td>
<td>-.166</td>
<td>.224</td>
<td>.019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4Fraud Experience</td>
<td>-.056</td>
<td>-.020</td>
<td>-.029</td>
<td>.548$^b$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5Fraud discovered</td>
<td>.030</td>
<td>.016</td>
<td>-.180</td>
<td>.149</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6Age</td>
<td>.152</td>
<td>.003</td>
<td>-.007</td>
<td>.033</td>
<td>-.033</td>
<td>-.153</td>
<td></td>
</tr>
<tr>
<td>7Firm</td>
<td>-.199</td>
<td>.049</td>
<td>.042</td>
<td>-.059</td>
<td>-.174</td>
<td>.107</td>
<td>.106</td>
</tr>
</tbody>
</table>

$^a$significance at the 0.05 level (two-sided)
$^b$significance at the 0.10 level (two-sided)
Table 5.8
ANOVA Result: Overall Fraud Risk Assessment

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.856</td>
<td>1</td>
<td>.856</td>
<td>.344</td>
<td>.561</td>
</tr>
<tr>
<td>Age</td>
<td>2.032</td>
<td>1</td>
<td>2.032</td>
<td>.817</td>
<td>.372</td>
</tr>
<tr>
<td>Gender</td>
<td>.089</td>
<td>1</td>
<td>.089</td>
<td>.036</td>
<td>.851</td>
</tr>
<tr>
<td>Fraud Experience</td>
<td>.158</td>
<td>1</td>
<td>.158</td>
<td>.064</td>
<td>.802</td>
</tr>
<tr>
<td>Fraud Discovered</td>
<td>.622</td>
<td>1</td>
<td>.622</td>
<td>.250</td>
<td>.620</td>
</tr>
<tr>
<td>Audit Experience</td>
<td>2.173</td>
<td>1</td>
<td>2.173</td>
<td>.874</td>
<td>.356</td>
</tr>
<tr>
<td>NFC</td>
<td>.025</td>
<td>1</td>
<td>.025</td>
<td>.010</td>
<td>.921</td>
</tr>
<tr>
<td>Skepticism</td>
<td>5.567</td>
<td>1</td>
<td>5.567</td>
<td>2.240</td>
<td>.143</td>
</tr>
<tr>
<td>Risk level</td>
<td>1.236</td>
<td>2</td>
<td>.618</td>
<td>.249</td>
<td>.781</td>
</tr>
<tr>
<td>Procedures</td>
<td>2.607</td>
<td>1</td>
<td>2.607</td>
<td>1.049</td>
<td>.313</td>
</tr>
<tr>
<td>Procedures × Risk</td>
<td>12.226</td>
<td>2</td>
<td>6.113</td>
<td>2.459</td>
<td>.100</td>
</tr>
<tr>
<td>Error</td>
<td>89.492</td>
<td>36</td>
<td>2.486</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = .300$ (Adjusted $R^2 = .107$)
5.3 Tests of Hypotheses

In order to test research hypotheses, the dependent variable, mean absolute expert error difference (MAE) was derived by subtracting individual assessment by the mean experts’ assessment. The MAE scores are used to determine the quality of auditors’ overall fraud risk assessment. Relative to the overall fraud risk assessment from the expert panel (please refer to section 4.5.1), the smaller MAE scores suggest the more consensus assessment; on the contrary, the higher MAE scores indicate the assessment highly deviates from the experts. Prior to conducting ANOVA, an evaluation of the underlying assumptions was performed (Rosenthal & Rosnow, 1991; Weinberg & Abramowitz, 2008). Figure 5.2, depicting the scatterplot of standardized residuals by participant ID, suggests that the randomization procedure was successful; thus, the independence of errors was met. The ratios of skewness to its standard error as well as the ratios of kurtosis to its standard error for each of treatment in Table 5.9 are less than 2 in magnitude, indicating that the normality assumption is tenable (Dean & Voss, 1999). The normal probability plots in Figure 5.3 provide support for the normality assumption. Because the sample sizes are unequal, test of homogeneity of variances is needed. The $F_{\text{max}}$ ratio$^{15}$ of 9.87 less than 10, the cutoff value suggested by Tabachnik and Fidell (2001), indicates that the homogeneity of variance can be assumed. On the contrary, Levene’s test of homogeneity of variance suggests unequal variances, $F_{(5, 44)} = 2.453, p = .048$. Although the ANOVA is very robust against the heterogeneity of variance, the tests for treatment differences (tests of H1A and H1B) can be severely affected. The results of

---

$^{15}$ The $F_{\text{max}}$ ratio is the proportion of the largest variance to smallest variance of treatment groups. Tabachnik and Fidell (2001) suggest the ratio is not greater than 10 and the ratio of largest sample size to smallest largest sample size is not greater than 4. The $F_{\text{max}}$ ratio can be used when the normality assumption is assumed. In this study, the sample size ratio is 3.25.
planned comparisons obtained are considered to be either too liberal or conservative and should be interpreted with extreme cautions.

Figure 5.2
Scatterplot of Standardized Residuals for MAE by Participant ID
### Table 5.9
Skewness and Kurtosis of MAE by Treatment Procedures and Risk Levels

<table>
<thead>
<tr>
<th>Treatment procedures</th>
<th>Skewness</th>
<th>Standard Error</th>
<th>Ratio †</th>
<th>Kurtosis</th>
<th>Standard Error</th>
<th>Ratio ‡</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low risk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W&amp;Z decomposition</td>
<td>.172</td>
<td>.616</td>
<td>0.28</td>
<td>-1.133</td>
<td>1.191</td>
<td>-0.95</td>
</tr>
<tr>
<td>SAS No. 99 categorization</td>
<td>1.369</td>
<td>.845</td>
<td>1.62</td>
<td>2.500</td>
<td>1.741</td>
<td>1.44</td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td>1.091</td>
<td>1.014</td>
<td>1.08</td>
<td>2.177</td>
<td>2.619</td>
<td>0.83</td>
</tr>
<tr>
<td><strong>High risk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W&amp;Z decomposition</td>
<td>.363</td>
<td>.687</td>
<td>0.53</td>
<td>-1.377</td>
<td>1.334</td>
<td>-1.03</td>
</tr>
<tr>
<td>SAS No. 99 categorization</td>
<td>-.132</td>
<td>.687</td>
<td>-0.19</td>
<td>-1.135</td>
<td>1.334</td>
<td>-0.85</td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td>.691</td>
<td>.794</td>
<td>0.87</td>
<td>.075</td>
<td>1.587</td>
<td>0.05</td>
</tr>
</tbody>
</table>

†Ratio = Skewness/Standard Error
‡Ratio = Kurtosis/Standard Error
Figure 5.3
Normal Probability Plots

Normal P-P Plot of MAE Overall Assessment

Expected Cum Prob vs. Observed Cum Prob

Normal Q-Q Plot of MAE Overall Assessment

Expected Normal Value vs. Observed Value
5.3.1 Hypotheses 1a and 1b: Effect of Assessment Procedures

Table 5.10 Panel A presents the means and standard deviation of MAE which suggest an interaction between assessment procedures and risk levels. To test H1a and H1b, a two-way analysis of variance was employed to analyze the relationship between MAE, assessment procedures, and risk levels. The explanatory variables in the ANOVA are assessment procedures, risk levels, and the two-way interaction of assessment procedures and risk levels. Table 5.10 Panel B reports the ANOVA results which reveals the significant interactive effect of assessment procedures and risk levels ($F_{(2,43)}=4.695$, $p=.014$). Planned comparisons of the MAE among treatments are performed and printed in Table 5.10 Panel C.

