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The effects of in-group bias and decision aids on auditors' evidence evaluation

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by

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DEDICATIONS

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ABSTRACT

This study examines the effect of in-group bias and decision aid use on auditor judgments, confidence, and decisions in an analytical procedures task. In-group bias, a product of Social Identity Theory, may impair auditor independence by influencing auditor judgments. Auditors rely on client representations to support their opinion of the financial statements; however, clients are sometimes former auditors of the external audit firm. This prior relationship could lead the auditor to exhibit unwarranted trust of client representations. In an online mixed design experiment using staff and senior auditors, I test whether auditor judgments, confidence in those judgments, and decisions to extend testing differ based on a client's prior affiliation. I find that there is insufficient evidence of in-group bias in auditor judgments, confidence, or decisions. Lack of support could be due to the small sample size. In the same experiment, I give auditors access to a decision aid. Practice and prior literature suggest using decision aids should improve audit judgment. I find that a structured decision aid improves audit judgments and decisions for all auditors, and improves confidence for auditors who initially made good judgments. Audit managers can benefit from noting the usefulness of decision aids in improving judgment.

CHAPTER 1: INTRODUCTION

This study examines whether in-group bias, an inclination to trust one's own group members, affects auditors' judgments, confidence in those judgments, and decisions in an analytical procedures task. It also explores whether a decision aid successfully mitigates in-group bias and improves auditors' decisions. Auditors perform analytical procedures in which they gather information from multiple sources to justify and explain changes in account balances; they often rely on client representations for supporting evidence (Biggs et al. 1995). When evaluating client representations, auditors must consider the client's source reliability, which includes both competence and objectivity (Hirst 1994).[1] In-group bias, which occurs when group members extend unjustified trust to other group members (Hewstone et al. 2002), could impact this evaluation.[2] As companies hire members of their external audit firm to work in key financial positions, former auditors become clients, yet current auditors may still consider them group members. The resulting in-group bias could lead auditors to overrate a client's objectivity, which would lead to an inappropriately high source reliability judgment. Auditors could conclude that evidence is sufficient when it is insufficient, prematurely end the search for additional or corroborating evidence, or exhibit an unjustified confidence in the final audit opinion. All of these outcomes could result in an ineffective audit.

[1] Objectivity, in this context, simply refers to the client's willingness to be truthful to the auditor. In other auditing literature, objectivity is also a measure of bias in an individual's judgment. In this study, I am exploring the effect of a bias on the *auditor's* judgment of the *client's* objectivity.

[2] Biases in auditor judgments, specifically those related to the auditor's evaluation of source reliability, have been the topic of several auditing studies (Anderson et al. 2003, Anderson et al. 1994, Bamber 1983, Hirst 1994).

Companies often hire employees from their external audit firm, (Beasley et al. 2000; Bleed 2002; Lennox 2005). In several of the most recent audit failures, high-ranking accounting personnel were also alumnae of the company's external audit firm (Barrionuevo 2002). Congress has recognized the potential for in-group bias to influence auditor judgments and has restricted public companies from hiring their external auditors in positions of financial authority for a one-year period.[3] *AICPA Ethics Interpretation 101-2* cautions that client hiring of their external auditors might impair independence (AICPA 2005). The Independence Standards Board also warned that auditor independence could be threatened by their familiarity or prior longstanding relationships with attest client (Independence Standards Board 2000). While these bodies recognize in-group bias as a threat, empirical studies of the phenomenon in auditing are scarce. King (2002) demonstrated in-group bias among auditors in a behavioral experiment. Lennox (2005) found that companies with affiliated executives (employees who were former members of the current external audit firm) were more likely to receive a clean opinion than companies without affiliated executives, and Menon and Williams (2004) found evidence of abnormal accruals in firms with affiliated executives. These studies suggest that auditors may exhibit in-group bias.

Even though the above studies suggest in-group bias exists among auditors, there are some reasons why individual auditors may be immune to this bias. Auditors have strict professional standards, training in professional skepticism and independence, are

[3] Sarbanes-Oxley mandates that the CEO, Controller, CFO, Chief Accounting Officer or person in an equivalent position cannot have been employed by the company's audit firm during the 1-year period preceding the audit (Sarbanes-Oxley Act (SOX) 2002).

subject to public accountability, and must meet stringent exam requirements. These factors suggest an auditor could accurately assess client objectivity, or lack thereof, regardless of past associations. Indeed, Bamber et al. (1995) notes several studies which suggest that auditors are less susceptible to psychological biases.

Whether and to what extent auditors demonstrate in-group bias toward former audit team members is an empirical question. It is important to answer this question since this bias could threaten the auditor's professional judgment, resulting in an unacceptably high risk of audit failure. Given the widespread practice of companies hiring their external auditors, and considering the recent Congressional laws, I first test the extent of in-group bias on auditor judgments and decisions. I then test whether a decision aid can improve audit judgments.

Practitioners use decision aids to improve auditing (Bedard and Graham 2002). These aids support decision-making by overcoming human information processing limitations (Rose 2002), automating structured decisions (Abdolmohammadi 1991), and providing models and data to assist the auditor in choosing between alternatives in semi-structured tasks (Abdolmohammadi 1991). I use analytical procedures in this study because they are semi-structured tasks: they have a reasonably well-defined problem, with limited alternatives, requiring some judgment (Abdolmohammadi and Usoff 2001; Abdolmohammadi 1991). I supply auditors with a decision aid that lists plausible explanations for a given account fluctuation. If in-group bias causes auditors to exhibit *unjustified* trust, which results in an incorrect audit judgment, a decision aid could provide the auditor with guidance regarding the correct judgment, thus mitigating the

negative effect of in-group bias. In practice, this decision aid could be something as simple as a listing of expected account relationships or something more complex, such as an interactive computer model that provides a probability report. A decision aid can also improve audit judgment in the absence of group bias by directing attention to relevant indicators.

I use a mixed design experiment with one *between-participants* variable, group affiliation (in and out) and one *within-participants* variable, decision aid (pre and post). Senior and staff auditors evaluate a client-provided explanation for the results of an analytical procedure; the client is either a former audit team member or a longstanding client employee. Dependent variables, measured pre- and post-decision aid, include the auditor's plausibility judgment, his confidence in that judgment, and his decision about how much to extend audit testing. After evaluating demographics (task experience, level, and affiliation) as possible covariates, I analyze the data using the appropriate statistical methods.

To summarize, first, I test for in-group bias in an audit context, exploring how this bias affects auditor judgment, confidence in that judgment, and decisions to extend audit testing. Second, I evaluate whether a decision aid is effective in improving audit judgments, confidence and decisions. Based on data collected, there is insufficient evidence to conclude that in-group bias exists among auditors performing an analytical procedure. Further, there is no indication that in-group bias affects either confidence or decisions to extend testing. Findings indicate that decision aid use improves auditor

judgments and auditor decisions for all auditors, but only improves confidence for auditors who initially provided a correct judgment.

One cannot conclude that insignificant findings indicate an absence of in-group bias. The small sample size and use of nonparametric tests reduce the likelihood of finding an effect, should one exist. Future research with a larger sample could yield results that are more conclusive. Audit firms should be especially interested in the findings related to the effectiveness of the decision aid in improving both judgments and decisions. The simple decision aid used for this task offers a feasible and cost-effective tool for practice improvement.

The dissertation continues as follows: Chapter 2 includes the literature review and development of the hypotheses, Chapter 3 describes the method, discusses the research design and provides results of the pilot test, Chapter 4 includes the statistical analysis, and Chapter 5 concludes with a discussion of results, limitations, and future research..

CHAPTER 2: LITERATURE REVIEW AND HYPOTHESES

2.1 Introduction

This section provides an overview of the audit and psychology literature pertaining to this study. The first part of this section focuses on a review of the audit literature related to analytical procedures and the auditor's judgment process during those procedures. I use the Anderson and Koonce (1998) model, which is a two-step approach including plausibility and sufficiency checks. I then integrate source reliability literature from the audit field, focusing on the auditor's judgment of client objectivity. I proceed to review the recent studies on auditor affiliation, discussing how affiliation can impact the audit process. I follow this discussion by a review of the seminal literature on social identity theory (Tajfel 1981), moving toward a definition of inter-group bias, and finally discussing how group biases can impact auditors. Hypotheses related to in-group bias are then stated.

The second part of this section provides a discussion of the audit-related debiasing literature, followed by a review of how decision aids can be used to improve auditor judgment and decisions.

2.2 Analytical Procedures and Source Reliability Judgments

2.2.1 Analytical Procedures

Generally Accepted Auditing Standards require auditors to obtain sufficient, competent, evidential matter to reasonably support their opinion of a client's financial

statement presentation and disclosures (AICPA 2005). *AU Section 329 "Analytical Procedures"* defines these procedures as "…evaluations of financial information made by a study of plausible relationships among both financial and nonfinancial data" (AICPA 2005, 465). This standard requires auditors to perform analytical procedures in both the planning and review stages of the audit (AICPA 2005). When used during planning, analytical procedures help auditors identify accounts that need further investigation, allowing them to budget more time and testing to these areas. *AU Section 329.09* also suggests that auditors use analytical procedures as a substantive test during fieldwork to obtain evidence about financial statement assertions (AICPA 2005). Analytical review procedures require auditors to develop expectations about account balances based on their knowledge of internal and external factors. These factors might relate to industry averages, current economic indicators, changes in accounting or operations policies, or firm-specific growth. After developing expectations, auditors compare their expectations to financial statement assertions, investigating differences. This investigation requires auditors to gather information from multiple sources. Auditors must also have a complete understanding of how accounts are related, in order to assess the reasonableness of account balance changes.

Practicing auditors commonly place great reliance on analytical procedures (Anderson et al. 1994; Biggs et al. 1995). Hirst and Koonce (1996) conducted a field study in which they interviewed 36 audit professionals (seniors, managers, and partners) about the use of analytical procedures in practice. They found that auditors use analytical procedures as a substantive test to determine account balance validity. Further, during

substantive testing, auditors emphasize "…the explanation development /evaluation and information search aspects…" of analytical procedures (Hirst and Koonce 1996, 476). The study also notes that although auditors report improvements in judgment over time (as they gain experience) they admit that even with additional experience their confidence in evaluating client explanations remains low.

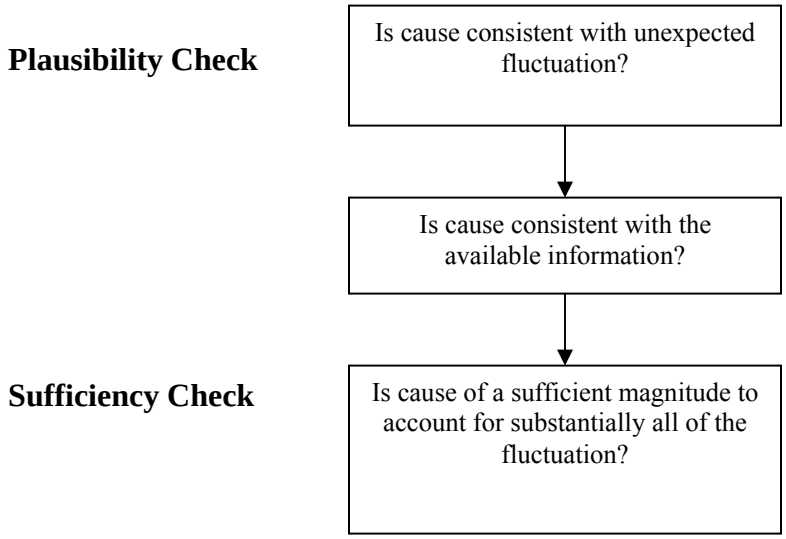
Auditors obtain explanations for unexpected fluctuations from multiple sources (Anderson et al. 2003). Changes in balances may relate to external events (*e.g.,* a change in general economic indicators or competition), or may result from internal client decisions (*e.g.,* discontinuation of a product line or replacement of depreciated assets). When changes result from external causes, auditors can probably gather evidence from objective external sources. However, when changes result from internal management decisions, auditors often rely on client explanations. In practice, Hirst and Koonce (1996) find that while experienced auditors are more likely to self-generate possible explanations before turning to the client, less experienced auditors are more likely to ask the client first. Both experienced and novice auditors turn to the client either to confirm or to seek explanations regarding the causes of observed fluctuations. The degree of reliance the auditor places on these explanations depends on his assessment of the client's objectivity.

2.2.2 The Judgment Process

According to the Anderson and Koonce (1998) model in Figure 1, auditors proceed through a two stage process when evaluating evidence. Auditors start with a two-step plausibility check. In the first step, they assess whether an explanation is consistent with the observed fluctuation. For example, if net income increases, an increase in sales

would be a plausible reason; an increase in common stock would not be a plausible reason. Once auditors judge a cause consistent with the fluctuation, they then consider whether the cause is consistent with the available information. Did sales, in fact, increase? If the evidence shows that sales decreased, this explanation would not be consistent with the facts and auditors would judge this explanation implausible (Anderson and Koonce 1998). After compiling a list of plausible hypotheses, auditors perform the sufficiency evaluation task. This evaluation requires an assessment of how much of the variation in the account is explained by the explanation overall.

Figure 1
Model of the Evaluation of Causes in Analytical Procedures
(Anderson and Koonce 1998, 3)



Although prior research has found that auditors often fail to adequately assess sufficiency (Anderson et al. 2003; Anderson and Koonce 1998; Hirst and Koonce 1996), little research has examined auditors' ability to assess plausibility. Since auditors

recognize basic accounting relationships, it is likely that they would accurately complete *step one* of the plausibility judgment (explanation is consistent with change in account balance). However, because *step two* of the plausibility check requires auditors to search for confirming evidence, they could fail to identify explanations that are inconsistent with actual circumstances. Given a seemingly plausible client-provided explanation, auditors could fail to complete step two accurately, independent confirmation that the hypothesis fits the circumstances. The current study uses an explanation that is consistent with the change in account balance, yet inconsistent with the actual facts (as evidenced by changes in other account balances). To identify the explanation as implausible, auditors must search beyond the account of interest.

Prior research suggests that experienced auditors can detect implausible explanations when source objectivity is manipulated at two levels: client and some other outside source (e.g., decision aid, external third party, audit team member) (Anderson et al. 2003; Bamber 1983; Hirst 1994; Joyce and Biddle 1981). None considers the case where the client is a former audit team member. In the current study, the auditor's judgment of the client's objectivity depends on both the client's former position as a fellow audit team member and the client's current position within his or her firm. The client's former position with the audit firm should increase the client's objectivity because the client (former auditor) has an understanding of proper financial statement preparation and of the importance of providing a high-quality audit. The client's current position with the firm could decrease objectivity because the client could be motivated by

bonuses and promotions related to strong financial results. In addition, the client could also be motivated to falsify financial statements in order to cover up fraud.

2.2.3 Source Reliability Judgments

Auditors weigh client explanations based on their assessment of the client's source reliability. The *source reliability* judgment includes an evaluation of both competence and objectivity (Bamber 1983; Hirst 1994). According to Hirst (1994), "…competence means an individual's ability to measure or interpret an item or event accurately. Objectivity means the likelihood an individual will report his measurement or interpretation truthfully, regardless of its accuracy" (p.114). *Ceteris paribus*, the level of source reliability increases with the level of competence, as well as with the degree of objectivity.

Source reliability judgments include an evaluation of both competence and objectivity. Therefore, any bias that impairs auditor judgment about either the competence or the objectivity of a source could reduce the audit's effectiveness and increase audit risk. When evaluating the *competence* of a client who was once an audit team member, the auditor's past interaction with that individual on audit engagements, as well as the auditor's knowledge of firm training and promotion policies, should result in an accurate competence judgment. Further, an individual's competence is unlikely to decrease when he or she goes to work for a client firm.