The first hypothesis (H1a) predicts that using the fraud risk judgment from the SAS No. 99 categorization should be of higher quality than the judgment from the W&Z decomposition. In other words, the MAE from the W&Z decomposition is expected to be higher than the MAE from the SAS No. 99 categorization. Unexpectedly, the results from Table 5.10 Panel B and mean plots in Figure 5.4 show the reverse pattern of MAE. Under the lower risk level, the mean MAE from the W&Z decomposition treatment is not significantly different from the mean response from the SAS No. 99 categorization treatment ($t_{(44)} = -.632$, $p = .266$). Likewise, under the higher risk level, the result is not significant ($t_{(44)} = -.907$, $p = .185$). Thus, H1a is not supported.
Table 5.10
MAE of Overall Fraud Risk Assessment

Panel A: Means and standard deviation in parentheses

<table>
<thead>
<tr>
<th>Risk level</th>
<th>Assessment Procedures</th>
<th>W&amp;Z decomposition</th>
<th>SAS No. 99 Categorization</th>
<th>Comprehensive assessment</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>W&amp;Z decomposition</td>
<td>2.024 (1.314)</td>
<td>2.330 (1.095)</td>
<td>.750 (.419)</td>
<td>1.882 (1.240)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n=13</td>
<td>n=6</td>
<td>n=4</td>
<td>n=23</td>
</tr>
<tr>
<td>Higher</td>
<td>W&amp;Z decomposition</td>
<td>.900 (.473)</td>
<td>1.298 (.762)</td>
<td>1.716 (1.147)</td>
<td>1.259 (.830)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n=10</td>
<td>n=10</td>
<td>n=7</td>
<td>n=27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.535 (1.165)</td>
<td>1.685 (1.007)</td>
<td>1.365 (1.039)</td>
<td>1.546 (1.074)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n=23</td>
<td>n=16</td>
<td>n=11</td>
<td>n=50</td>
</tr>
</tbody>
</table>

Panel B: ANOVA results – MAE

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>95.439</td>
<td>1</td>
<td>95.439</td>
<td>17.427</td>
<td>.142</td>
<td>.944</td>
</tr>
<tr>
<td>Median-split NFC</td>
<td>6.209</td>
<td>1</td>
<td>6.209</td>
<td>7.381</td>
<td>.009</td>
<td>.146</td>
</tr>
<tr>
<td>Procedure</td>
<td>2.401</td>
<td>2</td>
<td>1.201</td>
<td>1.427</td>
<td>.251</td>
<td>.062</td>
</tr>
<tr>
<td>Risk level</td>
<td>1.760</td>
<td>1</td>
<td>1.760</td>
<td>2.092</td>
<td>.155</td>
<td>.046</td>
</tr>
<tr>
<td>Procedure × Risk</td>
<td>7.900</td>
<td>2</td>
<td>3.950</td>
<td>4.695</td>
<td>.014</td>
<td>.179</td>
</tr>
<tr>
<td>Error</td>
<td>36.172</td>
<td>43</td>
<td>.841</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>176.005</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R² = .360 (Adjusted R² = .271)

Note: Median-split NFC is coded as follows: 0 = Low in NFC, and 1 = High in NFC.
Table 5.10 (Cont.)

Panel C: Planned Comparisons

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Procedure</th>
<th>Value of Contrast</th>
<th>SE</th>
<th>t</th>
<th>( p^\dagger )</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>W&amp;Z decomposition vs. SAS No.99 Categorization</td>
<td>-.306</td>
<td>.484</td>
<td>-.632</td>
<td>.266</td>
<td>H1a</td>
</tr>
<tr>
<td></td>
<td>SAS No. 99 categorization vs. Comprehensive assessment</td>
<td>1.580</td>
<td>.634</td>
<td>2.494</td>
<td>.008</td>
<td>H1b</td>
</tr>
<tr>
<td></td>
<td>W&amp;Z decomposition vs. Comprehensive assessment</td>
<td>1.274</td>
<td>.561</td>
<td>2.270</td>
<td>.014</td>
<td>H1b</td>
</tr>
<tr>
<td>Higher</td>
<td>W&amp;Z decomposition vs. SAS No.99 Categorization</td>
<td>-.398</td>
<td>.439</td>
<td>-.907</td>
<td>.185</td>
<td>H1a</td>
</tr>
<tr>
<td></td>
<td>SAS No. 99 categorization vs. Comprehensive assessment</td>
<td>-.418</td>
<td>.484</td>
<td>-.864</td>
<td>.196</td>
<td>H1b</td>
</tr>
<tr>
<td></td>
<td>W&amp;Z decomposition vs. Comprehensive assessment</td>
<td>-.813</td>
<td>.484</td>
<td>-1.687</td>
<td>.050</td>
<td>H1b</td>
</tr>
</tbody>
</table>

\( ^\dagger \)One-sided \( p \)-values
H1b posits that using the comprehensive assessment results in a higher quality fraud risk assessment because individuals pay more attention on fraud risk factors. The assessment using the comprehensive procedure should be of higher quality compared to the W&Z decomposition and the SAS No. 99 categorization. To test H1b, the relative effects of the comprehensive assessment on fraud risk judgment performance are compared. In other words, the MAE from the comprehensive assessment should be the lowest vis-à-vis the MAE from other assessment procedures. Planned comparisons in Table 5.10 Panel B indicate that the mean MAE using the comprehensive assessment is not uniformly significantly higher than the mean MAE using the other two procedures. Only when the risk level is manipulated as low, the comprehensive assessment provides lower MAE than the W&Z decomposition ($t_{(44)} = 2.270, p = .014$) and the SAS No. 99 categorization ($t_{(44)} = 2.494, p = .008$). On the other hand, when the fraud risk is presented as high, the mean MAE using the comprehensive assessment is significantly higher than the mean MAE using the W&Z decomposition ($t_{(44)} = -1.687, p = .050$). However, the value of contrast is opposite to the prediction. Thus, H1b is partially supported. The interaction between assessment procedures and risk levels as presented in Figure 5.4 indicates that the effectiveness of comprehensive assessment prevails only for the lower fraud risk condition.

The results of hypothesis tests may be attributed to the breadth of categorizations exposed. Ülkümen, Chakravarti and Morwitz (2010) propose that when individuals are exposed to narrow categorizations, in a subsequent judgment they are more likely to consider the fraud risk factor more than individuals exposed to broad categorizations. Narrow categorizations are defined as more fine-grained characterizations of an object,
while broad categorizations characterize an object into broad characterizations. For instance, wine can be categorized broadly into red and white as well it can be narrowly assorted as French-white, French-red, Italian-white, Italian-red, and so on. That is, broad categorizations have fewer pieces of information than do narrow categorizations. Ülkümen, et al. (2010) found that exposure to broad categorizations led individuals to make decisions based on fewer pieces of information. On the other hand, individuals exposed to narrow categorizations used more information in making their decisions.

Extrapolated from the categorization research in marketing, the comprehensive assessment provides auditors with narrower categorization of fraud risk factors, relative to the W&Z decomposition alone, and the SAS No. 99 categorization alone. Therefore, under the comprehensive assessment, auditors exposed to fraud triangle components and attributes of fraud risk factors and more likely processed the conflicting pieces on information. Additionally, in this experiment, the high fraud risk scenario contains more fraud risk factors than the lower fraud risk scenario. Auditors were likely to incorporate more information, both fraud risk increasing information and positive management characteristics to reach the overall assessment. That is, the conflicting messages and the multidimensional information processing from the comprehensive assessment manipulation result in the greater deviation from expert’s consensus. The next section investigates the variances of MAE in more details.
Figure 5.4

Interaction of risk levels and assessment procedures on MAE

![Graph showing the interaction of risk levels and assessment procedures on MAE. The graph plots the overall assessment of MAE against different assessment procedures (W&Z decomposition, SAS No. 99 categorization, and comprehensive assessment) for both lower and higher risk levels. The graph indicates how the assessment scores vary with different risk levels and assessment methods.]
5.3.2 Hypothesis 2: NFC

Hypothesis 2 predicts that the distribution of responses from low in NFC auditors is lowered due to the effect of assessment procedures. Participants were divided into two groups: high versus low in NFC participants, according to the median-split criteria (Echebarria-Echabe, 2010). The means and variances in Table 5.11 indicate an initial pattern of unequal variance. Figure 5.5 displays the scatterplots of MAE by assessment procedures and NFC. The variances under the comprehensive assessment are the lowest (low in NFC, $SD^2 = .301$ and high in NFC, $SD^2 = 1.391$), compared to the W&Z decomposition (low in NFC, $SD^2 = 1.016$ and high in NFC, $SD^2 = 1.738$), and SAS No. 99 categorization (low in NFC, $SD^2 = .465$ and high in NFC, $SD^2 = 1.767$). An ANOVA model in Table 5.12 shows that the significant interaction effect of assessment procedures and risk levels ($F_{(2,43)} = 3.202, p = .051$) but not NFC ($F_{(1,43)} = .022, p = .882$) on self-report time.
<table>
<thead>
<tr>
<th>Procedure</th>
<th>W&amp;Z decomposition</th>
<th>SAS No. 99 categorization</th>
<th>Comprehensive assessment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low in NFC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Risk</td>
<td>1.71 (1.308)</td>
<td>1.66 (.333)</td>
<td>.78 (.259)</td>
<td>1.49 (.916)</td>
</tr>
<tr>
<td></td>
<td>n = 7</td>
<td>n = 3</td>
<td>n = 3</td>
<td>n = 13</td>
</tr>
<tr>
<td>High Risk</td>
<td>.73 (.133)</td>
<td>1.28 (.536)</td>
<td>.89 (.485)</td>
<td>1.02 (.405)</td>
</tr>
<tr>
<td></td>
<td>n = 5</td>
<td>n = 7</td>
<td>n = 3</td>
<td>n = 15</td>
</tr>
<tr>
<td>Total</td>
<td>1.31 (1.016)</td>
<td>1.40 (.465)</td>
<td>.83 (.301)</td>
<td>1.24 (.672)</td>
</tr>
<tr>
<td></td>
<td>n=12</td>
<td>n=10</td>
<td>n=6</td>
<td>n=28</td>
</tr>
<tr>
<td>High in NFC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Risk</td>
<td>2.39 (2.283)</td>
<td>2.99 (1.333)</td>
<td>.67 (n.a)</td>
<td>2.34 (2.016)</td>
</tr>
<tr>
<td></td>
<td>n = 6</td>
<td>n = 3</td>
<td>n = 1</td>
<td>n = 10</td>
</tr>
<tr>
<td>High Risk</td>
<td>1.07 (.301)</td>
<td>1.33 (1.00)</td>
<td>2.34 (1.116)</td>
<td>1.56 (.939)</td>
</tr>
<tr>
<td></td>
<td>n = 5</td>
<td>n = 3</td>
<td>n = 4</td>
<td>n = 12</td>
</tr>
<tr>
<td>Total</td>
<td>1.79 (1.738)</td>
<td>2.16 (1.767)</td>
<td>2.00 (1.391)</td>
<td>1.938 (1.541)</td>
</tr>
<tr>
<td></td>
<td>n=11</td>
<td>n = 6</td>
<td>n=5</td>
<td>n=22</td>
</tr>
</tbody>
</table>
Figure 5.5

Scatterplots of MAE Overall Assessment
Table 5.12
ANOVA Result: Self-Report Time

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>$F$</th>
<th>$p$</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>9776.598</td>
<td>1</td>
<td>138.106</td>
<td>2.623</td>
<td>.030</td>
<td>.812</td>
</tr>
<tr>
<td>Median-split NFC</td>
<td>1.184</td>
<td>1</td>
<td>1.184</td>
<td>.022</td>
<td>.882</td>
<td>.001</td>
</tr>
<tr>
<td>Procedure</td>
<td>525.121</td>
<td>2</td>
<td>262.560</td>
<td>4.987</td>
<td>.011</td>
<td>.188</td>
</tr>
<tr>
<td>Risk level</td>
<td>4.110</td>
<td>1</td>
<td>4.110</td>
<td>.078</td>
<td>.781</td>
<td>.002</td>
</tr>
<tr>
<td>Procedure × Risk</td>
<td>337.199</td>
<td>2</td>
<td>168.599</td>
<td>3.202</td>
<td>.051</td>
<td>.130</td>
</tr>
<tr>
<td>Error</td>
<td>2264.084</td>
<td>43</td>
<td>52.653</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>12670.000</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = .821$ (Adjusted $R^2 = .792$)

*Note:* Median-split NFC is coded as follows: 0 = Low in NFC, and 1 = High in NFC.
H2 predicts that among low in NFC auditors, variance in the comprehensive assessment procedure \( (SD^2 = .301) \) is smaller than variances in the SAS No. 99 categorization \( (SD^2 = .465) \) and the W&Z decomposition \( (SD^2 = 1.016) \). Variances from each assessment procedure among auditors low in NFC are compared using the \( F \) statistic, the ratio of two variances. Table 15.3 Panel A shows that for low in NFC auditors, there is not enough evidence to support that variance in the SAS No. 99 categorization treatment is larger than variance in the comprehensive assessment treatment \( (F_{(9, 5)} = 1.548, p = .328) \) and smaller than variance in the W&Z decomposition treatment \( (F_{(11, 9)} = 2.185, p = .125) \). Variance in the comprehensive assessment procedure is significantly smaller than variance in the W&Z decomposition assessment \( (F_{(11, 5)} = 4.704, p = .095) \), consistent with H2. Furthermore, among high in NFC, variances among assessment treatments are not significantly different.

To further explore the effect of NFC and assessment procedures, results from Table 15.3 Panel B indicate that the variances of high in NFC responses are larger than those of low in NFC, under the SAS No. 99 categorization \( (F_{(5, 9)} = .3.80, p = .039) \) and the comprehensive assessment treatment \( (F_{(4, 5)} = 4.621, p = .062) \). However, the variances of low in NFC and high in NFC are not different under the W&Z decomposition \( (F_{(10, 11)} = 1.711, p = .196) \).

From the results of hypothesis tests, the manipulation of assessment procedures appears to be effective in reducing variances in MAE among low in NFC auditors. That is, the comprehensive assessment leads to the lowest MAE \( (M = .83, SD^2 = .301) \) compared to other procedures (see Table 5.11). Using the comprehensive assessment, high in NFC auditors provide the highest MAE \( (M = 2.00, SD^2 = 1.39) \). This phenomenon
may be attributed to the fact that low in NFC individuals can come to consensus more easily when arguments are not conflicting. The high consensus again means that there is high congruency among auditors but does not necessarily warrant the accuracy of fraud risk assessments. High in NFC individuals are more likely to investigate and process all dimensions of information and fraud risk factors available for them. As a result, the variances among high in NFC auditors are not significantly differences across assessment procedures.
Table 5.13
Tests of Differences in Variances

**Panel A: Differences among treatments**

<table>
<thead>
<tr>
<th></th>
<th>Low in NFC</th>
<th></th>
<th></th>
<th></th>
<th>High in NFC</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W&amp;Z decomposition vs.</td>
<td>2.185</td>
<td>11</td>
<td>9</td>
<td>.125</td>
<td>.983</td>
<td>10</td>
<td>5</td>
<td>.543</td>
</tr>
<tr>
<td>SAS No.99 Categorization</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAS No. 99 categorization vs.</td>
<td>1.548</td>
<td>9</td>
<td>5</td>
<td>.328</td>
<td>1.270</td>
<td>5</td>
<td>4</td>
<td>.420</td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W&amp;Z decomposition vs.</td>
<td>3.375</td>
<td>11</td>
<td>5</td>
<td>.095</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Panel B: Differences Between Low in NFC and High in NFC**

<table>
<thead>
<tr>
<th>Assessment procedures</th>
<th>F</th>
<th>df&lt;sub&gt;1&lt;/sub&gt;</th>
<th>df&lt;sub&gt;2&lt;/sub&gt;</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>W&amp;Z decomposition</td>
<td>1.711</td>
<td>10</td>
<td>11</td>
<td>.196</td>
</tr>
<tr>
<td>SAS No. 99 categorization</td>
<td>3.800</td>
<td>5</td>
<td>9</td>
<td>.039</td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td>4.621</td>
<td>4</td>
<td>5</td>
<td>.062</td>
</tr>
</tbody>
</table>

**Note:** \( F = \frac{s_{df_1}^2}{s_{df_2}^2}, df_1 = n_1-1; df_2 = n_2-1 \)
Furthermore, plots in Figure 5.6 suggest that low in NFC participants ($M = 1.24$, $SD = .82$) overall provided lower MAE *vis-à-vis* high in NFC participants ($M = 1.94$, $SD = 1.54$). Nonparametric statistical analysis is employed to test for the differences (results are not tabulated). For low in NFC participants, using different assessment procedures results in marginal differences in average MAE. Specifically, the MAE from the comprehensive assessment is higher than the MAE from the W&Z decomposition ($U = 26.50, p = .19$) and from the SAS No. 99 categorization ($U = 17, p = .09$). For high in NFC participants, different assessment procedures do not result in a significant difference in average MAE. Differences in responses from low in NFC auditor and high in NFC auditors are significant when using the comprehensive assessment ($U = 5, p = .082$), but not when using the SAS No. 99 categorization ($U = 18, p = .11$), and the W&Z decomposition ($U = 52, p = .213$).
Figure 5.6
Plots of Average MAE

A. Mean Plots of MAE across assessment procedures
B. Means Plots of MAE across levels of NFC

![Means Plots of MAE across levels of NFC](image)

- **Comprehensive assessment**
  - Low in NFC: 0.833
  - High in NFC: 2.002

- **SAS No. 99 Categorization**
  - Low in NFC: 1.398
  - High in NFC: 2.163

- **W&Z decomposition**
  - Low in NFC: 1.305
  - High in NFC: 1.786

**Assessment Procedures**

- Low in NFC
- High in NFC
5.3.3 Supplemental Analyses

Theoretical relationship between assessments of fraud triangle components and overall fraud risk assessment has not been well established in empirical work. To explore how auditors weight fraud triangle components relates to overall fraud risk assessment, auditors’ overall fraud risk assessments are regressed on the fraud-triangle component values to produce a measure of information usage ($\beta$ statistically greater than 0). The estimated beta coefficients in constant weighted averaging models indicate the relative importance of the fraud triangle components to overall fraud risk assessments (Anderson, 1981; Karren & Barringer, 2002). Table 5.14 presents the results of multiple regression models. In the W&Z decomposition, the beta coefficients of opportunity and incentive components are significant ($p = .082$ and $p = .023$) while the beta coefficient of attitude component is not significant ($p = .131$). The opportunity and incentive components are weighted and significantly influence the overall assessment in the SAS No. 99 categorization ($p = .023$ and $p = .058$). The attitude component does not significantly influence the overall assessment ($p = .627$). When auditors used the comprehensive assessment, the incentive and attitude components have a significant effect on overall assessment ($p = .044$ and $p = .068$).