Unlike competence, *objectivity* is subject to situational pressures. Clients, although knowledgeable, might not be objective (Hirst 1994). Compensation plans, promotion opportunities, and stock options provide motivation for clients to report

untruthfully. *AU 316, "Consideration of Fraud in a Financial Statement Audit"* requires auditors to evaluate client assertions with professional skepticism, directing them to inquire about management incentives, pressures and motivations (AICPA 2005). Auditors must consider how these motivations can influence clients to provide untruthful explanations. When evaluating the objectivity of a former audit team member, the current auditor must consider how the ex-auditor's objectivity may have changed, and how that change may affect the client's overall source reliability.

2.2.4 Clients' Insider Knowledge of Audit Process

The potential for client deception is especially relevant when the client is a former member of the current audit firm. A significant threat to financial reporting involves the ex-auditor's specialized knowledge of the continuing audit firm's processes and operations (Beasley et al. 2000). As a former audit team member, the client knows which tasks lower-level auditors complete. He or she can apply this knowledge strategically to hide his or her misdeeds, using certain accounts assigned to novice team members. Further, the client knows the audit firm's internal procedures for determining materiality, evaluating evidence, and conducting substantive testing. While AICPA *Ethics Interpretation 101-2* contains a requirement that the ongoing engagement team consider the necessity to modify engagement procedures, insider information does increase the risk that the client can anticipate and subvert those procedures. Admittedly, although a client might attempt to deceive the auditor, successful deception depends on the auditor's inability to detect the deception. The focus of this paper remains on the auditor's judgment of the plausibility of client explanations; the above discussion merely

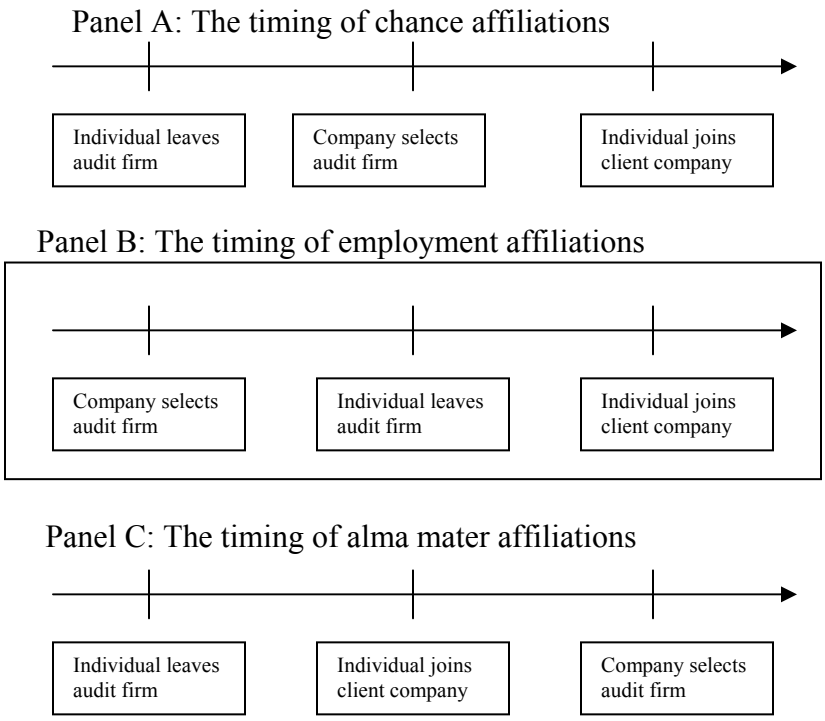
highlights the *increased potential* for a client to plan his deception, as well as the need for auditors to effectively detect deception when it occurs.

2.3 Auditor Affiliation and Related Studies

Lack of independence is an often-cited cause of audit failure. In some salient audit failures, the top executives at the client corporations were also past employees of the firms that audited them. For example, in the Enron case, both Richard Causey, Chief Accounting Officer, and Sherron Watkins, Vice President, were Andersen alumni (Barrionuevo 2002). Being past employees of the audit firm, the concern is that these key client personnel are able to exercise undue influence on the auditor, thereby impairing auditor independence. The federal government has responded to the auditor affiliation threat to independence by restricting the employment options of audit team members (Sarbanes-Oxley Act (SOX) 2002). In addition, *AICPA Ethics Interpretation 101-2* has identified the hiring of an external auditor by the client firm to be a threat to independence and suggests several mitigation techniques (AICPA 2005).

As displayed in Figure 2, the timing of an auditor affiliation can occur in one of three ways (Lennox 2005). This study focuses on employment affiliations (Panel B), which arise when the client company hires a member of the recurring external audit team. There are two reasons I focus on employment affiliations. First, they are the most common (Lennox 2005). Second, they are particularly susceptible to bias because the auditor goes directly from being a member of the audit team to being an audit client. This change in circumstance could alter the ex-auditor's motivations, and potentially, his or her objectivity.

Figure 2
Auditor Affiliations
(Lennox 2005, 212)



It is common for clients to hire employees from their current audit firm. In fact, the relationship between audit firm and client has been referred to as a "revolving door" (Bleed 2002, 1). Three benefits accrue from hiring former external auditors (Beasley et al. 2000). First, auditors are often highly trained by their firms. Second, auditors commonly have had exposure to varied clients, businesses, and complex financial transactions. Third, a client company's former auditors have an insider's knowledge of the client's current strategies and corporate environment and therefore can quickly acclimate themselves to client practices.

Beasley et al. (2000) also identify three threats to the financial reporting process associated with such hirings. While one of these threats relates to the potential for auditor shirking before hiring, two relate to the time period after the auditor is hired. The first threat, detailed previously in *Section 2.2.4*, relates to the client's advantage over the auditor. The ex-auditor's intimate knowledge of the audit firm's plans and procedures logically makes it easier for him or her to successfully hide improprieties in the financial statements from the current auditors. The second threat and the focus of this study, stems from the effect of an in-group bias, explained later in *Section 2.4.2*, which causes the auditor to overestimate the client's objectivity, leading to underauditing. This bias can cause a reluctance of the current auditors to question the assertions of clients who were once their co-workers.

Although auditor affiliation threats have attracted the interest of regulators, researchers have published little on the subject. Lennox (2004, 202) observes that "…no published archival evidence exists on the types of affiliations or whether affiliations impair audit quality." Using an estimation model to identify companies whose unfavorable opinion probabilities are greater than 10%, Lennox partitions these companies based on the presence or absence of an affiliated executive. Findings suggest that firms with affiliated executives were statistically more likely to have a clean audit opinion. Menon and Williams (2004) examined cases where the affiliated client was a former audit firm partner. Using an archival approach, after controlling for performance characteristics, they found evidence of an affiliation effect. Firms employing former audit partners were more likely to have larger abnormal accruals. In addition, they noted an

affiliation effect on earnings such that firms with former affiliated partners were more likely to just meet analysts' earnings forecasts than were firms without former affiliated partners. While the above studies examine correlations between affiliation and external measured variables, the current study uses an experimental approach to explore the effect of staff and senior auditor affiliation on individual audit judgments.

2.4 Auditing Judgment: Biases and Social Identity Theory

2.4.1 Biases in Auditing Judgments

Much has been written regarding the process, and particularly the weakness of human judgment and decision-making (Bamber et al. 1995; Hogarth 1980; Kahneman et al. 1982; Libby 1991). One such weakness is bias, defined as "a preference or an inclination, especially one that inhibits impartial judgment" (American Heritage 2000). Biases can be strategic (individuals are conscious of their bias) or implicit (individuals are unaware of their bias). Auditors' professional skepticism likely prevents them from exhibiting strategic biases; however, implicit biases may persist.[4] Bias identification is particularly important in auditing since auditors are required to make many judgments, the results of which can significantly impact multiple stakeholders. For example, if an auditor *incorrectly* believes there is sufficient evidence to support an account balance (overweighting), he could wrongly curtail further testing on that account. While a single judgment error is not likely to increase risk considerably, the final audit opinion is the

[4] For a discussion of the two types of biases, see Kunda (1990).

sum of multiple judgments; therefore, the cumulative effect of these errors could significantly increase the risk of an audit failure (Moeckel and Plumlee 1989).

Some frequently researched biases in the audit literature include: anchoring and adjustment (Hogarth and Einhorn 1992), primacy/recency effects (Kahneman et al. 1982), base rate frequency (Tuttle 1996), common information-sampling bias (O'Donnell et al. 2000), and information search strategy (Kida 1984). The roots of these biases reside in the psychology field. However, Bamber et al. (1995) suggest that auditing has unique attributes that prevent the blanket application of psychology findings to auditors. Indeed, research results are mixed. While auditors performed better than non-auditors in a representativeness judgment (Joyce and Biddle 1981), and demonstrated a better understanding of subpopulation error rates (Tuttle 1996), in anchoring and adjustment studies they exhibited a recency effect consistent with general psychology findings (Bamber et al. 1995). Although auditors are professionals, trained to detect errors and misstatements, they are still human, and as such, demonstrate many of the biases long established through years of psychology research.

2.4.2 Social Identity Theory

In-group bias, based on Social Identity Theory, influences human decision-making in social contexts (Tajfel 1981). This theory proposes that group members are an extension of the self, and as such, each group member has a "…systematic tendency to evaluate…(*his*)… own membership group (the in-group) or its members more favorably than a nonmembership group (the out-group) or its members" (Hewstone et al. 2002, 576). In-group bias, characterized by one's unquestioning belief in the assertions of a

fellow group member, provides an individual with a positive social identity, thereby satisfying his need for self-esteem (Hewstone et al. 2002). This bias is quite robust. Oakes et al. (1994) note that discriminatory behavior and attitudes can be brought about by a mere cognitive division of people into groups. Towry (2003) successfully manipulated team identity simply through the use of colored props and seating assignments.

Auditors become part of an audit firm's in-group when they are hired. As they work together on the same audit team, they develop familiarity through repeated interactions, increasing the level of in-group bonding. Although auditors who eventually leave the firm to go work for a client are technically no longer members of the audit team, this change in employment does not necessarily exclude them from the audit in-group. Levine et al. (1998) notes that individuals may simultaneously be members of multiple groups. When an auditor becomes a client, the remaining audit team members may view the ex-auditor as part of both the client and the audit groups. Therefore, even after auditors go to work for a client, remaining audit team members could continue to identify them as group members; they are, in fact, still working together on the same audit, albeit on opposite sides.

2.4.3 Inter-group Bias in Social Psychology

According to Apfelbaum and Lubek (1979), three characteristics define inter-group bias. First, in-group members view themselves as a homogeneous group; second, in-group members view out-group members as a homogeneous group; and third, in-group members view themselves as different from out-group members. Inter-group bias causes

people to draw distinctions based on group membership, rather than on individual traits. Inter-group bias can take the form of in-group trust or out-group derogation. In-group favoritism results in the "extension of trust, positive regard, cooperation, and empathy to in-group, but not out-group members" (Hewstone et al. 2002, 578). Out-group derogation is the underlying source of stereotyping and discrimination. Interestingly, much of the psychology research seeks to reduce out-group derogation, and, in turn, reduce the inter-group conflict (Hewstone et al. 2002; Tajfel 1981). In this study, the focus lies not with unwarranted out-group skepticism, but with unjustified in-group trust. The danger comes from overweighting assertions made by an in-group member, not from underweighting assertions made by an out-group member.

Self and social identity theories are often used to explain an individual's behavior in groups (Ellemers et al. 2002; Oakes et al. 1994; Tajfel 1981). Ellemers et al. (2002) presents a taxonomy of the primary concerns and motives of the social self. The two axes are level of group commitment (high and low) and level of perceived threat (none, individual, and group). The taxonomy in Figure 3 details concerns and motives for each response. For the purposes of this study, I classify auditors with a rank of senior and below auditors as belonging to Cell #4: high commitment to the group and exposure to individual-directed threats. While there is no prior research to directly support this classification, these auditors are likely to be highly committed to their firm; seniors have chosen to stay with their firms by accepting promotions and have been given additional responsibilities within the firm, and staff members have just completed years of training and study, as well as a competitive interview process. The individual threat is one of

exclusion from the group (e.g., being fired). These auditors are more likely to make decisions that further their acceptance as part of the group than decisions that might lead to their rejection by the group.

Figure 3
Primary concerns and motives of the social self: a taxonomy
(Ellemers et al. 2002, 167)

	Group Commitment	
	Low	**High**
No threat	1.	2.
Concern:	Accuracy/efficiency	Social meaning
Motive:	Noninvolvement	Identity expression
Individual-directed threat	3.	**4.**
Concern:	Categorization	**Exclusion**
Motive:	Self-affirmation	**Acceptance**
Group-directed threat	5.	6.
Concern:	Value	Distinctiveness, value
Motive:	Individual mobility	Group-affirmation

Ellemers et al. (2002, 173) points out that new group members "…tend to be more anxious and lack confidence reflecting acceptance concerns…." I surmise that this lack of confidence could negatively affect an auditor's professional skepticism, causing him to be reluctant to question affiliated clients, an idea echoed by Beasley et al. (2000).

Within a single organization, there are both in-group and out-group members. Napier and Ferris (1993) note that, among other factors, the higher the perceived similarity between supervisors and subordinates, the lower the psychological distance. In turn, "…less Psychological Distance is associated with greater attraction and liking, greater subordinate satisfaction, and higher supervisor evaluations of subordinate performance" (Napier and Ferris 1993, 333). Given these benefits, it is likely that staff

and senior auditors would seek to nurture perceived similarity between themselves and their superiors, including the former auditor who is now a client.

2.4.4 In-group Bias in Auditing

An extensive literature search revealed only one behavioral study on the effects of in-group bias among auditors. King (2002) challenged the idea that auditors are subservient to self-serving biases, and that they are unable to objectively audit a client upon whose business they depend. In an experiment, he created a strong group identity among the auditors by having them meet frequently with each other. This strong identity resulted in the auditors' increased ability to detect client deceptions. Auditors in the weak group treatment interacted primarily with clients and were less likely to detect client deception. The team identity in the strong group "…motivates auditors to focus more on the collective goal of conducting appropriate audits" (King 2002, 267). The result was that this motivation overcame the auditor's self-serving biases.[5]

In the above study, auditors' in-group bias toward other auditors resulted in better audits yet individuals belong to many groups simultaneously, resulting in differing degrees of group identity (Ellemers et al. 2002). I might identify myself as a graduate of a particular university, an accountant, an auditor, an employee of a large audit firm, and specifically, an employee of a particular firm. Depending on how strongly I identify with each group, I will exhibit a concomitant level of in-group bias. In an auditor/client relationship, auditors may view clients as fellow group members based on their common

[5] A self-serving bias in this case is defined as the auditor's need to please the client so that the client will continue to contract with the auditor for services.

socio-economic class, college alma mater, religious affiliation, or, where the client was once an auditor. In the case of employment affiliation, the auditor could still view the ex-auditor, now the client, as an audit firm group member.

In-group bias is particularly relevant in auditing because it can affect the auditor's professional skepticism. For example, analytical procedures often require auditors to gather and evaluate explanations from clients. A key part of this evaluation involves the auditor's ability to judge the client's objectivity correctly, and the effect that objectivity has on the client's truthfulness. In the context of the current study, clients were also once fellow auditors, thus confounding group identity. A likely outcome is that auditors will continue to identify affiliated clients with their former audit group and thus will fail to adjust their assessment of the client's objectivity appropriately. The resulting unwarranted trust could cause the auditor to accept the client's implausible explanation, resulting in an incorrect audit judgment.

2.4.5 A Normative View

Generally Accepted Auditing Standards require auditors to approach an audit engagement with professional skepticism; the notion that a seemingly irrelevant past association could result in unjustified bias is a cause for concern. It is important to investigate whether this past relationship is truly irrelevant.