The regression analysis findings in Table 5.14 show the different pattern of weighting from the Norman et al. (2010) study. That is, internal auditors, as participants in the Norman et al. (2010) study, weighted the fraud-triangle components differentially from auditors in the current study. Internal auditors significantly weighted the attitude component when using the W&Z decomposition. On the other hand, external auditors in this study focused more on the opportunity and incentive components. For the auditors
using the W&Z decomposition and the SAS No. 99 categorization, the opportunity and incentive components are significantly related to the overall fraud risk assessment. Furthermore, the regression analyses suggest that auditors using the comprehensive assessment significantly weighted and relied on the incentive and attitude components but not the opportunity components.
Table 5.14

Multiple Regression Analyses: Assessment Procedures

*Dependent Variable: Overall Fraud Risk Assessment*

<table>
<thead>
<tr>
<th>Model</th>
<th>Independent variables</th>
<th>B</th>
<th>SE</th>
<th>Standardized $\beta$</th>
<th>t</th>
<th>p†</th>
</tr>
</thead>
<tbody>
<tr>
<td>W&amp;Z decomposition</td>
<td>(Constant)</td>
<td>-.111</td>
<td>1.222</td>
<td>-.091</td>
<td>.928</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity</td>
<td>.256</td>
<td>.139</td>
<td>.276</td>
<td>1.839</td>
<td>.082</td>
</tr>
<tr>
<td></td>
<td>Incentive</td>
<td>.529</td>
<td>.215</td>
<td>.444</td>
<td>2.463</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>.266</td>
<td>.169</td>
<td>.276</td>
<td>1.578</td>
<td>.131</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$F = 11.201, p = .000$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R$^2 = .639$ (Adjusted R$^2 = .582$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAS No. 99 Categorization</td>
<td>(Constant)</td>
<td>.081</td>
<td>1.355</td>
<td>.060</td>
<td>.953</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity</td>
<td>.436</td>
<td>.167</td>
<td>.528</td>
<td>2.614</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>Incentive</td>
<td>.428</td>
<td>.204</td>
<td>.386</td>
<td>2.098</td>
<td>.058</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>.082</td>
<td>.165</td>
<td>.091</td>
<td>.499</td>
<td>.627</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$F = 8.475, p = .003$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R$^2 = .679$ (Adjusted R$^2 = .599$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive assessment</td>
<td>(Constant)</td>
<td>-2.520</td>
<td>2.662</td>
<td>-.947</td>
<td>.375</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity</td>
<td>.193</td>
<td>.165</td>
<td>.255</td>
<td>1.172</td>
<td>.279</td>
</tr>
<tr>
<td></td>
<td>Incentives</td>
<td>.758</td>
<td>.310</td>
<td>.524</td>
<td>2.444</td>
<td>.044</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>.369</td>
<td>.171</td>
<td>.476</td>
<td>2.156</td>
<td>.068</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$F = 5.488, p = .030$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R$^2 = .702$ (Adjusted R$^2 = .574$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†two-sided $p$-values
To gain more understanding of the weighting and NFC, two regression models are run separately for low in NFC and high in NFC auditors (see Table 5.15). Based on the prior research findings that individuals with higher NFC were more successful in problem solving, information gathering, and decision making on more aspects of the problem (Unnikrishnan Nair & Ramnarayan, 2000). Low in NFC individuals weighted the incentive component significantly ($p = .004$). Similarly, high in NFC individuals’ overall assessments were influenced by the incentive component ($p = .003$). Low in NFC auditors did not significantly consider the importance of the opportunity and attitude components ($p = .584$ and $p = .846$). On the contrary, the regression analysis for high in NFC shows the significant effect of the opportunity, incentive, and attitude components on overall assessments ($p = .000$, $p = .003$ and $p = .015$). The results indicate that level of NFC significantly relates to the extent to which auditors consider the fraud-triangle components when making an overall assessment of fraud risk. Individuals with high NFC are more likely to incorporate more dimensions of fraud triangle to make fraud risk judgment, compared to individuals with low NFC.
Table 5.15

Multiple Regression Analyses: NFC

*Dependent variable: Overall Fraud Risk Assessment*

<table>
<thead>
<tr>
<th>Model</th>
<th>Independent variables</th>
<th>$B$</th>
<th>SE</th>
<th>Standardized $\beta$</th>
<th>$t$</th>
<th>$p^\dagger$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low in NFC</td>
<td>(Constant)</td>
<td>1.967</td>
<td>1.105</td>
<td>1.780</td>
<td>.088</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity</td>
<td>.138</td>
<td>.098</td>
<td>.246</td>
<td>1.408</td>
<td>.172</td>
</tr>
<tr>
<td></td>
<td>Incentives</td>
<td>.430</td>
<td>.146</td>
<td>.476</td>
<td>2.941</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>.104</td>
<td>.122</td>
<td>.146</td>
<td>.859</td>
<td>.399</td>
</tr>
</tbody>
</table>

$F_{(3,27)} = 5.57, p = .005$

$R^2 = .410$ (Adjusted $R^2 = .337$)

| High in NFC      | (Constant)            | -2.520 | 1.052| -2.395                | .028   |             |
|                  | Opportunity           | .517   | .116 | .456                  | 4.466  | .000        |
|                  | Incentives            | .560   | .178 | .374                  | 3.155  | .005        |
|                  | Attitude              | .298   | .114 | .311                  | 2.610  | .018        |

$F_{(3,21)} = 34.79, p = .000$

$R^2 = .853$ (Adjusted $R^2 = .828$)

$^\dagger$two-sided $p$-values
5.4 Summary of Chapter Five

This chapter presents the descriptive statistics, preliminary analyses, tests of hypotheses and supplemental analyses. Fifty practicing auditors participated in the study. Tests of response bias were executed and found no evidence of response bias. Prior to hypothesis testing, the ANOVA model with time spent as a dependent variable, treatments and demographics as explanatory variables, shows that assessment procedures are effective to influence the self-report time spent to complete the task, consistent with the expectation. In addition, an ANOVA model with the overall assessment as a dependent variable, treatments and demographics as explanatory variables, shows that the interactive effect between assessment procedures and risk levels significantly affect the overall fraud risk assessments.

H1a predicts that the SAS No. 99 categorization results in a better judgment performance than the W&Z decomposition. That is, the MAE scores from the SAS No. 99 categorization procedure are expected to be lower than the MAE scores from the W&Z decomposition. The ANOVA does not lend support for H1a. H1b anticipated that the comprehensive assessment provides a higher judgment quality than the other two procedures. The ANOVA and planned comparisons provide partial support for H1b. The MAE scores from the comprehensive assessment is the lowest only under the lower fraud risk condition. H2 predicted that the comprehensive assessment should reduce the dispersion of low in NFC auditors’ assessments. The variance in the comprehensive assessment by low in NFC is significantly lower than the variance in the W&Z decomposition. The results partially support H2.
Supplemental analyses reveal how the fraud triangle component weights relate to the overall assessment. As expected, in all treatment condition, the weight of incentive is significant. Both in the W&Z decomposition and the SAS No. 99 categorization, auditors significantly weight the opportunity component. The attitude component is weighted significantly only under the comprehensive assessment. Additionally, multiple regression models were executed separately for low and high in NFC to investigate the effect of NFC as a motivational construct on the information usage. Apparently, low in NFC auditors significantly consider only the incentive component. High in NFC auditors consider all three fraud risk triangle components as the coefficients are all significant.

The dissertation demonstrates the effect of assessment procedures and fraud risk levels on the assessment quality, measured as MAE. The next chapter discusses the results of the study, the implications and future research avenue.
CHAPTER SIX
CONCLUSIONS

This final chapter begins with the summary of the dissertation. Then, the major results are discussed. The contributions are then presented. The chapter concludes with the limitations of the study and suggestions for further research.

6.1 Summary of the Study

This dissertation addresses the research question of the impact of the requirement and recommendation under SAS No. 99. The standard requires auditors to consider fraud risk factors along opportunity, incentive, and attitude components of fraud triangle when making fraud risk assessments. Auditors gather and categorize the pieces of information into fraud triangle components. The standard further recommends auditors to consider three attributes of fraud risk factors, namely, significance, likelihood, and pervasiveness. In spite of much research investigating antecedents of and techniques enhancing fraud risk assessments, none of studies examines whether the procedures under SAS No. 99 reinforce the quality of fraud risk assessments. For this reason, the study predicts that the categorization required under SAS No. 99 and the consideration of fraud risk attributes recommended under SAS No. 99 assist auditors in fraud risk assessments. The procedures as reasoning instructions motivate auditors to engage in systematic information processing and consequently increase quality of fraud risk assessments.
Accordingly, the fraud risk assessments are complex, multiple-attribute judgment
tasks. Such assessments require intense cognitive resources to cope with abundant and
conflicting information. Persuasion literature discusses that NFC as a personality trait
explains how individuals enjoy engaging in complex cognitive tasks. Similarly,
individual difference in NFC influences how auditors exert their cognitive effort to
perform fraud risk assessments. Although the positive relationship between NFC and
processing effort is highly correlated, some recent research found that strong contextual
factors could overshadow the influence of NFC. Low in NFC individuals exert the
cognitive effort as much as do high in NFC individuals when they receive appropriate
interventions. Correspondingly, the study predicts that the assessment procedures reduce
the influence of NFC on fraud risk assessments. Specifically, among auditors low in
NFC, the comprehensive assessment treatment provides more consistent assessments than
the W&Z decomposition and SAS No. 99 categorization.

To investigate the effect of the fraud risk assessment procedures required and
recommended under SAS No. 99, an experimental study is a suitable research method.
Fifty audit seniors participated in the $3 \times 2$ between-participants design with three levels
of assessment procedures (W&Z decomposition, SAS No. 99 categorization, and
comprehensive assessment) and two levels of fraud risk (low and high). The W&Z
decomposition is the baseline treatment for comparing the relative effect of the
procedures. The hypothetical scenario describes a client operating in the competitive
fashion industry facing downturn economic condition. Presence of fraud risk factors
indictive to higher and lower levels of fraud risk is manipulated. Auditors responded to a
series of questions after reviewing the client information.
The dependent variable is MAE derived from the absolute difference between auditors’ overall fraud risk assessment and expert panel’s overall fraud risk assessment. The expert panel serves as a benchmark to evaluate the quality of fraud risk judgment. The higher MAE indicates that the judgment is less consistent with the experts’ judgment. Likewise, the lower MAE indicates the higher degree of consistency. The experimental instrument includes a manipulation check question, NFC scale, skepticism scale, and demographic questions.

Before tests of hypotheses, preliminary analyses are performed to test for response biases, scale validity and the effectiveness of treatment manipulations. The results show that response biases are not a concern. The reliability of the NFC and perceived skepticism scales are sufficient. Treatment manipulations are successful in influencing the amount of time spent to complete the experimental task and the perceived fraud risk. The assumptions underlying ANOVA are met.

6.2 Discussion of Results

The effect of assessment procedures and fraud risk levels was tested using ANOVA. Demographics and personality traits are not significant in the ANOVA model. They are then excluded from proceeding analyses. The main effect of assessment procedures and fraud risk levels are not significant; but the interaction effect of two independent variables is significant. The planned comparisons are performed to test the hypotheses.

The results are not consistent with the prediction of the enhancing effect of
categorization procedure on fraud risk assessment. That is, the assessments from the SAS No. 99 categorization are not significantly different from those from the baseline treatment. Contrary to the proposition, the assessments from SAS No. 99 categorization are less congruent with the expert assessment than those from W&Z decomposition for both lower and higher fraud risk levels, although the magnitude is not significant.

The results provide support for the effect of consideration procedure exclusively under the lower fraud risk condition. Auditors in the comprehensive assessment perform significantly better than those in other two assessments. The assessments are better when employing the comprehensive assessment. Unexpectedly, the results in higher fraud risk condition show the more deviation of the auditors’ assessments from the expert assessment when using the comprehensive assessment.

In sum, the findings reveal that the categorization required by SAS No. 99 alone does not gain support for its effectiveness to improve fraud risk judgment quality under both lower and higher fraud risk conditions. Nevertheless, the categorization of fraud risk factors coupled with consideration of attributes of fraud risk factors recommended by SAS No. 99 effectively increase the judgment quality of fraud risk assessment when auditors make fraud risk assessment based on the lower fraud risk scenario. Conversely, the comprehensive assessment provides an opposite outcome when the scenario presents higher fraud risk. In the higher fraud risk condition, W&Z decomposition alone provides the more accurate assessment compared to other treatments. Furthermore, the assessments from the comprehensive assessment most highly deviated from the expert assessment. The results reveal that the effect of including categorization fraud risk factors along fraud triangle components and consideration of fraud risk attributes is conditional.
upon the levels of fraud risk present.

The less consistent assessment from using the comprehensive assessment is potentially attributed to the amount of fraud risk factors provided and the lengthy procedures required. That is, they may reconcile the scenario and fraud risk factors and then subconsciously narrow their thoughts to certain characteristics of the hypothetical client. Different auditors may anchor their judgments on different dimensions of fraud risk factors and result in the high variation. Additionally, the results in Table 5.11 highlight the tendency that the MAE dispersion from high in NFC auditors under both scenarios is high relative to low in NFC auditors. Thus, the effect of assessment procedures is partially influenced by NFC. An analysis of the three-way interaction among assessment procedure, fraud risk levels and NFC is definitely beneficial to explain the outcome. The unreported full ANOVA model shows that there is not enough evidence to support the significant effect of the two-way and three-way NFC interaction terms.

The second hypothesis predicts that the comprehensive assessment reduces the dispersion of fraud risk judgments among low in NFC auditors. Less variation in audit judgments, representing a desirable process of audit judgment, may imply higher judgment quality (Trotman, 1998). In particular, for low in NFC auditors, the variance within comprehensive assessment treatment is predicted to be smaller than that within other assessment treatments. The results are consistent with the prediction. However, there is no enough evidence to conclude that the variances from auditors high in NFC were smaller when they used the comprehensive assessment than when they used the W&Z decomposition and SAS No. 99 categorization. This finding must be interpreted with care because the small sample size may cause the results of F tests quite
conservative. Alternatively, the high congruency among low in NFC auditors may be caused by their natural tendency to rely on available fraud risk factors and narrow their problem set to only existing fraud risk factors. In the high in NFC group, variances within assessment procedure treatments are relatively higher than variances under low in NFC group. This may be explained that auditors high in NFC are in general considering more aspects of fraud risk factors available. Both fraud-risk decreasing and increasing information presented in the scenarios may sensitize high in NFC auditors to be more suspicious. As a consequence, the conflicting content together with the assessment approach lead to the high variation of assessments for high in NFC auditors.

To gain insight how component weights relate to overall fraud risk assessments, supplemental analyses were executed. The constant weighted averaging regression models demonstrate that incentive component influences the overall fraud risk assessments regardless of assessment methods. In the W&Z decomposition and SAS No. 99 categorization, auditors were influenced by their evaluation of incentive and opportunity components. Only under the comprehensive assessment, auditors placed significant relative important weights on attitude component. This shows that the comprehensive assessment increases auditors’ sensitivity to attitude component. Auditors were not influenced by their evaluation of opportunity component when using the comprehensive assessment. Categorizing fraud risk factors together with considering fraud risk attributes do not show a simple additive effect on fraud risk assessment.

The findings may be attributed to the breadth of categories presented in the research instrument. In particular, extensive marketing research argues that the externally imposed categories influence individuals’ subsequent decision making (Poynor & Diehl,
2007; Ülkümen, et al., 2010). Particularly, Ülkümen, et al. (2010) found that incidental exposure to broad versus narrow categorization relates to individuals’ information processing styles. By definition, broad categories refer to the fewer dimensions of object attributes. For instance, wine can be simply categorized as red and white. Narrow categories refer to the more dimensions of object attributes. For instance, wine can be classified by its countries of origin, viticultural areas, and vinification methods. Exposing with broad categories before making decisions, individuals base their decisions on fewer pieces of information that are salient. On the other hand, individuals previously exposed to narrow categorizations use more dimensions or multiple pieces of information. Ülkümen et al. (2010) argue that broad and narrow participants may be equally aware of all dimensions of information and therefore take the same amount of time to make their decisions, but participants may simply choose to weigh these dimensions differently.

Findings from Ülkümen, et al. (2010) study provide explanation for the current study. Fraud triangle components and attributes of fraud risk factors can be viewed separately as broad categorization of fraud risk cues. Employing only categorization of fraud risk factors along fraud triangle components does not improve the quality of fraud risk judgment because the broad categories of fraud triangle components perhaps fail to trigger multidimensional information processing. For the comprehensive assessment procedure, both procedures considered together can be viewed as narrower categories of fraud risk factors. That is, exposure to both fraud triangle components and attributes of fraud risk factors leads to better audit judgment because the narrow categorization exposure subconsciously activates individuals’ multidimensional information processing.
6.3 Contributions

This dissertation has several contributions, both academic and practical. A body of audit research has investigated antecedents of fraud risk assessments and techniques or procedures enhancing quality of fraud risk assessments (e.g. Asare & Wright, 2004; Wilks & Zimbelman, 2004a; Wilks & Zimbelman, 2004b). Hence, the dissertation extends and adds to the body of audit research by examining the requirement and recommendation under SAS No. 99 as the extensions of decomposition. The study investigates the effect of categorizing fraud risk factors along fraud triangle components and considering attributes of fraud risk factors on the quality of fraud risk judgment. Unlike recent research in fraud risk assessments, the study uses the expert assessment as a benchmark for audit judgment quality. The study also finds that NFC describes how auditors weight and relate those cues to the overall fraud risk assessments. Importantly, the comprehensive assessment reduces the variances within assessment procedure treatments. This more consistency in fraud risk assessments indicate higher quality in judgment.