Hirst (1994) suggests that both competence and objectivity should be considered in a source reliability judgment. Based on an insider's knowledge of hiring criteria, professional certifications, firm training and evaluation procedures, along with the direct experience of working together, auditors should correctly assess their former co-worker's

competence. The validity of this assessment should not change regardless of the fellow co-worker's employment. Auditors must also assess a client's objectivity -- an individual's motivation to communicate his beliefs honestly. In fulfilling their obligation to reduce the risk that accompanies the principal-agent relationship characteristic of owners and managers, auditors must maintain objectivity. Auditor objectivity arises from the motivation to provide a quality audit. Contrary to this, client bias arises from the motivation to present the financial statements in the best possible light. Because of this difference in motivations, it is likely that a client's representations are more biased (less objective) than those of an auditor.

2.5 Statement of Hypotheses – In-group Bias

The first part of this study tests whether staff and senior auditors demonstrate in-group bias when assessing a client-provided explanation. As noted earlier, senior auditors' experience should enable them to detect an implausible explanation. However, senior auditors' tenure with the firm should lead to a strong in-group association. Staff auditors, although less experienced, have a need for acceptance by the group and are likely to align themselves with established group members. Staff members could either seek to impress the audit team by demonstrating skepticism of client explanations or could view the client as part of the audit firm in-group and thus be reluctant to question the assertions. In sum, both levels have the potential to exhibit in-group bias. Given that arguments exist for and against in-group bias at each level, I make no formal hypotheses about level. Rather I make a general proposal that in-group bias persists from the original

association between the client and auditor, making the auditor more likely to overrate the plausibility of a client explanation.

The following hypothesis tests for a simple effect of in-group bias.

> **H1: Given an implausible explanation, auditors will judge that explanation as more plausible when it comes from an in-group client, than when it comes from an out-group client.**

Auditors also must express confidence in their judgments. Rose (2002, 114) notes that individuals may exhibit either overconfidence ("…increases in confidence without the associated improvements in decision quality…"), or underconfidence (failure of the individual to recognize when the decision is accurate). General psychology research finds overwhelmingly that individuals are overconfident (Fischoff 1982). In the audit literature, findings on confidence are mixed (Ahlawat 1999; Bamber and Ramsay 2000; Einhorn and Hogarth 1978; Moeckel and Plumlee 1989). Tomassini et al. (1982) find that auditors demonstrate less overconfidence than suggested by the general psychology literature for an audit-related task. Solomon et al. (1982) find that auditors were underconfident in an audit task; however, similar to general psychology findings, were overconfident in a general knowledge task. In an audit evidence recall task, Moeckel and Plumlee (1989) find that participants are equally confident in their inaccurate memories as in their accurate memories. Bamber (1995) suggests that there is some underlying, unknown reason for underconfidence in an audit context.

Given that auditors would not expect an in-group client to present an implausible explanation, they may question their own judgment, causing their confidence to be lower

than it would be if the implausible explanation came from an out-group client. This discussion leads to the following hypothesis:

> **H2: Given an implausible explanation, auditors will be less confident in their initial plausibility judgment when the explanation comes from an in-group client than when it comes from an out-group client.**

Auditors rely on their judgments to adjust future audit plans (Cohen and Kida 1989). It is important to evaluate whether in-group bias has an effect on auditors' decisions to extend or curtail further testing. Auditors who correctly identify an explanation as implausible could still suspend testing on that item because a fellow group member supplied the explanation. To explain further, an auditor could believe that a client explanation is implausible, but not believe that the client is intentionally lying. An auditor who has an in-group relationship with the client could still choose to extend testing; however, this extension of testing could be less than if the auditor did not have an in-group relationship with the client. In-group bias could result in an auditor deciding to give a fellow group member "the benefit of the doubt." On the other hand, an auditor who receives an implausible explanation from an in-group client could believe that the client is intentionally lying and compensate for this discovered deception by increasing testing. I propose that consistent with in-group bias, an auditor will extend testing by less when the client is an in-group member than when the client is an out-group member.[6]

> **H3: Given an implausible explanation, auditors who correctly identify an explanation as implausible will extend testing less when the client is an in- group member than when the client is an out-group member.**

[6] This hypothesis refers to decisions without benefit of a decision aid; however, auditors may reassess their decision after using a decision aid. I test this hypothesis pre and post-decision aid.

2.6 Discussion of Potential Covariates

I consider the following potential covariates for inclusion in the model: perception of client competence, prior task experience, and prior experience with affiliated clients.[7] Hirst (1994) finds that competence and objectivity interact in an auditor's determination of source reliability. To control for this possible interaction, I measure each participant's perceived client competence rating. I plan to compare these ratings across groups to rule out a competence effect on auditor judgments, confidence, and decisions.

Prior research finds that task experience is positively related to performance on audit tasks in general, as well as on analytical procedures (Hirst and Koonce 1996; Kaplan et al. 1992; Libby and Frederick 1990). Thus, auditors who are experienced in analytical procedures are likely to give lower plausibility judgments than are auditors with less experience. Given that the sample includes auditors from staff through senior levels, it is reasonable to assume that participants have varying levels of experience with procedures. Therefore, I include a measure of analytical procedures experience as a potential covariate in the model.

An auditor's prior experience with affiliated clients could impact their attention to the group manipulation, and as a result, affect their judgment. For example, an auditor who has no prior experience working with an affiliated client could interpret the in-group manipulation as unusual. This interpretation could lead him or her to weight the in-group factor more than an auditor who had prior experience with affiliated clients. Accordingly,

[7]All covariates are measured post-task to avoid confounds within the research design.

I ask for participants' prior experience working with affiliated clients for inclusion in the model as a potential covariate.

If auditors exhibit in-group bias, and this bias potentially increases audit risk, it is valuable to examine whether there is a tool to mitigate this bias effectively and efficiently. In sections *2.7 – 2.10*, I develop an argument that a valid, objective decision aid will be successful in mitigating in-group bias.

2.7 Debiasing In Auditing

Multiple techniques exist for debiasing in an audit environment. Justification (Peecher 1996), counterexplanation (Kennedy 1995), accountability (Kennedy 1993; Tetlock 1983), documentation (Ballou 2001) and the review process (Brazel et al. 2004; Trotman 1985) all influence the auditor's judgment and performance on audit tasks. Although research has shown the prior methods to be effective, there are three noteworthy drawbacks to using them. First, since the cost of an audit depends on the number of hours worked, efficiency is of key importance. The review process, while effective, takes both the auditor's and the reviewer's time. Second, review and documentation procedures are detective or corrective controls -- they do not prevent staff members from making initial errors in judgment. Third, because individuals implement these methods, execution could be inconsistent, resulting in more audit risk.

Decision aids are not subject to the above drawbacks. Abdolmohammadi and Usoff (2001) find that practitioners identify a multitude of audit tasks that are well-suited to the use of decision aids. Rose (2002) notes that decision aids can mitigate systematic

information-processing biases.[8] By their nature, they offer a consistent, objective recommendation to the auditor (Ashton 1992). This consistency reduces variability in both an individual auditor's judgments, as well as auditors' judgments firm-wide. Although decision aids do not completely prevent incorrect judgments, they can provide auditors with suggestions and direction.

2.8 Debiasing and Improving Judgment and Decisions with Decision Aids

Several studies establish the effectiveness of decision aids in mitigating audit judgment biases and improving audit judgments overall (Butler 1985; Eining et al. 1997; Emby and Finley 1997; Rose and Rose 2003). Butler (1985) developed a decision aid that focused the user's attention away from specifics and to a broader view of the situation. Since analytical procedures require auditors to consider the interrelationships among accounts, a decision aid that informs the user about these interrelationships should improve judgments. Eining et al. (1997) find that for a complex task (fraud detection) an expert system with a constructive dialogue feature is effective in improving judgments. The authors considered a combination of characteristics from the psychology literature to design a constructive dialogue feature that would increase decision aid reliance. Increased reliance led not only to improved assessments, but also to improved decisions. Emby and Finley (1997) successfully used an evidence rating technique to mitigate framing effects for internal control assessments and decisions.

[8] Decision aids can create new judgment biases, especially in the presence of other debiasing strategies such as accountability and incentives (Ashton 1990). For a discussion of the literature on decision aids, see Rose (2002).

Decision aids can effectively mitigate biases in auditing. Kennedy's (1993; 1995) framework classifies biases as either "data-related" or "effort-related." Effort-related biases occur when the decision-maker has either insufficient capacity or insufficient motivation to complete the task. Suggested solutions include increasing internal capacity, providing incentives, or introducing accountability. Data-related biases occur when either internal or external information (or both) are imprecise. Internal data (individual memory) is the source for individual biases such as framing (Emby and Finley 1997), first impression bias (Lim et al. 2000), and anchoring and adjustment (George et al. 2000). External data biases arise when the information provided to the individual is unclear, irrelevant, or presented in complex format. In the current study, I classify in-group bias as an internal data bias because the in-group influence arises from the individual's biased perception of the affiliated client's trustworthiness.

Both Kennedy (1995) and Roy and Lerch (1996) suggest the following solutions to minimize data-related bias. First, firms can modify information presentation. This approach is used successfully by Lim et al. (2000) to reduce reinterpretation of secondary data (a framing bias) and present the secondary data in such a way that it could not be ignored. Second, firms can train individuals to use appropriate information processing strategies. Firms can provide feedback during a task so that individuals can adjust their decision processes and subsequently apply the improved process to similar situations. Eining et al. (1997) uses this approach in designing a decision aid that includes constructive dialogue. Third, firms can replace decision-makers with a model that suggests a normative answer. Libby and Libby (1989) find less variability and better

performance when auditors used a decision aid to combine multiple judgments into a global answer. Rose and Rose (2003) also find that decision aids mitigated recency bias in an audit evidence evaluation task.

In this study, in-group bias involves a subconscious leaning toward believing an in-group member. The debiasing agent will display information in a structured format, as well as provide cues to guide the auditor in his search for support. I discuss the decision aid design in *Section 3.5.2*.

2.9 Decision Aid Reliance in Auditing

Technology use is increasing in today's audit process. A longitudinal survey of auditors indicates an increase in the number of audit tasks that are amenable to the application of a decision aid (Abdolmohammadi and Usoff 2001). Audit firms use a variety of decision aids, decision support systems, and expert systems in the audit process (Abdolmohammadi and Usoff 2001; Bedard and Graham 2002). Relevant decision aid studies find that reliance is influenced by face validity (Ashton 1990), and source objectivity (Anderson et al. 2003; Lim et al. 2000). A decision aid's face validity refers to the users' assessment of "the extent to which it appears sensible and reasonable" (Ashton 1990, 170). Source objectivity refers to the trustworthiness of the decision aid's source.

Ye and Johnson (1995) find that auditors are more likely to accept expert system advice if the advice is reasonable. In addition, the study finds that justification, described as "…an explicit description of the causal argument or rationale behind each inferential step taken by the ES" is most effective in user acceptance of expert systems (Ye and Johnson 1995, 158). Justification requires auditors to have a deep understanding of

accounting; in this study, auditors must be familiar with the relationships among accounts, in order to judge the decision aid predictions as reasonable. Ye and Johnson (1995) posit that decision aid reasonableness increases the auditor's confidence in the aid, and thus increases the probability that the auditor will rely on the aid. As noted above, Eining et al. (1997) successfully increase decision aid reliance by incorporating a constructive dialogue feature in their decision aid. However, there is ample evidence in the literature that decision makers do not always rely on decision aids (Rose 2002). Individuals may work around the decision aid (Kachelmeier and Messier 1990) or try to outperform the decision aid (Arkes et al. 1986). Thus, there is a possibility that auditors will not rely on a decision aid.

Anderson et al. (2003) find that auditors judged decision aid explanations as more sufficient than client-provided explanations, when, in fact, such explanations were insufficient. Overreliance on the decision aid resulted from the auditor's assessment of the decision aid's objectivity. Since validity and objectivity are both important to decision aid reliance, I will confirm that participants judged the decision aid in the study to be both valid and objective.

2.10 Statement of Hypotheses – Decision Improvement

Auditor judgments can be influenced by in-group bias, as posited above. However, factors other than group biases can also negatively impact auditor judgments. For example, even auditors who receive an implausible explanation from a non-affiliated client can incorrectly accept the explanation as plausible. This error in judgment can arise from the auditor's reliance on perceived client competence. In other words, an auditor

can successfully complete step one of the plausibility check (plausibility of hypothesis given the change in account balance), yet fail to complete step two (plausibility of the hypothesis given other, external information) successfully. A decision aid that redirects the auditor's attention to other possible hypotheses (similar to the approaches of Lim et al. (2000) and Butler (1985)) should improve auditor judgments. Further, a decision aid that provides reasonable justification (as found by Ye and Johnson (1995)) should result in auditor reliance, which is necessary for audit judgment improvement. I propose that a decision aid will improve auditor judgment by directing auditors' attention to the implausibility of the client-provided explanation. The decision aid will provide more information, lowering cognitive effort, as suggested by Kennedy (1993). Finally, auditors should judge a firm-developed decision aid as more valid and objective, causing them to weight the decision aid's recommendation more than the client's explanation, as evidenced in Anderson et al. (2003).

Hypothesis 4 tests the effectiveness of decision aid use on auditors who initially incorrectly judge plausibility to be high.

H4: Given an implausible explanation, auditors who make an initial incorrect judgment will decrease their plausibility judgment after using a decision aid.

Ahlawat (1999) finds that confidence increases with an increase in the amount of information provided. The decision aid report provides additional information to the auditor by directing his or her attention to alternative explanations and expected relationships among relevant accounts. Hogarth and Einhorn (1992) provide a model for belief adjustment that addresses how beliefs change when new information is received.

Srivastava and Mock (2004) suggest that an auditor's belief assessment regarding audit evidence includes three components: first, the belief that the evidence supports the conclusion, second, the belief that it supports an opposing conclusion, and third, the ambiguity related to unknown information. As auditors gather new information the amount of ambiguity decreases and they can classify information as confirming or disconfirming. As ambiguity about the judgment decreases, auditors should feel more certain about their decisions. Ye and Johnson (1995) suggest that the use and acceptance of decision aid recommendations will improve user confidence. Chung and Monroe (2000) find that judgment confidence decreases as perceived task difficulty increases. Use of a decision aid should reduce cognitive effort and therefore reduce task difficulty. As task difficulty decreases, I expect confidence to increase. In this study, the decision aid offers feedback by providing expected relationships between relevant accounts. Auditors who have the requisite accounting knowledge and rely on the decision aid should recognize whether their prior judgment was correct. If they were initially incorrect, this realization should lead them to the correct answer, about which they should be confident. If they were initially correct, reliance on the decision aid reinforces their original answer and should also increase confidence. I propose the following hypothesis.

H5: Auditors will be more confident in their post-decision aid plausibility judgment than in their pre-decision aid plausibility judgment.

Finally, I explore the effect of decision aid reliance on auditor decisions to extend testing. Based on the reasoning used for Hypothesis 4, a logical result of the change in plausibility judgment is a change in extent of testing. Auditors who rely on the decision

aid, and subsequently change their judgment of the client explanation from plausible to implausible, should logically adjust their extent of testing to reflect their revised belief. Eining et al. (1997) noted that not only did auditors improve their judgments after using a decision aid, but they also improved their subsequent decisions. Bukszar (2003) finds that individuals treat decisions with more consideration than they do judgments.[9] In a forecast and investment task, he finds that individuals perform an additional evaluation step between making a judgment and making a decision, which results in individuals being likely to act on their accurate judgments. In an audit context, it is important to explore the effect of a decision aid not only on judgments, but on subsequent decisions.

Auditors who initially judge a client explanation plausible, will likely extend testing little, if at all. Post decision-aid, auditors who reevaluate their decision and conclude that the client explanation is implausible, will likely increase testing. Further, an auditor who changes his or her plausibility judgment to implausible will also likely reassess the client's objectivity, also leading to a decision to increase testing. Therefore, I propose the following hypothesis.

H6: Given an implausible explanation, auditors who make an initial incorrect judgment will increase their extent of testing after using a decision aid.

[9] A judgment is an individual's inference about an external event or phenomenon. A decision is an individual's choice of action (Hastie 2001).

CHAPTER 3: METHOD

3.1 Introduction

This section details the experimental method. I first justify the sample selection, noting that seniors and staff members both have the potential to exhibit in-group bias for different reasons. Then I discuss the choice and design of analytical procedures as the experimental task. Analytical review of expenses is an appropriate task for staff and senior auditors and it is amenable to decision aid development (Abdolmohammadi 1999).

I proceed to discuss the research design, detailing the procedure, instrument development, and measurement of dependent variables. I include a discussion of the client explanation, noting that the explanation is reasonable given the related change in account balance, but implausible given the change in related accounts. I describe the establishment of the between-subjects manipulation - group affiliation, and the creation of the within-subjects treatment – decision aid. I describe the dependent variable scales, noting their use by prior researchers in the audit literature.

Finally, I include a discussion of threats to internal and external validity, noting how this study addresses those threats. I follow with a discussion of manipulation checks. I also describe the pilot study. Finally, I detail planned statistical analyses.

3.2 Sample

Participants are staff and senior auditors. I chose staff auditors because, as noted, clients will likely use their inside knowledge to deceive less-experienced (novice) auditors. Further, analytical procedures are often completed by assistant auditors

(Abdolmohammadi 1999). I chose senior auditors to explore whether in-group bias affects multiple levels within the firm. Seniors, because of their experience, should accurately detect implausible explanations. However, their longer affiliation with the firm may increase their in-group bias. The use of auditors (as opposed to audit students) is necessary to establish the in-group treatment. Auditors have had time to develop in-group feelings toward their co-workers, and should also have sufficient task experience.

Online access to the experimental materials simplified data collection from various locations. I recruited participants from several national CPA firms. All participation was voluntary; I contacted firms and asked them to distribute the web link to their staff through senior auditors, along with a letter endorsing the study. I provided no incentives for performance; however, participants were asked to voluntarily provide contact information if they wanted individual feedback. To encourage completion, I allowed participants to direct a $5.00 donation to their choice of charity (from a select list).

3.3 Experimental Task

The experimental task required an auditor to perform an analytical procedure on the repair and maintenance expense account during the substantive testing phase of the audit. There are three reasons for this choice of task: it is appropriate for staff through senior auditors, expense accounts have been used to hide fraud (high inherent risk), and the analytical procedure related to expenses is amenable to decision aid use. First, auditors identify this task as appropriate for a staff auditor to conduct (Abdolmohammadi 1999). Second, asset misappropriation often occurs in expense accounts (Hall 2004).

Third, analysis of repair and maintenance expense is a substantive testing task that is amenable to the development of decision support systems (Abdolmohammadi 1999). Analytical procedures are a semi-structured task; they include a reasonably well-defined problem, with limited alternatives, requiring some judgment (Abdolmohammadi 1991). Although a decision aid can list plausible reasons for an account balance fluctuation, auditors must also consider many intangible, non-financial factors that cannot or typically are not covered by a decision aid. Auditors must use their judgment to make a final determination regarding the likelihood that a given explanation is plausible.

Task materials included a narrative description of the firm, a copy of the current and prior year's financial statements (with the unexpected increase in the repair and maintenance expense account highlighted), a description of the client's background (to establish the varying group treatments), and the client's explanation for the unexpected fluctuation.[10] After the first measurements, participants had access to a decision aid.[11]

3.4 Research Design

3.4.1 Procedure

Figure 4 details the mixed research design with one between-subjects factor (group affiliation) and one within-subjects factor (decision aid). Prior to completing the task, participants filled out an online informed consent, as well as a demographic questionnaire to elicit the identity of their current employer, as well as their level in the

[10] Overstatement of expenses is often an indication of asset misappropriation; a fraud which is more likely to be committed by mid to lower management (Hall 2004), such as a controller or assistant controller.
[11] The decision aid was labeled as "firm developed", but was developed by the author and was the same decision aid for all participants.

firm (staff or senior).[12] It was necessary to gather this information before the experiment to operationalize the group manipulation. I randomly assigned participants to either an in-group or an out-group treatment (the difference between in-group and out-group was the client representative's history). For in-group participants, the client was a former employee of the participants' audit firm, for out-group members, the client was a long-time employee of the client firm.

Figure 4
Diagram of the Experimental Design

Experimental Condition	Read Current and Prior Year Financial Statements (Treatment)	Implausible Client Explanation (Treatment)	Plausibility, confidence, extension of testing (Observation)	Decision Aid Report (Treatment)	Post-Decision Aid Plausibility, confidence, extension of testing (Observation)
In-group	X	X	O	X	O
Out-group	X	X	O	X	O

Time ⟶

All participants then had access to the above-referenced task materials. They made the following judgments: plausibility of the client's explanation (scale of 0 – 100), their confidence in that judgment (scale of 0 – 100), and whether and how much to extend testing on that item (number of hours). After making those judgments, participants were shown a decision aid report (attributed to their firm's national office research department), as well as to the materials provided earlier. They then answered the same

[12] Demographics also include age, gender, certifications held, and highest education level.

questions regarding plausibility, confidence, and extent of testing. A post-test questionnaire included manipulation checks and further measures that may be significant, including the participants' perceptions of client competence, prior analytical procedures experience, and experience with affiliated clients. At the conclusion of the online experiment, participants were thanked for their participation and were allowed to direct a contribution to a charity of their choosing.

3.4.2 Characterization of Client Explanation

There are two steps to the plausibility check (see Figure 1). Step one relates to how well the explanation fits with the unexpected fluctuation. This judgment is a test of accounting knowledge (Libby 1985). The auditor need only do a search of his internal knowledge base to judge the explanation's plausibility. It is also unlikely that a client, especially a competent client, would present an explanation that violates the accounting relationships. Therefore, I use a client-provided explanation that is plausible, given an increase in the repair and maintenance account.[13]

The second step requires the auditor to confirm that the explanation fits the circumstances. The auditor must search for information to confirm or disconfirm the client's explanation. To judge implausibility, the auditor conducts an external information search, rather than an internal accounting knowledge search. This search requires additional effort. In a situation where in-group bias exists, the auditor could

[13] A manipulation check confirmed that the participant has sufficient accounting knowledge to identify the explanation as plausible, given the fluctuation.

subconsciously choose to forego the additional work and rely instead on his positive assessment of the client's source objectivity.

In the experimental task, the client explanation is consistent with the direction of the unexpected fluctuation, yet inconsistent with certain financial statement information (fixed assets have increased). The client explanation provided to participants follows:

> The unexpected increase in repair and maintenance expense comes from an internal decision to forego replacing certain capital equipment until next year. We were planning to replace our fleet of trucks with a new fleet, but due to the increase in interest rates, we decided to repair, rather than replace them.

3.5 Independent Variables

3.5.1 Between-subjects treatment: Group Affiliation

I manipulate group affiliation at two levels between subjects. Although individuals concurrently claim various group affiliations, in this study, I vary only the former employment of the client. In-group clients are either former managers or seniors from the recurring audit team.[14] Out-group clients have worked only for the client firm. I expect the manipulation to affect the auditor's judgment of the client's objectivity. However, since source reliability includes both competence and objectivity, I hold competence constant between treatment groups.

Manipulations occur after this brief introduction.

[14] Senior auditors received an explanation from a former audit team manager who became a controller for the client. Staff auditors received an explanation from a former audit team senior who became an assistant controller for the client. This design maintains one level between the auditor and his or her superior.

As part of the current audit fieldwork, your assignment is to evaluate the changes in expense accounts. Noticing that the current year's repair and maintenance expense account balance is unexpectedly high, you have asked Chris, the controller, to provide an explanation.

In group	Out group
Chris's Background	**Chris's Background**
Chris worked for (*your firm)* for the last several years, where he was a manager *(senior)* on the Continental Transport audit.	Chris has worked for Continental Transport for the last several years
He recently took a job at Continental as the controller *(assistant controller).*	He was recently promoted to Controller *(Assistant Controller)* at Continental.
Chris is technically proficient in accounting.	Chris is technically proficient in accounting.

3.5.2 Within-subjects treatment: Decision Aid

I propose that the decision aid will mitigate in-group bias by modifying the presentation of information and providing the auditor search cues. Based on the client's financial statements, the decision aid report lists possible explanations for the unexpected account fluctuation. I establish decision aid validity and objectivity as follows.

> The following report was generated by "DecisionSERVE" audit software, developed by the *(your firm's)* national office research department. Auditors should use it to assist them in evaluating client explanations. The process uses the client's current and past year's financial data to generate possible explanations for changes in account balances.
>
> Past experience indicates that DecisionSERVE provides valid explanations.

See Appendix A for an example of the decision aid output and the financial statements.

3.6 Dependent Variables

Three dependent variables are measured both pre- and post-decision aid—plausibility, confidence, and extension of testing.

3.6.1 Plausibility

Prior source reliability studies (Bamber 1983; Hirst 1994), used a 100-point scale to evaluate participants' judgments. Bamber (1983) asked participants to evaluate the sufficiency of an internal control system. End points were "No Likelihood" and "Certain Likelihood." Hirst (1994) asked participants to provide a probability estimate that inventory was materially misstated. On a 100-point scale, endpoints were "there is absolutely no chance that Inventory is materially misstated" and "I am absolutely certain that Inventory is materially misstated" (p.119). This study uses a 0-100 point scale: end points are "not at all plausible" and "highly plausible".

3.6.2 Confidence

Final audit opinions are the result of combining multiple audit judgments. Confidence in each judgment should be sufficient to prevent an audit failure. Bamber et al. (1995) reviews research on auditor confidence finding that auditors are overconfident in their general knowledge, but underconfident in their performance of financial and audit tasks. This underconfidence could be a result of conservatism. I measure confidence on a 0-100 point scale; end points are "not at all confident" and "completely confident."

3.6.3 Extension of Testing

The extent of testing variable measures the effect of in-group bias on auditor decisions. I inform participants that a normal budget for expense testing for this type of client and risk level is 40 hours. The measure allows for the participant to answer "0" if they choose not to extend testing. Although staff auditors generally do not make decisions to increase testing, they have leeway to investigate items further and/or make recommendations to their superiors. Senior auditors do make decisions regarding extension of testing therefore this measure mirrors practice. Following prior research (Cohen and Kida 1989), I use number of hours budgeted to measure planned increases in testing. The scale has end points of 0 hours and 10 hours.

3.7 Internal and External Validity

3.7.1 Internal Validity

Pedhazur and Schmelkin (1991, 224) define internal validity as "…the validity of assertions regarding the effects of the independent variable(s) on the dependent variable(s)." In this study, I establish internal validity through a careful research design. My goal is to eliminate alternative explanations so that any significant findings related to judgments, confidence in those judgments and decisions to extend testing, are, in fact, due to either the group manipulation or the use of a decision aid. Common threats to internal validity include history, maturation, testing, instrumentation, regression to the mean, selection bias, and mortality (Pedhazur and Schmelkin 1991).

History threats relate to events that occur during or immediately preceding the study, which could influence participants' responses. In this study, legislation restricting auditor hiring by clients was passed one year prior data collection. Since auditors would likely be aware of this legislation, they could have been more attuned to the concept of in-group bias toward affiliated clients. This awareness could have led participants to guess the group hypothesis and as a result, overcompensate for the bias by reducing their initial plausibility judgment.

Maturation occurs during studies that occur over time – allowing individual personal changes to affect outcomes. Participants completed this study in a single sitting over less than one hour's time; therefore, maturation is not a significant threat.

The testing threat is applicable when individuals are measured multiple times using the same variable (Pedhazur and Schmelkin 1991). In this study, all three dependent variables are measured twice (pre- and post-decision aid). To increase the likelihood that individuals would give true responses to the post-decision aid questions, I designed the survey so that prior answers were unavailable for viewing (participants could not access prior survey pages). This design prevents auditors from merely repeating their original answers. Instead, they should have been more likely to incorporate new information (from the decision aid) into their second responses.

Instrumentation threats arise from differences in the instrument or differences in the administration of the instrument. I used the same instrument for all participants, however, since data collection occurred online, individual differences in browsers or computing speed could have influenced participant responses. For example, although two

individuals could have spent the same amount of time completing the survey, the individual with a faster online connection speed could have spent more time reading the background information and thinking about his answers before responding. The participant with a slower online connection would have had to wait longer for the page to load, thus shortening the time used to consider responses. Other than an analysis of "time to complete" (I verified that no participant took less than 9 minutes or more than 60 minutes), the only other way to control this threat would have been to administer the survey in a computer lab. Given the geographical disparity of participants, this option was not feasible.

Regression to the mean occurs whenever two variables are not perfectly correlated with each other (Pedhazur and Schmelkin 1991). In this study, the threat of regression to the mean is relevant to the second measurements of the dependent variables. For example, regression to the mean predicts that auditors who initially rate plausibility low (the correct answer), will increase their second plausibility rating toward the mean. Likewise, auditors who initially rate plausibility high will decrease their second plausibility ratings toward the mean. To test for this effect, I evaluate the direction of change for both high and low initial plausibility ratings to assure that they do not assume this pattern.

Random assignment to treatment groups minimizes the threat of selection bias. However, the method of participant recruitment could lead to sample selection bias. I recruited auditors by contacting each firm's national or local office. Partners distributed the survey site link through an internal e-mail. Bias could occur from the partners'

selection of employees to send the e-mail to, or could occur from the employees who chose to respond to the e-mail. A larger sample size would allow me to confirm that there is no difference between early or late responders with respect to demographics and dependent variable measures. However, the small sample size prevents a thorough analysis of non-response bias.

Mortality occurs when individuals do not complete the entire survey. Given that this experiment was voluntary, individuals were free to drop at any time. In addition, since the survey was online, there was little cost to dropping out (participants would just close their browser). Further, mortality in an online context could be unintentional (e.g., technology breakdowns, lost Internet connections). During the data collection period, two audit firms distributed links to the survey immediately preceding the Thanksgiving holiday. The following Monday is referred to as "Black Monday" because of the increased online shopping traffic (Kopytoff 2005). Auditors who attempted to logon to the Internet could have experienced slower connections due to this phenomenon. This could have influenced participants to drop out of the study prior to completion. When I became aware of this threat, I contacted the two firms and requested that they send an e-mail encouraging auditors to return to the survey if they had experienced Internet slowdowns. I also designed the survey to allow participants to logon multiple times. This allowed participants a chance to complete surveys that were unintentionally interrupted. Using demographic analysis and IP address data, I confirmed all responses were from different individuals.

3.7.2 External Validity

External validity is a measure of how well findings can be generalized to or across target populations, settings, or time (Pedhazur and Schmelkin 1991). Participants, task, and time are all limitations to external validity. I designed this study and collected data from only staff and senior auditors at large, national audit firms. Application of findings is limited to this population group. Because managers and partners have longer tenure with their firms, as well as more advanced audit skills, generalization to levels above senior auditor are inappropriate. In addition, this study makes use of a single audit task, analytical procedures. Audit research indicates that task structure and complexity influence outcomes and should be adequately considered (Abdolmohammadi and Usoff 2001). Care should be taken in extending findings to expectations of auditor behavior on other audit tasks, especially tasks of different complexity. Finally, as noted before, data collection occurred during a time of heightened awareness of possible biases related to auditor affiliation. On a larger scale, given several large recent audit failures, audit quality was also a concern during data collection. Generalization to future time periods may be unsupported and should be approached with caution.

3.8 Manipulation Checks

The post-task questionnaire includes a series of manipulation checks to evaluate the strength of the manipulation and rule out alternative explanations. It also contains several questions related to prior audit experience and prior experience with clients who are former audit firm employees.