From practical standpoint, the results show that considering both fraud triangle components and attributes of fraud risk factors can potentially improve audit judgment quality. Note that the effect of the procedures is conditional to fraud risk levels presented to auditors. Narrow categorization of fraud risk factors can engage auditors to process more dimensions of information. Training in specific categorization is plausible in practice. Chrysikou (2006) demonstrated that a certain kind of categorization training made people better at problem solving without spend more time in generating the solutions to those problems.
6.4 Limitations and Suggestions for Future Research

The current study, in particular, seeks to establish the evidence of causality. While the findings provide support for the relationship between assessment procedures and the quality of fraud risk assessments, limitations in the present study should be considered carefully before seeking to generalize the findings.

First, the study relies upon the responses from audit seniors identified by contact persons in five audit firms. A sample of audit seniors may strictly the ability to generalize these results to the population of more experienced auditors. Secondly, in the experiment, the hypothetical client information and task requirements are purposely limited to necessary information to perform the task, in order to increase internal validity. In particular, the evidence reported here is not, by itself, sufficient to deny the possible sensitivity of the results to characteristics of the decision context or to changes in environmental conditions. Thirdly, the instrument was distributed two rounds. In lieu of nonresponse bias testing, an analysis of first-distribution versus second-distribution responses was conducted and no differences were found. There is no mean to obtain the demographics of audit seniors who did not complete the instrument. Note that there is no economic incentive offered to the participants and that the responses rely on the fact that the study was voluntary. Fourth, sample size, although enough for testing the research hypotheses, is relatively small. Due to the mutual agreement between the researcher and participating firms, audit firms provide minimal contact information of liaisons in each office. Therefore, the researcher could only send reminders and follow-up messages to the contact persons instead of individual audit seniors. Fifth, the current study includes measures of demographics, skepticism and NFC, according to prior research, that
potentially influence the results. However, other unmeasured variables may have affected
the participants’ judgment performance. To illustrate, industry specialization may
influence the fraud risk assessment. The garment industry is chosen to rule out this
possibility because to audit this industry does not require specialized knowledge like
banking and financial institution.

Importantly, the decomposition approach in this study does not include the
algorithm combination rules to auditors, unlike the suggestions from Libby and Libby
(1989), because the optimal rules to integrate and form fraud risk assessments have yet
been identified. It is not possible in this study to observe or trace the processes of
decomposition and aggregation. This limits the ability to ascertain that participants
strictly followed the instructions. Additionally, separating a group of auditors into high
and low in NFC by median split criterion is questionable. The differences in NFC scores
between two groups may not be significant to represent the high and low in NFC.
However, the median split seems to be effective to a certain extent in distinguish two
levels of NFC in this study since the results in Table 5.11 show the different patterns of
fraud risk assessments. Finally, the MAE is a measure of audit judgment quality. This
measure has its own limitations. The expert panel provides the fraud risk assessments
with their best knowledge; however, the average assessments from the expert panel are
not necessarily the most accurate fraud risk assessments. That is, the MAE may not be the
best measure of accuracy but it is the most practical and appropriate for the research
design in this dissertation.

Even though the findings provide support for the relationship between assessment
procedures and the quality of fraud risk assessments, many questions remain unanswered.
The associations among fraud risk factors, fraud triangle components, and overall fraud risk assessments are not well understood. Replication of the fraud risk assessment procedures in other contexts and other groups of participants will help to better understand the mechanism underlying the judgment processes. Future research should consider the types of fraud risk factors, the number of fraud risk factors, and the extent to which fraud risk factors are attributable to fraudulent financial reporting.

There are different ways to assess and quantify fraud risk factors according to fraud triangle dimensions and the attributes. This study provides the result of categorizing and weighting fraud risk factors which is merely an interpretation of considering fraud risk factors. In addition, the literature revealed that practicing auditors conceptualize the dimensions of fraud triangle differently from SAS No. 99 classification of fraud risk factors (Wilks & Zimbelman, 2004a). The interaction of fraud triangle components can be varied upon the clients’ risk and environment.

Additional studies may focus on the breadth of categories of fraud risk factors. When considering fraud risk factors, increasing the dimensions of categories can activate the multidimensional thinking. In turn, it should enhance the fraud risk judgment quality. Another venue of fraud risk assessment research is to capture how auditors consider, use, weight the pieces of information to make the overall fraud risk assessment. Especially, how experienced auditors weight and integrate the components of fraud triangle as well as the attributes of fraud risk factors is a topic of interest. The policy-capturing methodology in organizational research can be utilized to capture individual judges’ decision-making policies (Zadeck, 1977; Karren & Barringer, 2002). The methodology can be used to identify the extent of individual differences in strategies and also to group
or cluster individual with similar policies.
REFERENCES


# APPENDIX A

## Skepticism Scale

For the following statements below, please decide how much you agree with each according to your beliefs and experiences. Remember that there is no right or wrong answers. The scale ranges from 1 to 7, with 1 = strongly disagree, and 7 = strongly agree.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am questioning about many widely held beliefs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to think about the possible reasons underlying human behavior.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I always try to reconcile conflicting messages from different people.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am always trusting.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I always question why I do what I do.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t like it when people say something vague or unclear.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before making a decision, I always think through the alternatives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am open to others’ opinions and ways of thinking, though they may be different from mine.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>I like to observe why people behave in a certain way.</td>
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<td>When I get a piece of information, I usually think about the credibility of the source.</td>
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<td>What people say can influence my decisions.</td>
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<td>People always act upon their thoughts.</td>
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<td>I very quickly see the one best way to solve a problem.</td>
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<tr>
<td>I am curious about what I experience and learn.</td>
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<tr>
<td>I am likely to put off my decisions until the last possible moment.</td>
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<td>I am not easily convinced.</td>
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<tr>
<td>I tend to make important decisions quickly and confidently.</td>
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<tr>
<td>The majority of people choose should be the best option.</td>
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<tr>
<td>I often fantasize about working in ways that are quite different from my current job.</td>
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<td>In making a decision, I often rely on circumstantial evidence that is readily available.</td>
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<tr>
<td>The ways things look, feel, sound, taste, and smell accurately represents the ways things are in reality.</td>
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<tr>
<td>People generally do not present themselves as they exactly are.</td>
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<tr>
<td>I feel irritated when I don’t know the reason why an event happens in my life.</td>
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<tr>
<td>I believe what I see, hear, and feel.</td>
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<tr>
<td>I like to know what people are thinking.</td>
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<tr>
<td>I cannot observe all dimensions of things.</td>
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<tr>
<td>When thinking about a problem, I consider many different perspectives on the issue.</td>
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<tr>
<td>I am questioning even when a position or viewpoint is quite persuasive.</td>
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<tr>
<td>I usually question the validity of what I am told.</td>
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<tr>
<td>I like to challenge conventional wisdom.</td>
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</tbody>
</table>
APPENDIX B
RESEARCH INSTRUMENT

MEMORANDUM

TO: JOHN SWEENEY and Pailin Trongmateerut,

FROM: Patrick Conner, Office of Research Assurances (3005)

DATE: 4/16/2009

SUBJECT: Certification of Exemption, IRB Number 10855-001

Based on the Exemption Determination Application submitted for the study titled The Impact of Assessment Strategies and Need for Cognition on Fraud-Risk Assessments, and assigned IRB # 10855, the WSU Institutional Review Board has determined that the study satisfies the criteria for Exempt Research contained in 45 CFR 46.101(b)(2).

This study may be conducted according to the protocol described in the Application without further review by the IRB.

This certification is valid only for the study protocol as it was submitted to the IRB. Studies certified as Exempt are not subject to annual review. If any changes are made to the study protocol, you must submit the changes to the IRB for determination that the study remains Exempt before implementing the changes. Request for Amendment forms are available online at http://www.irb.wsu.edu/forms.asp.

Exempt certification does not relieve the investigator from the responsibility of providing continuing attention to protection of human subjects participating in the study and adherence to ethical standards for research involving human participants.

In accordance with federal regulations, this Certification of Exemption and a copy of the study protocol identified by this certification must be kept by the principal investigator for THREE years following completion of the project.

Washington State University is covered under Human Subjects Assurance Number FWA00002946 which is on file with the Office for Human Research Protections.

If you have questions, please contact the Institutional Review Board at (509) 335-3668. Any revised materials can be mailed to the Office of Research Assurances (Campus Zip 3005), faxed to (509) 335-6410, or in some cases by electronic mail, to irb@wsu.edu.

Review Type: New
Review Category: Exempt
Date Received: 4/15/2009
Exemption Category: 45 CFR 46.101 (b)(2)
OGRD No.: N/A
Funding Agency: N/A

*It is important to note that certification of exemption is NOT approval by the IRB. You may not include the statement that the WSU IRB has reviewed and approved the study for human subject participation. Remove all statements of IRB Approval and IRB contact information from study materials that will be disseminated to participants.*

You have received this notification as you are referenced on a document within the MyResearch.wsu.edu system. You can change how you receive notifications by visiting https://MyResearch.wsu.edu/MyPreferences.aspx

Please Note: This notification will not show other recipients as their notification preferences require separate delivery.
July 22, 2010

Dear Participant:

First of all, I want to thank you for supporting this study, and I want to thank you for participating. Your participation will enable me to complete my dissertation and obtain my Ph.D. in Accounting. It has taken me five years of hard work to get to this point, which is why your responses to the enclosed questionnaire are so important. So again, thank you for your time and attention.

Enclosed please find a questionnaire. In recent years, there has been a lot of discussion concerning the risk of fraudulent financial reporting. Understanding how auditors think about and perform fraud risk assessments will help to improve audit procedures.

There is no direct benefit to you from being in this study. However, if you take part in this study, your responses will enhance our understanding of auditors’ professional judgments. The study does not involve sensitive ethical or political issues.

Participating in the study will take about 15 minutes. Please carefully read a limited set of information about an audit engagement, review and assess the risk of financial statement fraud for a hypothetical client. You will be asked to answer questions relevant to this hypothetical client, respond to some questions, and provide demographic information. There are no right answers: your honest responses are all that is needed. Additionally, please do not discuss the study with your colleagues as it may influence or affect their responses.

Your participation is completely voluntary. Your responses will be confidential, and you will not be asked to provide any identifying information. The results of this study will be reported only in aggregated data, and your materials will remain confidential.

If you have questions about this study, you can contact me, Pailin Trongmateerut at tpailin@wsu.edu at the Department of Accounting at Washington State University, or my dissertation advisor, Professor John T. Sweeney at jtsweeney@wsu.edu.

Thank you again for participation.

Sincerely,

[Signature]

Pailin Trongmateerut
Ph.D. Candidate in Accounting
SCENARIOS

LOW RISK

For the past four years, you have been working as an auditor for a large international accounting firm. You will be taking over as the current in-charge on the LFY engagement. You must perform an evaluation of LFY’s control environment and assess fraud risk. The LFY Companies, manufacturers of women’s apparel, are located in the heart of Manhattan’s bustling garment district. LFY’s principal customers are the department store chains that have flourished in large metropolitan areas. Dresses and suits constitute approximately 67 percent of sales.

Most of the LFY management team have been with the company since your firm began auditing the company five years ago. Your firm maintains a good working relationship with LFY and has found both management and the employees to be generally cooperative. Furthermore, several reliable sources of information indicate that the character of the management team is of high quality. Most people in the business community characterize LFY as being very supportive of social values and maintaining high ideals. This characterization stems largely from the principles of the management team.

The five top officers of LFY have been at the firm for 10-15 years. Chris, the son of the company’s founder, became the CEO after graduating from business school. Paul, the CFO, had been hired personally by the company’s founder after graduating with an accounting degree and rising quickly through the ranks of LFY. The internal audit department reports to the audit committee and demonstrates reasonable competence in performing its tasks.

Auditing LFY is somewhat cumbersome because the general ledger system is running on a platform different from the sales and inventory management systems. Current computerized systems are incompatible and not well integrated, requiring laborious data transfer, export, transformation and reconciliation. Accounting staff must put in sixteen hour shifts when closing the books. Presently, the company is hiring an IT consulting firm to implement an ERP system to remedy the problems.

The fashion industry in general and LFY in particular have been growing rapidly and increasingly competitive over the past four decades. LFY and other garment industry companies are subject to the ups and downs of fashion. The ever-increasing preference for more casual stylish apparel has dramatically impacted women’s dress sales. In recent periods, retailers have been critical of LFY’s dated product lines. The management
updated its marketing by inviting consumers to talk directly to the company. The approach paid off, LFY becomes a sophisticated, consumer-driven dress manufacturer.

Recently department stores have been cutting back on orders because they are having a hard time selling LFY products, in part due to serious competition from discount and outlet stores. Many department store chains that survived the recent economic downturn wrangled financial concessions from their suppliers. These concessions included longer payment terms, more lax return policies, and increased financial assistance to develop and maintain in-store displays, kiosks, and apparel boutiques. At the end of the year, LFY discussed in its most recent SEC 10-K form that approximately 20 percent of 2009 sales were estimated and booked as bad debts according to your firm’s recommendation, although LFY observed that those firms’ obligations were being paid on a timely basis.

Most companies in the women’s apparel industry, including LFY, have garment manufacturing operations located overseas. At the end of the fiscal 2009 year, LFY reported that the in-transit inventory production from overseas was nearly ten percent of the reported year-end inventory.

The structural and economic changes affecting the women’s apparel industry during the late 2000s has had a major impact on most of its leading companies. Even Liz Claiborne, a major competitor, whose revenues had zoomed from $47 million in 2003 to more than $1 billion by 2009, faced slowing sales from its major product lines and was eventually forced to take large inventory write-downs. Occasionally, industry publications reported modest quarterly sales increases. Despite the trauma being experienced by its key competitors, LFY reported stable sales and earnings throughout the mid and late 2000s.

Since 2003, gross margins have stayed between 30-32% of sales, and selling, general and administrative expenses remained at approximately 22-23% of sales. EPS has been climbing, rising from $1.05 in 2005 to $1.30 by 2009. Department stores are likely to concentrate on suppliers offering nationally known brands at a variety of price points. Analysts believe that LFY’s marketing initiatives and plans bode well for the future. Value Line indicates that LFY’s EPS may increase to $1.50 by 2010. Ed Johnson, a highly regarded retail industry analyst predicted that LFY’s stock would rise 5% during 2010. At year-end 2009, LFY’s unused existing lines of credit equaled $190 million, approximately 45% of total lines of credit.
HIGH RISK

For the past four years, you have been working as an auditor for a large international accounting firm. You will be taking over as the current in-charge on the LFY engagement. You must perform an evaluation of LFY’s control environment and assess fraud risk. The LFY Companies, manufacturers of women’s apparel, are located in the heart of Manhattan’s bustling garment district. LFY’s principal customers are the department store chains that have flourished in large metropolitan areas. Dresses and suits constitute approximately 67 percent of sales.

Most of the LFY management team have been with the company since your firm began auditing the company five years ago. Your firm maintains a good working relationship with LFY and has found both management and the employees to be generally cooperative. Furthermore, several reliable sources of information indicate that the character of the management team is of high quality. Most people in the business community characterize LFY as being very supportive of social values and maintaining high ideals. This characterization stems largely from the principles of the management team.

The five top officers of LFY have been at the firm for 10-15 years. Chris, the son of the company’s founder, became the CEO after graduating from business school. Paul, the CFO, had been hired personally by the company’s founder after graduating with an accounting degree and rising quickly through the ranks of LFY. The internal audit department reports to the audit committee and demonstrates reasonable competence in performing its tasks. Both Chris and Paul are ambitious and hard driving.

Auditing LFY is somewhat cumbersome because the general ledger system is running on a platform different from the sales and inventory management systems. Current computerized systems are incompatible and not well integrated, requiring laborious data transfer, export, transformation, and reconciliation. Accounting staff must put in sixteen-hour days when closing the books.

The fashion industry in general and LFY in particular have been growing rapidly and competition has increased over the past four decades. LFY and other garment industry companies are subject to the ups and downs of fashion. The ever-increasing preference for more casual stylish apparel has a dramatically impacted women’s dress sales. In recent periods, retailers have been critical of LFY’s dated product lines. The management updated its marketing by inviting consumers to talk directly to the company. The approach paid off, and LFY became known as a sophisticated, consumer-driven dress manufacturer.
Recently, large department store chains have cut back on orders because they are having a hard time selling LFY products, in part due to serious competition from discount and outlet stores. Many department store chains that survived the recent economic downturn negotiated financial concessions from their suppliers. These concessions included longer payment terms, more lax return policies, and increased financial assistance to develop and maintain in-store displays, kiosks, and apparel boutiques.

At year end, LFY discussed in its most recent SEC 10-K form that approximately 20 percent of 2009 sales were to major clients that have incurred significant debt as a result of leveraged buyouts or similar transactions.