The first series of questions measures the participant's judgment of client competence and client and decision aid objectivity. Consistency of competence ratings between group treatments rules out the possibility that perceived differences in client competence influenced plausibility judgments.

Following Hirst (1994), I had the participants rate the client's objectivity (defined as …the likelihood that the client would give you, the auditor, a fictitious reason for an account fluctuation, when, in fact, he knew that the real reason was different). End points are "Extremely low" and "Extremely High".

Finally, as in Anderson et al. (2003), participants rated the objectivity of the decision aid. To rule out participant non-reliance on the decision aid due to a perception of low validity, I also measured the participant's perception of the decision aid's validity.

The second set of questions elicits information about the participant's past experience and general opinions. Participants answered questions about their audit experience, experience with clients who were former audit team members, and analytical procedures experience. They also rated whether their firm alumnae are more or less competent and/or objective than are alumnae of other audit firms, or non-firm accountants.

3.9 Planned Statistical Analyses

The first step in data analysis, before hypothesis testing, is to evaluate responses for adherence to the manipulation checks. In this study, I am testing for group bias on the basis of auditor affiliation. I cannot assume that participants who fail the between-subjects group manipulation adequately attended to the group affiliation factor; therefore,

I plan to exclude those participants from the analysis. I will also evaluate how much time each participant spent logged onto the survey. Based on pilot study findings (*section 3.10*), participants who spend less than eight minutes likely have not put forth the minimum effort to complete the task, therefore, I will eliminate those responses from the dataset.

I will then analyze the remaining data for violations of the statistical assumptions of normality of the dependent variables and constant and equal variance of the residuals using visual analysis of the stem and leaf plots and histograms and formal statistical tests including the Kolmogorov-Smirnov and Shapiro-Wilk tests for normality. I will use Levene's test for equality of variances.

If the data adhere to the required assumptions, I will analyze the dependent variables and potential continuous covariates for significant correlations using the Pearson correlation coefficient (r). Significant correlations between the dependent variables suggest that they must be evaluated simultaneously using multivariate statistics. If the dependent variables are significantly correlated, as I expect them to be for the repeated measures variables, I will use MANOVA or MANCOVA, as indicated. If the dependent variables are not significantly correlated, I will use univariate analysis, ANOVA or ANCOVA to test hypotheses.

If the data does not adhere to the required assumptions for parametric tests, I will analyze the dependent variables and covariates for significant correlations using the Spearman rank correlations (rho). I will then test the hypotheses using nonparametric tests. I will use the Mann-Whitney, two independent samples test in place of ANOVA. I

will use the Friedman Test for K related samples in place of repeated measures MANOVA.

I will also complete a post hoc analysis to explore interesting or unusual findings not formally specified by the hypotheses.

3.10 Pilot Study

3.10.1 Pilot Background and Descriptive Statistics

I conducted a pilot study to gather preliminary data and assess the validity of the instrument.[15] Participants were undergraduate audit students at a large metropolitan university. Since students do not have an in-group affiliation with a particular audit firm, I manipulated the group variable by characterizing the client as either a graduate of the participant's university (in-group) or as a graduate of an unnamed university (out-group). I also collected additional demographic data relating to grade point average and courses taken.

Twenty-three participants took the survey; I eliminated four because they failed the group manipulation check. Of the remaining 19, four took under 8 minutes to complete the instrument. Given the length of the instrument, it is unreasonable to believe that those participants supplied the requisite effort and I excluded them from the final analysis. Of the remaining 15 participants, seven received the in-group treatment and eight received the out-group treatment. The mean time to complete was approximately 24

[15] Prior to the pilot data collection, two expert auditors previewed the instrument to determine face validity, realism, and clarity. Experts indicated that the task and background information was both believable and appropriate for novice auditors. I made several small changes to the question text to improve clarity.

minutes, average age was 25 years, and mean GPA was 3.3. Gender was fairly even within each group. Table 1, Panel A includes descriptive statistics. Panel B of Table 1 includes dependent variable data by group.

TABLE 1 – PILOT STUDY
(All participants n = 15)

Panel A
Descriptive Statistics

Time to Complete	
Mean	24.08
Standard Deviation	8.08
Minimum	16
Maximum	36
Gender	
Male	9
Female	6
Age	
Mean	24.08
Standard Deviation	4.82
Minimum	21
Maximum	36
Grade Point Average	
Mean	3.31
Standard Deviation	.39
Minimum	2.30
Maximum	3.80

Panel B
Dependent Variables by Group (mean, standard deviation, range)

	Initial Plausibility	Initial Confidence	Initial Extent of testing	Post-decision Aid Plausibility	Post-decision Aid Confidence	Post-decision Aid Extent of testing
In-group n = 7	56.43 (20.56) 30-90	62.14 (17.29) 40-90	11.43 (7.84) 0-20	47.14 (19.12) 25-80	67.14 (20.38) 40-90	14.43 (8.81) 3-90
Out-group n = 8	49.50 (27.73) 10-90	78.75 (13.29) 60-100	10.38 (6.84) 0-20	55.63 (24.12) 10-85	80.63 (14.25) 60-100	8.88 (5.64) 0-20
Overall n= 15	52.73 (24.05)	71.00 (17.03)	10.87 (6.91)	51.67 (21.60)	74.33 (18.11)	11.47 (7.58)

3.10.2 Pilot Study Results

The small sample size made analysis of the data for assumptions of normality and equal variance problematic. To address this issue, I used nonparametric methods to analyze the data. Conover (1999) suggests using the Mann-Whitney, two independent samples test, when analyzing data which are not normally distributed. Prior to analysis, I analyzed the data for outliers. Noting none, all data were retained within the analysis.

Although the raw mean for initial plausibility indicates that in-group auditors rate plausibility higher than do out-group auditors, statistical tests show insufficient support ($p=.310$) for hypothesis one. Hypothesis two predicts that auditors will be less confident in their judgment when an implausible explanation comes from an in-group member than when it comes from an out-group member. Mean confidence measurements support this hypothesis as mean in-group confidence (62.14) is lower than mean out-group confidence (78.75). Using a Mann-Whitney test, there is a significant difference in confidence between groups ($p=.035$) demonstrating support for hypothesis two.

Hypothesis 3 suggests that in-group bias could affect an auditor's decision to extend testing, even though the auditor has correctly identified the explanation as implausible. Hypothesis 3 is tested both pre- and post-decision aid. To test this hypothesis, responses were split into high (≥ 50) and low (<50) plausibility groups, resulting in 9 high responses and 6 low responses pre-decision aid and 6 high responses and 9 low responses post-decision aid. Using the Mann-Whitney test, I found no significant support either pre-decision aid ($p=.251$) or post-decision aid ($p=.400$) to indicate that auditors who correctly identify an explanation as implausible will extend

testing less when the explanation is given by an in-group member. Although I found no support during the pilot test, recall that the pilot subjects are not auditors, and therefore, have little experience in making decisions about extending testing during fieldwork.

Hypothesis 4 predicts that decision aid use will reduce effectively reduce plausibility judgments for auditors who have initial incorrect judgments. Conover (1999) suggests using the nonparametric Friedman test as a substitute for parametric repeated measures analysis when comparing several related samples. Using the Friedman test, results indicate that the decision aid did not significantly change auditor judgments ($p=.353$). Hypothesis 5 suggests that confidence will increase post-decision aid. Using the Friedman test, there is insufficient evidence to support Hypothesis 5 ($p=.125$). Finally, Hypothesis 6 predicts that auditors who make a correct post-decision aid judgment will also increase their decision to extend testing. Although raw mean hours increased post-decision aid, there is insufficient evidence to support a significant difference between pre-and post-decision aid extent of testing.

3.10.3 Discussion of Design Changes

The pilot study was undertaken to provide preliminary data as well as identify potential weaknesses in the research design. One caveat is that the group manipulation in the pilot study did not exactly replicate the planned group manipulation in the main study (university rather than audit firm affiliation).

Based on the pilot study results, I made several changes to the instrument. Since four of the 23 participants (17 percent) could not recall the group manipulation, I made the manipulation more salient. I significantly reduced the amount of information given

about the client background and presented it in bullet point format. I added an accounting knowledge question to confirm the auditors' internal knowledge about account relationships. I included a question about the participant's experience with affiliated clients, and modified a question pertaining to skepticism training. Finally, I simplified the decision aid in order to make its content more salient.

Expert auditors indicated that staff auditors often complete tasks similar to the one in the study. However, they also noted that based on the amount of background information, several alternative explanations exist for the change in repair and maintenance expense. Peecher and Solomon (2001) suggest that internal validity is more important than mundane realism. Therefore, I reduced the amount of information in the financial statements and firm background to make the task more manageable for the participants. This change reduces noise and eliminates alternative explanations for the change in account balances. The final instrument can be found in Appendix B.

CHAPTER 4: RESULTS

4.1 Background and Descriptive Statistics

I collected data over a three-month period using an online survey software application. Participants were staff and senior auditors from five large national firms; all were located in the Southeastern United States. Fifty-five auditors answered the survey; fifty-three completed all questions. Eleven failed the group manipulation check and three failed the accounting knowledge check, leaving forty-one usable responses for the group bias hypotheses.[16] Table 1 includes the descriptive statistics. Participants included twenty-two seniors and nineteen staff auditors. Mean time to complete the survey was nineteen minutes, with a minimum of 9.25 and a maximum of 58.18. A frequency distribution is included in Figure 5. Average age was about thirty for seniors and twenty-five for staff members. Mean experience with analytical procedures was twenty-seven times (about thirty-nine times for seniors and only six times for staff members). On average, senior auditors worked with affiliated clients thirteen percent of the time, staff members worked with affiliated clients only about six percent of the time. Table 2 shows the number of participants per treatment group. Twenty-four were in-group (client was a

[16] The 25 percent failure rate is high and indicates that these individuals did not attend to the manipulation. While none of the participants who failed the group treatment manipulation check indicated an incorrect client affiliation, all eleven answered that they were unable to tell the client's prior affiliation given the information provided. Given that these participants did not attend to the manipulation, they were dropped from the analysis of hypotheses related to group. Inclusion of these eleven does not qualitatively change results. The three auditors who failed the accounting knowledge check did not demonstrate sufficient knowledge to accurately complete the initial step in plausibility determination. They were also dropped form the analysis.

former audit firm employee) and seventeen were out-group (client was a long-time employee of the client firm).

FIGURE 5

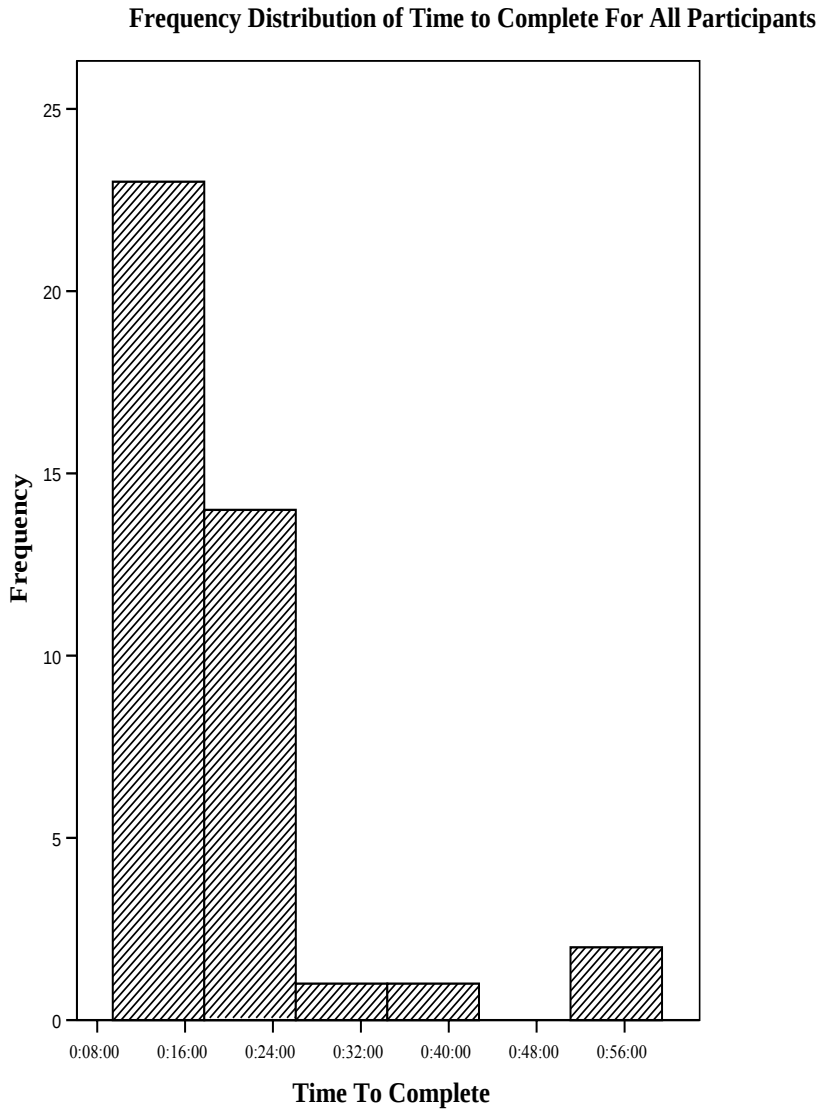


TABLE 2 – PARTICIPANT DEMOGRAPHICS FOR GROUP BIAS HYPOTHESES TESTS
(All participants n = 41)

Panel A- Descriptive Statistics

	Seniors (n=22)	Staff (n=19)	Overall (n=41)
Time to Complete			
Mean	17.51	20.28	19.04
Standard Deviation	5.31	14.43	10.44
Minimum	9.53	9.25	9.25
Maximum	30.28	58.18	58.18
Gender			
Male	17	10	27
Female	5	9	14
Age			
Mean	30.59	25.63	28.39
Standard Deviation	8.18	4.30	7.00
Minimum	24	23	23
Maximum	55	41	55
Analytical Procedures Experience (# of times)			
Mean	39.41	6.43	26.37
Standard Deviation	44.73	10.56	37.12
Minimum	2	0	0
Maximum	200	40	200
Experience with Affiliated Clients (% of total clients)			
Mean	13.41	6.16	9.22
Standard Deviation	20.01	13.01	16.87
Minimum	0	0	0
Maximum	80	50	80
Certified Public Accountant	18	7	25
Highest Education Level			
B.S. Accounting	6	4	10
Master of Accounting	14	10	24
Master of Business Administration	2	3	5
Master - Other	0	2	2

Panel B – NUMBER OF PARTICIPANTS IN EACH TREATMENT CONDITION

Participants per Treatment	N	Senior	Staff
In-group	22	11	11
Out-group	19	13	6
Total	41	24	17

4.2 Correlation Matrices

A comprehensive statistical analysis requires the evaluation of correlations among the dependent variables. If the dependent variables are significantly correlated, a multivariate approach is appropriate. Furthermore, significant correlation of potential continuous covariates with the dependent variables justifies their inclusion in the statistical analysis. I also evaluate correlations between the demographic variables (age, gender, level, analytical procedures experience, and affiliated percentage) and the dependent variables (plausibility, confidence, and extent of testing). Noting no significant correlations, I do not plan to include these demographics variables in the model.

Table 3 includes the Spearman rank correlation coefficient matrices (chosen because of the non-normality of the data) for the fifty participants who passed the accounting knowledge check[17]. All three post-decision aid dependent variables, plausibility, confidence, and extent of testing are significantly positively correlated with their respective pre-decision aid variables. This correlation supports the use of the Friedman test for repeated measures. Pre-decision aid extension of testing is significantly negatively correlated with initial plausibility (rho = -.481). Likewise, post-decision aid extension of testing is significantly negatively correlated with post-decision aid plausibility. These findings suggest support that lower plausibility judgments lead to increased testing, as predicted by Hypothesis 6.

[17] Results for the sample excluding the group manipulation check failures are not qualitatively different.

TABLE 3 – CORRELATION MATRIX

Spearman Rank Correlations (Sig. 2-tailed)

Complete Data Set (n=50)

	Initial Plausibility	Initial Confidence	Initial Extension of Testing	Plausibility Post-decision Aid	Confidence Post-decision Aid	Extension of Testing Post-decision Aid	Affiliated Percentage	Analytical Procedures Experience
Initial Plausibility	1	.-.060	-.481(**)	.694 (**)	-.233	-.428 (**)	-.092	-.157
Initial Confidence		1	-.299	.040	.740 (**)	-.300 (*)	-.135	.084
Initial Extension of Testing			1	-.416 (*)	-.238	.895 (**)	.074	.042
Plausibility Post Decision Aid				1	-.031	-.531 (**)	-.160	-.032
Confidence Post Decision Aid					1	-.322 (*)	-.269	-.024
Extension of Testing Post Decision Aid						1	.054	.007
Affiliated Percentage							1	.381 (*)

4.3 Statistical Analysis

Prior to hypothesis testing, I evaluated the data for compliance with the required statistical assumptions. Random assignment to groups implies that observations are independent for the between-subjects variable, group, but are not independent for the within-subjects factor, decision aid. Univariate analysis relies on an assumption of normality of the dependent variable (Mendenhall and Sincich 1996). To test for univariate normality, I visually analyzed stem and leaf plots and histograms for each dependent variable (plausibility, confidence, and extent of testing) across groups. Given the small sample size, it was difficult to judge normality from the graphs alone. I also analyzed the dependent variables for normality using formal statistical tests: Shapiro-Wilk and Kolmogorov-Smirnov with Lilliefors significance correction. Table 4 includes results. Based on these tests, the dependent variables are not normally distributed. However, these tests are highly sensitive to even small departures from normality and are therefore of limited use (Mendenhall and Sincich 1996).

TABLE 4 – TESTS OF NORMALITY FOR DEPENDENT VARIABLES

	Group	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pre-Decision Aid							
Plausibility	Out	.185	19	.088	.870	19	.015
	In	.172	20	.124	.880	20	.018
Confidence	Out	.286	19	.000	.816	19	.002
	In	.204	20	.028	.820	20	.002
Extent of Testing	Out	.223	19	.014	.829	19	.003
	In	.187	20	.066	.860	20	.008
Post-decision Aid							
Plausibility	Out	.223	19	.014	.852	19	.007
	In	.232	20	.006	.826	20	.002
Confidence	Out	.258	19	.002	.856	19	.008
	In	.222	20	.011	.822	20	.002
Extent of Testing	Out	.203	19	.039	.775	19	.001
	In	.207	20	.024	.832	20	.003

To address these concerns, I used the more appropriate nonparametric tests, which do not rely on the assumption of normality. For hypotheses that test variables with independent observations, I used the Mann-Whitney tests. For hypotheses that test repeated measures variables, I used the Friedman test.

I evaluated the data for outliers and noted observations with values greater or less than two standard deviations from the mean. Three observations for initial confidence fit this criterion (all rated confidence at 10), while two observations for extent of testing fit this criterion, (rated at 40.00 and 60.00). Removing these observations did not qualitatively change results. Given the small sample size and limited justification for removal, I retained these observations within the dataset.

4.3.1 In-Group Bias and its Effect on Initial Audit Judgment

The purpose of this section is to report the findings as to whether in-group bias affects auditor plausibility judgments. Prior to testing this hypothesis, I used Mann-Whitney to confirm that there was no statistically significant difference between groups in auditors' ratings of client competence (p=.200). Thus, I am reasonably assured that each group perceived the client equally competent and that differences in plausibility judgments are unaffected by differences in client competence judgments. Table 5, Panel A displays the plausibility judgment mean, standard deviation, range and number of participants by level and treatment group. Participants rated plausibility on a 101-point scale where 0 indicates "not at all plausible" and 100 indicates "highly plausible." I first reviewed the plausibility raw means for the total sample, noting that means were in the expected direction (in-group 54.50 and out-group 47.84). Using the Mann-Whitney nonparametric statistic, I found insufficient support to conclude that groups were

significantly different (p=.572 two-tailed). Upon further analysis, I noted that senior means were in the expected direction (in-group 56.64 and out-group 35.36), while staff means were in the opposite direction. Using Mann-Whitney, I tested the significance for seniors only, finding insufficient support (p=.097 one-tailed) to conclude a significant difference between groups.

TABLE 5 – TEST OF IN-GROUP BIAS ON INITIAL PLAUSIBILITY JUDGMENT [a]
(mean, standard deviation, range, n)

Panel A- Descriptives

	Senior	Staff	
In-Group	56.64 (36.34) 10-95 11	52.36 (36.35) 1-100 11	54.50 (35.54) 22
Out-Group	35.36 (31.96) 10-89 11	65.00 (23.76) 25-95 8	47.84 (31.83) 19
	46.00 (35.12) 22	57.68 (31.54) 19	

a- Plausibility is measured on a 101-point scale where 0 is "not at all plausible" and 100 is "highly plausible"

(1) Using Mann-Whitney, one-tailed p-value is insignificant at the .05 level.
(2) No test is performed as means are in the opposite direction of prediction.

Panel B – Total Sample

Mann-Whitney Ranks for Total Sample

	Group	N	Mean Rank	Sum of Ranks
Plausibility	Out-group	19	19.87	377.50
	In-group	22	21.98	483.50
	Total	41		

Test Statistics Plausibility by Group for Total Sample

	Plausibility
Mann-Whitney U	187.500
Wilcoxon W	377.500
Z	-.565
Asymp. Sig. (2-tailed)	.572

Panel C – Seniors Only

Mann-Whitney Ranks for Seniors

	Ingroup 1	N	Mean Rank	Sum of Ranks
Plausibility	0	11	9.68	106.50
	1	11	13.32	146.50
	Total	22		

Test Statistics by Group for Seniors

	Plausibility
Mann-Whitney U	40.500
Wilcoxon W	106.500
Z	-1.338
Asymp. Sig. (2-tailed)	.181
Exact Sig. [2*(1-tailed Sig.)]	.193
One tailed Sig.	.097

4.3.2 In-group Bias and it Effect on Auditor Confidence

Hypothesis 2 predicts that participants who received an implausible explanation from an in-group client would be *less* confident in their initial judgment than auditors who received an implausible explanation from an out-group client. Table 6, Panel A displays the mean, standard deviation, range and number of participants by level and treatment group for the initial confidence variable. Participants indicated their confidence level on a 101-point scale where 0 indicates “not at all confident” and 100 indicates “completely confident”. Means

are in the predicted direction for the total sample (in-group 62.50 and out-group 71.95), for the seniors (in-group 64.09 and out-group 74.27) and for the staff (in-group 60.91 and out-group 68.75). Using Mann-Whitney tests, there is insufficient evidence to support Hypothesis 2 for the total sample (p=.654), for senior auditors (p=.562), or for staff auditors (p=.968).

TABLE 6 – TEST OF IN-GROUP BIAS ON INITIAL CONFIDENCE [a]
(mean, standard deviation, range, n)

Panel A - Descriptives

	Senior	Staff	
In-Group	64.09 (32.24) 10-95 11	60.91 (32.47) 15-90 11	62.50 (31.61) 22
Out-Group	74.27 (30.06) 10-100 11	68.75 (15.30) 45-85 8	71.95 (24.51) 19
	69.18 (30.86) 22	64.21 (26.31) 19	

a – confidence is measured on a 101-point scale where 0 is "not at all confident" and 100 is "completely confident".

Panel B – Total Sample

Mann-Whitney Ranks for Total Sample

	Group	N	Mean Rank	Sum of Ranks
Initial Confidence	Out-group	19	21.89	416.00
	In-group	22	20.23	445.00
	Total	41		

Test Statistics by Group for Total Sample

	Initial Confidence
Mann-Whitney U	192.000
Wilcoxon W	445.000
Z	-.449
Asymp. Sig. (2-tailed)	.654

Panel C - Seniors

Mann-Whitney Ranks for Seniors

	Group	N	Mean Rank	Sum of Ranks
Initial Confidence	Out-group	11	12.36	136.00
	In-group	11	10.64	117.00
	Total	22		

Test Statistics by Group for Seniors

	Initial Confidence
Mann-Whitney U	51.000
Wilcoxon W	117.000
Z	-.632
Asymp. Sig. (2-tailed)	.527
Exact Sig. [2*(1-tailed Sig.)]	.562

Panel D – Staff

Mann-Whitney Ranks for Staff

	Group	N	Mean Rank	Sum of Ranks
Initial Confidence	Out-group	8	9.88	79.00
	In-group	11	10.09	111.00
	Total	19		

Test Statistics by Group for Staff

	Confidence 1
Mann-Whitney U	43.000
Wilcoxon W	79.000
Z	-.083
Asymp. Sig. (2-tailed)	.934
Exact Sig. [2*(1-tailed Sig.)]	.968

4.3.3 In-group Bias and it Effect on Auditor Decisions to Extend Testing

Hypothesis 3 predicts that in-group bias persists in an auditor's decision to extend testing, even when the auditor correctly identifies the explanation as implausible. For this test, I used a subset of "low plausibility" auditors to represent auditors who are correct. In lieu of a normative answer, I considered auditors who rated plausibility less than 50 % to be correct. Table 7, Panel A displays the mean, standard deviation, and range for the dependent variable extent of testing. Panel A also includes the number of participants by level and treatment group. The extent of testing measurement represents the number of hours participants chose to extend analytical procedures testing. Participants selected this amount after making plausibility and confidence judgments. Using a Mann-Whitney test, I evaluated this hypothesis both pre and post-decision aid. As noted in *section 4.2*, plausibility rating is significantly correlated with the dependent variable of interest "decision to extend testing" both pre- and post-decision aid. Partitioning the sample to include only "correct" responses should sufficiently address this correlation. Initial extent of testing is significantly correlated (rho = .881) with post-decision aid extent of testing, but cannot be accommodated by nonparametric procedures. An analysis of the raw means for each group indicates that extent of testing is in the opposite direction from predicted

for both pre-decision aid (in-group 14.89 and out-group 11.11) and post-decision aid (in-group 17.44 and out-group 12.44). Given the raw means for auditors who correctly assess an explanation, a statistical test is unjustified. There is insufficient evidence that group affiliation impacts the auditor's decision to extend testing either pre- or post-decision aid. A post hoc analysis in *section 4.4* further investigates this finding.

TABLE 7– TEST OF IN-GROUP BIAS ON DECISION TO EXTEND TESTING: CORRECT JUDGMENTS ONLY
(mean, standard deviation, range, n)

	Pre-decision Aid	Post -decision Aid
In-Group Extent of Testing	14.89 (11.67) 2-40 9	17.44 (13.99) 4-40 9
Out-Group Extent of Testing	11.11 (9.33) 0-20 9	12.44 (8.05) 0-20 9

4.3.4 Discussion of Analysis of Decision Aid Hypotheses

As noted in *section 4.1*, eleven participants failed to answer the group manipulation check correctly. Given that I found insufficient support to indicate the presence of in-group bias (and there is no reason to believe that group bias affects decision aid effectiveness), there is no justification to exclude the participants who failed the manipulation check from the analysis. I test the decision aid hypotheses using the complete sample[18]. Table 8 includes descriptive statistics for the sample including manipulation check failures.

[18] Note that two of the additional participants failed to indicate post-decision plausibility, confidence, and extent of testing, resulting in a final sample of 50.

TABLE 8– PARTICIPANT DEMOGRAPHICS FOR DECISION AID HYPOTHESES TESTS
(All participants n = 50)

	Seniors (n=26)	Staff (n=24)	Overall (n=50)
Time to Complete			
Mean	19.27	18.17	18.53
Standard Deviation	12.49	12.49	11.14
Minimum	9.53	9.25	9.25
Maximum	45.36	58.18	58.18
Gender			
Male	21	14	35
Female	5	10	15
Age			
Mean	31.04	26.08	28.66
Standard Deviation	8.59	4.39	7.28
Minimum	24	23	23
Maximum	55	41	55
Analytical Procedures Experience (# of times)			
Mean	38.12	5.72	25.87
Standard Deviation	44.67	10.75	39.91
Minimum	2	0	0
Maximum	200	40	200
Experience with Affiliated Clients (% of total clients)			
Mean	13.48	7.71	10.65
Standard Deviation	18.56	16.77	17.92
Minimum	0	0	0
Maximum	80	75	80
Certified Public Accountant	22	8	30
Highest Education Level			
B.S. Accounting	8	4	12
Master of Accounting	15	14	29
Master of Business Administration	3	4	7
Master - Other	0	2	2

4.3.5 Decision Aid Use and its Effect on Auditor Plausibility Judgments

Hypothesis 4 tests for the effectiveness of a decision aid on improving plausibility judgments for auditors who were initially incorrect. In this study, a reduction in plausibility rating represents an improvement in judgment (since the explanation given is

implausible). I partition the total sample by initial plausibility judgments considering judgments greater than or equal to 50% as incorrect. As shown in Table 9, Panel A, overall, plausibility judgments decreased after use of the decision aid (initial plausibility mean 75.77 and post-decision aid plausibility mean 49.76). The appropriate nonparametric test for related samples is the Friedman test (Conover 1999). Results for the Friedman test for the total sample (Table 9, Panel B) find support for the effectiveness of the decision aid to improve plausibility judgments (p=.000). Hypothesis 4 is supported. Additional analysis finds that hypothesis 4 is also supported for seniors (Table 7, Panel C) (p=.008) and for staff (Table 9, Panel D) (p=.001).

TABLE 9– EFFECT OF DECISION AID ON AUDITOR PLAUSIBILITY JUDGMENTS (Incorrect auditors only)
(mean, standard deviation, range, n)

Panel A – Descriptives

	Seniors	Staff	
Pre-decision Aid Plausibility	80.33 (14.00) 50-95 12	72.89 (16.36) 50-100 19	75.77 (15.68) 31
Post-decision Aid Plausibility	55.73 (34.65) 0-95 11	46.11 (32.34) 0-100 18	49.76 (32.96) 29

Panel B – Total Sample

Friedman Ranks for Total Sample

	Mean Rank
Pre-decision Aid Plausibility	1.84
Post-decision Aid Plausibility	1.16

Test Statistics for Change in Plausibility for Total Sample

N	29
Chi-Square	18.182
df	1
Asymp. Sig.	.000

Panel C –Seniors

Friedman Ranks for Seniors

	Mean Rank
Pre-decision Aid Plausibility	1.82
Post-decision Aid Plausibility	1.18

Test Statistics for Change in Plausibility for Seniors

N	11
Chi-Square	7.000
df	1
Asymp. Sig.	.008

Panel D – Staff

Friedman Ranks for Staff

	Mean Rank
Pre-decision Aid Plausibility	1.86
Post-decision Aid Plausibility	1.14

Test Statistics for Change in Plausibility for Staff

N	18
Chi-Square	11.267
df	1
Asymp. Sig.	.001

Section 4.3.6 Effect of Decision Aid on Confidence

Hypothesis 5 predicts that auditor confidence will *increase* post decision aid. I measured confidence on a 101-point scale where 0 is "not at all confident" and 100 is "completely confident." Table 10 includes the mean, standard deviation, range and

number of observations. Pre-decision aid confidence ratings ranged from 10 to 100, with a mean of 68.79 (standard deviation 27.96). Post-decision aid confidence ratings ranged from 0-100 with a mean of 65.74 (standard deviation 32.72). Contrary to expectations, raw mean confidence scores decreased for both seniors and staff members; thus Hypothesis 5 is not supported. *Section 4.4* contains a post hoc analysis that explores the changes in confidence.