Most companies in the women’s apparel industry, including LFY, have garment manufacturing operations located overseas. At the end of fiscal 2009 year, LFY reported that the in-transit inventory production from overseas was nearly twenty percent of the reported year-end inventory. Due to its antiquated inventory management systems, the company cannot keep track of inventory effectively, and sales reps are forced to monitor their sales by telephoning large customers on a weekly basis.

The structural and economic changes affecting the womens’ apparel industry during the late 2000’s has had a major impact on most of its leading companies. Even Liz Claiborne, a significant competitor, whose revenues had zoomed from $47 million in 2003 to more than $1 billion by 2009, faced slowing sales from its major product lines and was eventually forced to take large inventory write-downs. Occasionally, industry publications reported modest quarterly sales increases. Despite the trauma being experienced by its key competitors, LFY reported impressive sales and earnings throughout the mid and late 2000s.

Earlier in 2009, when summer orders had not picked up, Chris ordered price cuts across the board. The company began offering retailers rebates of millions of dollars if they had to slash prices on LFY’s apparel to move their inventory. The plan appears to have succeeded because LFY met its earnings goals for 2009. LFY reported that annual sales increased on average 15 percent in recent years, and the CEO contends that the company will be able to maintain the trend.

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1 Markdown money represents promises to retailers of cash rebates (or discounts on future orders) should goods need to be marked down to be sold to the retail customer. Markdown money is a prevalent apparel-industry practice.
Since 2003, gross margins have stayed between 30-32% of sales, and selling, general and administrative expenses remained at approximately 22-23% of sales. EPS has been climbing, rising from $1.10 in 2005 to $1.90 by 2009. Department stores are likely to concentrate on suppliers offering nationally known brands at a variety of price points. Analysts believe that LFY’s marketing initiatives and plans bode well for the future. Value Line indicates that LFY’s EPS may increase to $2.10 by 2010. Ed Johnson, a highly regarded retail industry analyst predicted that LFY’s stock would rise 15% during 2010. At year-end 2009, LFY’s unused existing lines of credit equaled $190 million, approximately 10% of total lines of credit.
CATEGORIZATION OF FRAUD RISK FACTORS ALONG FRAUD TRIANGLE COMPONENTS

Here is the list of fraud risk factors (red flags) concerning the LFY.

Based on the information about the client, categorize the factors to one of the fraud triangle dimensions.

<table>
<thead>
<tr>
<th>Fraud risk factors</th>
<th>Incentive</th>
<th>Opportunity</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>High vulnerability to rapid changes, such as changes in technology, product obsolescence, or interest rates.</td>
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<tr>
<td>Domination of management by a single person or small group without compensation controls</td>
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<tr>
<td>Significant operations located or conducted across international borders in jurisdictions where differing business environments and cultures exist</td>
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<tr>
<td>Profitability or trend level expectations of investment analysts, institutional investors, significant creditors, or other external parties (particularly expectations that are unduly aggressive or unrealistic), including expectations created by management in, for example, overly optimistic press releases or annual report messages</td>
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</tr>
<tr>
<td>Excessive interest by management in maintaining LFY’s earnings trend.</td>
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<tr>
<td>Inadequate monitoring controls, including automated controls and controls over interim financial reporting (where external reporting is required).</td>
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<tr>
<td>Rapid growth or unusual profitability especially compared to that of other companies in the same industry.</td>
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</table>
CONSIDERATION OF ATTRIBUTES OF FRAUD RISK FACTORS

Here is the list of fraud risk factors (red flags) concerning the LFY.

Based on the information about the client, rate the factors for each dimension.

For each applicable factor, rate EACH dimension below on a scale from 1(low) to 10 (high):

- **Significance** in terms of whether its magnitude could lead to a possible material misstatement of the financial statements.
- **Likelihood** is that the potential risk will probably result in a material misstatement in the financial statements.
- **Pervasiveness** in terms of whether the potential risk is pervasive to the financial statements as a whole or specifically related to a particular transaction.

<table>
<thead>
<tr>
<th>Fraud risk factors</th>
<th>Significance</th>
<th>Likelihood</th>
<th>Pervasiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>High vulnerability to rapid changes, such as changes in technology, product obsolescence, or interest rates.</td>
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<tr>
<td>Domination of management by a single person or small group without compensation controls</td>
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<tr>
<td>Profitability or trend level expectations of investment analysts, institutional investors, significant creditors, or other external parties (particularly expectations that are unduly aggressive or unrealistic), including expectations created by management in, for example, overly optimistic press releases or annual report messages</td>
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<tr>
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<tr>
<td>Rapid growth or unusual profitability especially compared to that of other companies in the same industry.</td>
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</table>
COMPONENT ASSESSMENTS

Before providing an overall fraud risk assessment for this client, please respond to the following questions.

<table>
<thead>
<tr>
<th></th>
<th>What is the risk of financial statement fraud attributable to</th>
<th>Low</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>the incentives faced by LFY management?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>What is the risk of financial statement fraud attributable to the opportunities available to LFY</td>
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<tr>
<td>3.</td>
<td>What is the risk of financial statement fraud attributable to LFY management’s attitude or character?</td>
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</table>

OVERALL ASSESSMENT

Consider the overall risk of material financial statement fraud and answer the following question.

Based on all the information you have reviewed in this case, what is the overall risk of material financial statement fraud for LFY?
### NFC SCALE

For each of the statements below, please indicate to what extent the statement is characteristic of you. The scale ranges from 1 to 7, with 1 = extremely uncharacteristic of you, and 7 = extremely characteristic of you.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would prefer complex to simple problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I like to have the responsibility of handling a situation that requires a lot of thinking.</td>
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<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Thinking is not my idea of fun</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I would rather do something that requires little thought than something that is sure to challenge my thinking abilities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I find satisfaction in deliberating hard and for long hours</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I only think as hard as I have to</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I prefer to think about small, daily projects than long-term ones</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I like tasks that require little thought once I’ve learned them</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>The idea of relying on thought to make my way to the top appeals to me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I really enjoy a task that involves coming up with new solutions to problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Learning new ways to think doesn’t excite me very much</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I prefer my life to be filled with puzzles that I must solve</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>The notion of thinking abstractly is appealing to me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I feel relief rather than satisfaction after completing a task that required a lot of mental effort.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>It’s enough for me that something gets the job done; I don’t care how or why it works.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I usually end up deliberating about issues even when they do not affect me personally.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
SKEPTICISM SCALE

For the following statements below, please decide how much you agree with each according to your beliefs and experiences. Remember that there is no right or wrong answers.

The scale ranges from 1 to 7, with 1 = strongly disagree, and 7 = strongly agree.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like to think about the possible reasons underlying human behavior</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I always try to reconcile conflicting messages from different people</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I don’t like it when people say something vague or unclear</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I like to observe why people behave in a certain way</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>When I get a piece of information, I usually think about the credibility of the source</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I am curious about what I experience and learn</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I am not easily convinced</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>People generally do not present themselves as they exactly are</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I feel irritated when I don’t know the reason why an event happens in my life</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I cannot observe all dimensions of things</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I am questioning even when a position or viewpoint is quite persuasive</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I usually question the validity of what I am told</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>I like to challenge conventional wisdom</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
DEMOGRAPHICS

Please provide your background information

Years of full-time audit experience _____________ (years)

Please indicate the highest level of education attained:

☐ Bachelors  ☐ Masters
☐ Other (please specify)___________________

Please indicate which of the following most accurately describes your professional position:

☐ Staff  ☐ Senior  ☐ Supervisor
☐ Manager  ☐ Other (please specify)______________________.

What are your professional certifications? Please check all applied.

☐ CPA  ☐ CIA  ☐ CMA  ☐ CFE  ☐ Other (please specify)______________________.

Do you have you experience in assessing the risk of fraudulent financial reporting?

☐ Yes, for ________ months.  ☐ No

How many audit engagements have you experienced where material fraud was discovered? _____

Age ____________ years old

Gender  ☐ Male  ☐ Female

MANIPULATION CHECK QUESTION

Please choose the correct statement regarding to LFY.

A) LFY’s earnings per share has been rising from $1.05 in 2005 to $1.30 by 2009.
B) LFY’s earnings per share has been rising from $1.10 in 2005 to $1.90 by 2009.
C) LFY’s earnings per share has been falling from $2.30 in 2005 to $4.05 by 2009.
D) LFY’s earnings per share has been falling from $6.90 in 2005 to $3.10 by 2009.
FINAL INSTRUCTION PAGE

Your comments will be appreciated, either here or in a separate envelope.

If you would like to learn more about the results of the study, please include a note with your email address and “COPY OF THE RESULTS REQUESTED” written on it. Please do not record this information on the questionnaire itself.

Thank you for your help 😊

Please return your questionnaire to the enclosed envelope to:

Pailin Trongmateerut  
Department of Accounting  
College of Business  
Washington State University  
Pullman WA 9916-4729