TABLE 10–CHANGE IN CONFIDENCE POST-DECISION AID
(mean, standard deviation, range, n)

Descriptives

	Seniors	Staff	
Pre-decision Aid Confidence	69.70 (30.99) 10-100 27	67.80 (24.88) 15-95 25	68.79 (27.96) 52
Post-decision Aid Confidence	66.92 (35.28) 0-100 26	64.46 (24.88) 0-100 24	65.74 (32.72) 50

Section 4.3.7 Effect of Decision Aid on Extent of Testing

As noted, it is insufficient to examine auditor judgments alone, as auditor decisions ultimately impact audit effectiveness. This test explores whether auditors will improve their decisions after using a decision aid. Hypothesis 6 predicts that auditors who initially make an incorrect judgment, will increase their extent of testing after using a decision aid. In keeping with prior procedures, I restrict my analysis to auditors who initially provided an incorrect judgment (plausibility judgment greater than or equal to 50%). Table 11, Panel A includes the mean, standard deviation, and range for the dependent variable extent of testing both pre- and post-decision aid. After having access to the decision aid, participants increased testing by 61 %, from 6.34 hours to 10.21

hours. Using the Friedman test, which is the appropriate nonparametric statistic for a repeated measures analysis, this increase in the extent of testing is significantly greater post-decision aid for the total sample (p=.000). Additional analysis shows that Hypothesis 6 is also supported for staff auditors (p=.001), but not for senior auditors (p=.083). *Section 4.4* includes a post hoc analysis of changes in extent of testing for auditors who are initially correct.

TABLE 11 – TEST OF EFFECT OF DECISION AID ON EXTENT OF TESTING
(INITIALLY INCORRECT AUDITORS ONLY)
(mean, standard deviation, range, n)

Panel A – Descriptives

	Seniors	Staff	
Pre-decision aid Extent of Testing	5.00 (5.79) 0-16 11	7.17 (8.38) 0-30 18	6.34 (7.28) 29
Post-decision aid Extent of Testing	6.27 (5.06) 0-16 11	12.61 (14.86) 0-60 18	10.21 (12.37) 29

Panel B – Total Sample

Friedman Ranks for Total Sample

	Mean Rank
Pre-decision Aid Extent of Testing	1.26
Post-decision Aid Extent of Testing	1.74

Test Statistics for Change in Extent of Testing for Total Sample

N	29
Chi-Square	14.000
df	1
Asymp. Sig.	.000

Panel C – Seniors

Friedman Ranks for Seniors

	Mean Rank
Pre-decision Aid Extent of Testing	1.36
Post-decision Aid Extent of Testing	1.64

Test Statistics for Change in Extent of Testing for Seniors

N	11
Chi-Square	3.000
df	1
Asymp. Sig.	.083

Panel D – Staff

Friedman Ranks for Staff

	Mean Rank
Pre-decision Aid Extent of Testing	1.19
Post-decision Aid Extent of Testing	1.81

Test Statistics for Change in Extent of Testing for Staff

N	18
Chi-Square	11.000
df	1
Asymp. Sig.	.001

4.4 Post Hoc Analysis

I perform the following post hoc analyses to investigate prior nonsignificant findings and to explore relevant relationships.

Hypothesis 3 suggested that in-group bias could cause auditors who correctly identified a client explanation as implausible to curtail additional testing. I found no support to indicate that group bias affects decisions to extend testing. However, it is important to confirm that auditors who correctly identified a client explanation as implausible did, in fact, increase testing (independent of group). I conducted the following Mann-Whitney nonparametric test to confirm that auditors who judged the client explanation as implausible increased testing more than auditors who judged the

client explanation as plausible. Table 12 includes the ranks and test statistics. Findings suggest that auditors acted as expected and that decisions to extend testing logically followed judgments (p=.008).

TABLE 12 POST HOC ANALYSIS OF EXTENT OF TESTING

Mann-Whitney Ranks for Total Sample

	Initial Plausibility	N	Mean Rank	Sum of Ranks
Initial Extent of Testing	Correct	21	33.21	697.50
	Incorrect	31	21.95	680.50
	Total	52		

Test Statistics by Group for Total Sample

	Initial Extent of Testing
Mann-Whitney U	184.500
Wilcoxon W	680.500
Z	-2.653
Asymp. Sig. (2-tailed)	.008

Hypothesis 5 proposed that confidence would increase post-decision aid for all auditors. A post hoc analysis analyzed the changes in confidence by initial plausibility, separating auditor into groups of initially correct and initially incorrect. Table 13, Panel A includes descriptive statistics. Table 13, Panel B reports the Friedman test statistics for pre- and post-decision aid confidence for auditors who were initially correct. Confidence significantly increased post-decision aid (p=.005). This result is logical because the decision aid provided confirming evidence. It also partially supports Hypothesis 5. Table 13, Panel C reports Friedman test statistics for pre- and post-decision aid confidence for auditors who were initially incorrect. While raw means indicate that confidence decreased post-decision aid, this decrease was not significant (p=.127).

TABLE 13 - POST HOC ANALYSIS OF CONFIDENCE BY INITIAL JUDGMENT
(mean, standard deviation, range, n)

Panel A

	Initially Correct	Initially Incorrect
Pre-decision aid Confidence	64.52 (35.03) 10-100 21	72.66 (21.33) 10-95 29
Post-decision aid Confidence	71.57 (33.36) 10-100 21	61.52 (32.16) 0-100 29

Panel B

Friedman Ranks for Initially Correct Auditors

	Mean Rank
Pre-decision aid Confidence	1.31
Post-decision aid Confidence	1.69

Test Statistics for Initially Correct Auditors

N	21
Chi-Square	8.000
df	1
Asymp. Sig.	.005

Panel C

Friedman Ranks for Initially Incorrect Auditors

	Mean Rank
Pre-decision aid Confidence	1.62
Post-decision aid Confidence	1.38

Test Statistics for Initially Incorrect Auditors

N	29
Chi-Square	2.333
df	1
Asymp. Sig.	.127

Hypothesis 6 examines whether decision aid use improves decisions for auditors who are initially incorrect. I performed additional testing to confirm that auditors who are initially correct also increase testing post-decision aid. Table 14, Panel A provides descriptive statistics of pre- and post-decision aid extent of testing for initially correct auditors. Table 14, Panel B shows test results. There is significant support (p=.014) that initially correct auditors also increased testing post-decision aid.

TABLE 14 - POST HOC ANALYSIS OF EXTENT OF TESTING FOR INITIALLY CORRECT AUDITORS
(mean, standard deviation, range, n)

Panel A

Pre-decision aid Extent of Testing	13.29 (10.05) 0-40 21
Post-decision aid Extent of Testing	15.57 (11.01) 0-40 21

Panel B

Friedman Ranks for Initially Correct Auditors

	Mean Rank
Pre-decision aid Extent of Testing	1.36
Post-decision aid Extent of Testing	1.64

Test Statistics for Initially Correct Auditors

N	21
Chi-Square	6.000
df	1
Asymp. Sig.	.014

CHAPTER 5: CONCLUSION

5.1 Discussion of Results

Table 15 includes a summary of findings. I found no support for an in-group bias effect on auditor plausibility judgments, confidence in those judgments or decisions to extend testing. I found strong support for the effect of a decision aid on improvements in auditor plausibility judgments and decisions to extend testing. I found no support for an increase in confidence post-decision aid. I follow with a discussion of findings and possible reasons for lack of significant findings.

TABLE 15 SUMMARY OF FINDINGS

Hypothesis	IV	DV	Supported	p-value
1	Group	Plausibility	No	.572
2	Group	Confidence	No	.654
3 (pre-decision aid)	Group	Extent of Testing	No	---
3 (post-decision aid)	Group	Extent of Testing	No	---
4	Decision Aid	Plausibility	Yes	.000
5	Decision Aid	Confidence	No	---
6	Decision Aid	Extent of Testing	Yes	.000

Legislation that restricts client hiring of former external auditors provides evidence that there is a belief that in-group bias exists and that it affects auditor independence. Although theory suggests that individuals demonstrate in-group bias in the form of extending unjustified trust to their group members, auditors may or may not exhibit this bias in an audit context. I employ an experiment to investigate potential differences in auditor judgments based on the client's former employment with the audit

firm. Hypothesis 1 predicted that auditors would judge an explanation from an in-group client as more plausible than an explanation from an out-group client.

I partitioned the sample into seniors and staff to analyze the data in more detail. An analysis of raw means for seniors indicated that plausibility judgments were, in fact, higher for the in-group treatment, (56.64 versus 35.36); however, the difference was not statistically significant. Raw means for staff auditors' plausibility judgments are in the opposite direction with out-group plausibility judgments higher than in-group plausibility judgments (65.00 versus 52.36); again, the difference is not statistically significant. The raw means do suggest that seniors are more likely to exhibit in-group bias than are staff auditors. Seniors could be more likely to exhibit in-group bias because they likely have been a part of the audit firm group for a longer period of time than have staff auditors. In addition, staff auditors are likely recent graduates of accounting programs. These programs typically cover professional standards, which emphasize professional skepticism. The emphasis on skepticism could cause staff auditors to pay close attention to client source reliability, thus mitigating in-group bias. Although the current study found insufficient evidence to support an effect of in-group bias on auditor plausibility judgments in an analytical procedures task, increasing the sample size of senior auditors only might shed light on the prevalence of in-group bias.

While theory supports finding a difference, there are several possible reasons why I did not find a significant difference. These include lack of power, experimental weaknesses, or absence of a difference in fact. First, I had access to a limited sample of auditors, which resulted in a small pool of participants. To rectify this situation, I plan to collect additional data. Second, several participants failed the manipulation check and were removed from the analysis. A failed manipulation check is often the result of an

experimental weakness. I plan to improve the study by making the client affiliation manipulation more salient, perhaps by including detailed information about the controller's background, particularly his or her experience at the audit (client) firm. Finally, it may be that auditors do not exhibit in-group bias when performing audit procedures. Both extensive training and attention to professional skepticism act against an individual's inclination to exhibit in-group bias and could mitigate this bias.

Hypothesis 2 predicted an effect of in-group bias on confidence such that auditors who received an implausible explanation from an in-group client would be less confident in their plausibility judgments than an auditor who received the same explanation from an out-group client. Although there is insufficient evidence to support a statistical difference between groups, the raw means are in a direction consistent with Hypothesis 2. In-group seniors have a mean confidence level of 64.09, while out-group seniors demonstrate a higher mean confidence of 74.27. The same relationship holds for staff members' mean confidence: in-group, 60.91 and out-group, 68.75. Prior research has indicated that factors such as experience and gender could moderate confidence. Although I collected data regarding participants' analytical procedures experience and gender demographics, the use of nonparametric statistics prevented their inclusion in the analysis, since there is no nonparametric procedure that allows for the inclusion of covariates. A larger sample size could allow the use of parametric statistics, which, in turn, accommodate models that are more powerful and allow for the inclusion of covariates.

Hypothesis 3 predicted that in-group bias would affect an auditor's decision to extend testing such that even though the auditor had made a correct plausibility judgment, he or she would extend testing less if the client was a former audit team member. In other words, even though an auditor "knows" that a client is providing an implausible

explanation, he or she could still choose to "overlook" the inconsistency of the explanation because the client is a former auditor from his or her firm. I tested for this effect both pre- and post-decision aid. I examined the means and found that pre-decision aid, in-group auditors extended testing by 14.89 hours, while out-group auditors extended testing an average of 11.11 hours. Likewise, post-decision aid measures show that in-group auditors extended testing by 17.44 hours, while out-group members extended testing by only 12.44 hours. Although there is no evidence of a group effect, in a post hoc analysis, I analyzed extent of testing to confirm that an auditor who makes a correct initial plausibility judgment extends testing more than an auditor who makes an incorrect initial plausibility judgment. I find significant support that auditors do, in fact, extend testing more when they are correct than when they are incorrect. This finding indicates that participants expended the requisite cognitive effort to the task. Thus, results likely indicate that there is no in-group bias in auditors' decisions to extend testing in an analytical procedures task.

In addition to testing for group biases, I also examined whether a simple decision aid could improve auditors' plausibility judgments, confidence in those judgments, and decisions. Hypothesis 4 predicted that auditors who provided initially incorrect (high plausibility) judgments, would decrease those judgments after using a decision aid. Nonparametric statistical analyses provided evidence that decision aids improved auditors' plausibility judgments in an analytical procedures task. This effect was supported for the total sample and for staff and senior auditors independently. Seniors significantly reduced their plausibility judgments from 80.33 to 55.73, while staff auditors significantly reduced their plausibility judgments from 72.89to 46.11. These

findings justify the effectiveness of a simple decision aid in improving auditors' performance during analytical procedures.

Prior literature indicates confidence improves as individuals gather more information. Hypothesis 5 predicted that auditors would increase their confidence after using a decision aid. A review of the raw means indicated that confidence decreased overall for both seniors (69.70 to 66.92) and staff members (67.80 to 64.46). I explored the change in confidence further in a post hoc analysis. Confirmation bias suggests that individuals tend to disregard disconfirming evidence and overweight confirming evidence. Although I found no prior literature indicating that this effect is associated with changes in confidence, I chose to partition the sample by initial plausibility judgment to explore this variable further. I found that for auditors who were initially correct (low plausibility), confidence significantly increased after using a decision aid. The decision aid's confirmation of their original judgment likely is responsible for their increased confidence. However, confidence for auditors who were initially incorrect showed a marginally significant decrease. This decreased confidence is possibly a result of the disconfirming evidence provided to those auditors by the decision aid. Although initially incorrect auditors improved their plausibility judgment post-decision aid (indicating reliance on the decision aid), they would logically have felt less confident about their own ability to audit. It is possible that when they answered the confidence question, they were indicating confidence in their ability, rather than confidence in that particular judgment.

Hypothesis 6 predicted that the use of a decision aid would improve auditors' decisions to extend testing. As I did before in the tests for Hypothesis 4 (effect of decision aid on plausibility judgments); I partitioned the sample, choosing only auditors

who were initially incorrect (high plausibility). I found that those auditors significantly increased the extent of testing after using a decision aid. This finding supports the effectiveness of a decision aid on auditor decisions to extend testing in an analytical procedures task. I also analyzed the participants by level. While senior auditors increased their extent of testing from a mean of 5.00 to 6.27, (the correct direction but a statistically insignificant difference), staff auditors increased their extent of testing from 7.17 to 12.61, (a statistically significant difference). Although only staff auditors increased testing significantly, seniors also increased testing. These findings support the hypothesis that decision aids improve decisions to extend testing.

A post hoc analysis explores the effect of a decision aid on extent of testing for initially correct (low plausibility) auditors. Raw means for extent of testing increased from 13.29 pre-decision aid to 15.57 post-decision aid. This increase was statistically significant, demonstrating that decision aids are effective in improving auditor decisions for both initially correct and initially incorrect auditors.

5.2 Summary

This study had two objectives: first, to investigate whether in-group bias was evident in auditors' judgments, confidence in those judgments, and decisions and second, to examine whether a decision aid was effective in improving auditors' judgments, confidence in those judgments, and decisions. Auditors completed an online task in which they evaluated client explanations for changes in an account balance. The client source's affiliation differed between participants – in-group clients were former members of the participant's audit firm, out-group members were long-time client employees. Based on Social Identity Theory, I predicted that auditors would exhibit in-group bias in their judgments and decisions, assigning a higher level of plausibility to explanations

obtained from a former group member, and reducing testing for in-group client audits. I found no effect for in-group bias on judgment, confidence in judgment, or extent of testing.

After collecting auditors' initial plausibility judgments, confidence ratings, and decisions, I presented them with a decision aid report. I expected the structured design of the report to improve audit plausibility judgments, confidence in those judgments, and decisions to extend testing. The decision aid improved plausibility judgments for both staff and senior auditors, and for both initially incorrect and initially correct auditors. The decision aid also increased confidence for auditors who made initially correct judgments, but not for auditors who were initially incorrect. For auditors who were initially incorrect, there was a marginally significant reduction in confidence. Although decision aid use did not result in increased confidence for all auditors, the decision aid resulted in improved plausibility judgments and decisions to extend testing. Practitioners should note the positive effects of providing a decision aid during analytical review.

Professional skepticism is necessary to audit effectively; however, auditors are subject to human biases. An auditor's failure to adjust appropriately his or her assessment of client objectivity may compromise independence and audit effectiveness. Audit firms should be aware of the potential for this bias, so that they can reduce the risk of audit failure. Congress and the AICPA already have noted that the hiring of former audit team members could lead to an impairment of independence and objectivity. This study sought to improve the understanding of both the existence and extent of this claim. However, due to the small sample size, results about in-group bias are inconclusive. Additional data collection could provide results that are more conclusive.

A simple decision aid was effective in improving judgments overall. Both seniors and staff members improved their judgments, as well as their decisions post-decision aid. The decision aid also improved judgments and decisions not only for auditors who were initially incorrect, but also for auditors who initially rated plausibility low. An added benefit is that the decision aid increased confidence for auditors who were initially correct. This increase in confidence possibly stems from the positive feedback offered by the decision aid. The decision aid used in this study was a simple listing of account relationships and expectations related to those relationships. The decision aid provided valid, reasonable advice to auditors during the task. Audit firms could find the use of simple decision aids a low-cost way to improve auditor performance.

5.3 Limitations

5.3.1 Small Sample Size

Pedhazur and Schmelkin (1991) list four elements to consider when using a decision-based strategy for hypothesis testing.[19] These elements are effect size, Type I error, Type II error and sample size. In this study, effect size refers to the magnitude of the difference between groups (and between pre- and post-decision aid) for the dependent variables plausibility, confidence, and extent of testing. A Type I error (designated by α) is the error of rejecting the null, when it should not have been rejected (Pedhazur and Schmelkin 1991). In this case, a Type I error would be to conclude that there is an in-group bias, when there is not actually an in-group bias. A Type II error (designated by β) is the error of failing to reject the null hypothesis, when, in fact, it should be rejected.

[19] A decision-based strategy refers to using a pre-determined value for hypothesis testing. For example, when comparing two groups, setting an α (alpha) value to determine rejection of the null.

This is also known as the power to detect a difference, should one exist. An example in this study would be finding no significant group bias, when, in fact, there is a significant group bias. Sample size, the fourth element, inter-relates with effect size, and both Type I and Type II errors, such that increases in sample size, increase power, while decreases in sample size decrease power (holding effect size constant). In this study, the sample size was small, which made determination of normality of the data problematic. Without the ability to confirm that the data was normal, I chose to use nonparametric statistical methods (which do not rely on normality). Nonparametric methods are more likely to result in a Type II error (less likely to detect differences). Given that I designed the study with careful attention to internal validity, I estimate that my failure to detect group bias is a result of either small sample size or small (no) bias effects in fact. While there is insufficient evidence to reject the null hypothesis (of no group bias), based on the data collected, I likewise cannot conclude that in-group bias does not exist for auditors. By increasing sample size in the future, I hope to arrive at results that are more conclusive.

5.3.2 Alternative Explanations

There are a number of limitations to consider in interpreting the results of the current study. Given the heightened awareness of threats to independence resulting from auditor affiliation, participants could have engaged in hypothesis guessing. Demand effects from hypothesis guessing typically result in participants trying to "give the researcher what he or she wants." In this study, participants could have wanted to appear in the best light possible, answering in such a way as to obscure their inclination toward in-group bias.

Limitations to the findings of a reduction in plausibility post decision-aid could be due to a recency effect, rather than a mitigation of in-group bias. Recency argues that auditors overweight information received later in a sequence.[20] In this study, since auditors receive the decision aid report last, they could have placed more weight on its recommendation. Both Hogarth and Einhorn (1992) and Ashton and Ashton (1988) find recency effects for a series of conflicting evidence. However, the tasks used in those studies were not analytical procedures tasks. Asare and Messier (1991) note that in an unpublished study, Bonner and Butler (1989) did not find recency effects in an analytical procedures task. Confirmation bias (Church 1990) could also mitigate the effectiveness of the decision aid. Confirmation bias exists when individuals tend to overweight evidence that supports their initial beliefs. Auditors who initially believe the client could be more likely to disregard the decision aid report, resulting in a non-significant finding. However, Smith and Kida (1991) find that auditor's conservatism precludes the use of confirmatory strategies. Since participants are practicing auditors, confirmation bias is unlikely.

5.3.3 Experimental Context

The experimental context is also a limitation. The sterility of an online experiment cannot capture the face-to-face interactions present in an actual audit. When faced with individuals that they know personally and with whom they have a working relationship and history, auditors may subconsciously make different judgments than they would in an experimental setting. In-group bias in an audit context might be more subtle and difficult to recreate in an experimental setting. This study is also limited to positive prior

[20] Asare and Messier (1991) provide an in-depth summary of belief adjustment audit research.

relationships between the parties. Circumstances in which the past relationship is negative could result in different findings.

The online method of data collection has limitations as well. The researcher cannot observe participants as they proceed through the survey; this lack of supervision reduces experimental control. Participants can engage in multiple tasks (e.g., surfing the web, talking on the phone, answering e-mails) while completing the online survey. Participants can also leave the computer and return later leaving the researcher to guess whether the extra time spent online was, in fact, representative of added effort or lack of effort. In this particular study, an additional limitation arose from the recruiting method. The researcher had no control over which auditors at a firm took the survey. Therefore, selection bias could have been a factor in the results. Auditors who took the survey could have been the "less capable" auditors with more free time. On the other hand, partners could have selected the "more capable" auditors to answer the survey in order to present their firm in the best light.

5.4 Future Research

There are several avenues for future research including addressing research design weaknesses, using alternative research methods, extending research parameters, and altering the decision aid. As noted above, the research design was limited. Recency provides an alternative explanation to findings of decision aid effectiveness. Prior research suggests a recency effect for mixed evidence in a content-rich audit setting (Tubbs et al. 1990). This issue could be addressed by including a group that receives the decision aid concurrently with the client explanation and comparing that group with pre-decision aid judgments. A large number of participants (11 out of 55 or 20%) failed the

between-subjects group affiliation manipulation check. While the removal of these observations is justified, the smaller sample size reduced the power of the study. Future trials can be modified to make the group manipulation more salient. Alternatively, researchers can require participants to respond to a set of questions that ensures they are aware of the manipulation before proceeding with the experiment.

Another avenue for future research is to use an alternative research method. Given that in-group bias appears sensitive to face-to-face cues, an experiment that uses actual firm auditors interacting with participants could improve results. An archival approach using working papers for completed audits would provide a richer data set. By analyzing auditors' work, I could explore whether auditor judgments and decisions differ based on the presence/absence of an affiliated client.

A natural and relevant extension of this research is to vary the participants of interest. Archival studies including Lennox (2005) and Menon and Williams (2004) find evidence of affiliation bias at the partner level. Based on the current study, there is some evidence that seniors exhibit bias, while staff members do not. Using managers and partners in an experimental study could reveal stronger biases. Another extension would explore affiliation at various levels; for example, does affiliation (in-group bias) occur between members of the same office, the same firm, or even between Big Four group members? In addition, does in-group bias depend on the audit task? This study used a single task, analytical procedures related to expense accounts, often completed by a lower level employee. Given the multitude of tasks completed during an audit, it would be worthwhile to explore tasks that have a larger impact on the final audit opinion (*e.g.,* evaluation of a going concern). As a final point, given the effectiveness of the decision aid report, future research should investigate the development and effectiveness of

decision aids in audit practice. Eining et al. (1997) find that *constructive dialogue*, a form of interaction between participants and the decision aid, auditor performance. The decision aid in this study could be modified to include an interactive component. The current study found that staff auditors relied heavily on their plausibility judgments in making the decision to extend testing. Given the link between judgments and decision-making, it is worthwhile to study how decision aids can improve audit practice.

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Appendix A

Background Material[21] and DecisionSERVE Report

Client Background

Continental Transport Inc. is one of North America's largest logistics companies, with operations in the United States, Canada, Mexico, South America, Europe, and Asia. Most of their revenue comes from providing truck, rail, ocean, and air transportation throughout the world.

Continental Transport Inc. works with Fortune 500/Blue Chip companies and family-owned and start-up businesses. They develop logistics plans and provide the people, transportation, and execution to make the plans work. Their 2,000+ motor carriers provide flatbed, temperature controlled, expedited, and special handling services. They are publicly owned and traded on the NASDAQ. They have 27 offices and 750 employees.

Continental Transport, Inc.
Income Statement
FYE 12/31/05, 12/31/04
(unaudited)

(in thousands)	12/31/2004	12/31/2003	Actual Change	Percent Change
Revenue:				
Transportation Revenue	284,593	251,721	32,872	13.06%
Cost of Transportation:				
Fuel and Depreciation	238,123	210,590	27,533	13.07%
Repair and Maintenance	6,532	3,862	2,670	69.14%
Total Cost:	244,655	214,452	30,203	14.08%
Gross Profit	39,938	37,269	2,669	7.06%
Total selling, general, and administrative expenses	24,470	24,203	267	1.10%
Income from operations	15,468	13,066	2,402	18.38%
Net interest expense	87	64	23	35.94%
Income before taxes	15,555	13,130	2,425	18.47%
Provision for income tax	(7,196)	(6,158)	(1,038)	16.86%
Net Income	8,359	6,972	1,387	19.89%

[21] Information adapted from CH Robinson Worldwide Inc. website and Financial Statements.

Continental Transport, Inc.

Balance Sheet

FYE 12/31/05, 12/31/04
(unaudited)

(In thousands)	12/31/2004	12/31/2003	% Change		12/31/2004	12/31/2003	% Change
Current Assets	91,393	85,333	7.10%	Current Liabilities	35,850	31,468	13.93%
Property, Plant and Equipment							
Land	15,000	15,000	0%				
Buildings	26,000	26,000	0%				
Vehicles	52,844	29,749	77.63%	Total Long-term Liabilities	57,580	43,542	32.24%
(Less accumulated depreciation)	(46,719)	(44,273)	5.52%	Stockholders' Equity			
Net Property, Plant and Equipment	47,125	26,476	77.99%	Common Stock	8,400	8,400	0%
Goodwill, net of accumulated amortization	15,297	15,297	0%	Additional Paid in Capital	9,668	9,668	0%
Other Assets	550	480	14.58%	Retained Earnings	42,867	34,508	24.22%
				Total Stockholders' Equity	60,935	52,576	15.9%
Total Assets	154,365	127,586	20.99%	Total Liabilities and Stockholders' Equity	154,365	127,586	20.99%

DecisionSERVE Report
Possible Explanations for Unexpected Increases in Repair and Maintenance
Client: Continental Transport, FYE 2005

Reason	Information Source	Related Accounts	Expected Direction
Increase in volume	Income Statement	Sales	Increase
Increase in labor rates	Income Statement	Salary	Increase
Repair rather than replace fixed assets	Balance Sheet	PP&E	Either No Change or Decrease
Fictitious Payments/Billings	Evidence may be found through additional substantive testing.		

Appendix B Survey Instrument

Welcome!

Welcome to the survey site.

The following survey and accompanying audit task will take about 15-30 minutes to complete. Please set aside enough time to complete this survey in a single session.

First, you will be asked some demographic questions, then you will be given some information about a hypothetical audit client and asked to make a series of audit-related judgments.

After making your initial judgments, you will be given additional information and be asked to make another series of audit-related judgments.

Finally, you will be given some case-related and general questions to answer.

After you have completed the survey, you will be able to direct a $5.00 contribution to your choice of charity (from a list of four).

Before you begin, please read over the consent form on the next page. You must check "Accept" to continue. Should you choose not to accept the consent form, check "Do not Accept" and you will be taken to a log off screen.

Your participation in this study will assist us in improving audit practice.
We appreciate your attention and best efforts.

Click next to begin...

Next Cancel

Appendix B Survey Instrument

Informed Consent

Informed Consent

Social and Behavioral Sciences
University of South Florida

Information for People Who Take Part in Research Studies

The following information is being presented to help you decide whether or not you want to take part in a minimal risk research study. Please read this carefully. If you do not understand anything, ask the person in charge of the study.

Title of Study: Analytical Audit Procedures
Principal Investigator: Eileen Z. Taylor
Study Location(s): Remote locations online

You are being asked to participate because the study involves making auditing judgments.

General Information about the Research Study

The purpose of this research study is to examine how auditors make judgments about audit evidence.

Plan of Study

You will be required to complete a short questionnaire. You will then be asked to evaluate audit evidence from a single, fictitious firm. After you make your evaluation, you will be given additional information and asked to make an additional evaluation. At the conclusion, there will be another short set of general questions. The duration of the study is expected to be less than one hour.

Payment for Participation

At the end of the study, you will be asked to select a charity from a pre-determined list of four, to which a $5.00 contribution will be directed.

Benefits of Being a Part of this Research Study

You will not directly benefit from participating in this study. However, by taking part you may potentially increase your analytical procedures skills. In addition, you will also be helping to advance knowledge about auditor judgments.

Risks of Being a Part of this Research Study

There are no known risks associated with participating in this experiment.

Confidentiality of Your Records

Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, and the USF Institutional Review Board may inspect the records from this research project.

The results of this study may be published. However, the data obtained from you will be combined with data from others in the publication. The published results will not include your name or any other information that would personally identify you in any way.
Your responses will be downloaded and kept by the researcher in a secure environment, on a password-protected computer server in the School of Accountancy. Other researchers within the College of Business Administration may review the data.

Volunteering to Be Part of this Research Study

Your decision to participate in this research study is completely voluntary. You are free to participate in this research study or to withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive, if you stop taking part in the study.

Questions and Contacts

- If you have any questions about this research study, contact Eileen Taylor (813) 974-7721.
- If you have questions about your rights as a person who is taking part in a research study, you may contact the Division of Research Compliance of the University of South Florida at (813) 974-5638.

Consent to Take Part in This Research Study

By signing this form I agree that:

- I have fully read or have had read and explained to me this informed consent form describing this research project.
- I have had the opportunity to question one of the persons in charge of this research and have received satisfactory answers.
- I understand that I am being asked to participate in research. I understand the risks and benefits, and I freely give my consent to participate in the research project outlined in this form, under the conditions indicated in it.
- I can print a copy of this informed consent form, which is mine to keep.

1. By checking the Accept box below, I consent to participating in the following research study.*

◌ Accept ◌ Do Not Accept

Appendix B Survey Instrument

Demographic Information

Please complete the following demographic information. All responses will be kept confidential.

1. Select your gender.*

- ◯ Male
- ◯ Female

2. Tell us your age.*
The value must be greater than or equal to 18.

3. Indicate the highest educational degree you have completed.*

B.S. Accounting

4. Indicate which certifications you currently hold.

	Check all that apply
CPA (Certified Public Accountant)	☐
CFE (Certified Fraud Examiner)	☐
CMA (Certified Management Accountant)	☐

5. Indicate the level you have attained in your current firm.*

- ◌ Staff: no in-charge experience
- ◌ Staff: some in-charge experience
- ◌ Senior

6. Where do you currently work? *(Firms were listed by name in the actual survey, but have been replaced to maintain confidentiality)**

- ◌ Firm C
- ◌ Firm A
- ◌ Firm B
- ◌ Firm D
- ◌ Other, please specify

7. I was born on an even day of the year.*

◌ True ◌ False

Next Cancel

Appendix B Survey Instrument

Introduction

As an auditor, you are required to evaluate account balances, client representations, and other audit evidence. On the following pages, you will be asked to provide auditing judgments. Before you begin, please answer the following question.

1. All of the following are plausible reasons for an unexpected increase in the repair and maintenance expense account except:*

- ◌ Client issued additional stock
- ◌ Client increased labor rates
- ◌ Client refurbished existing assets, rather than replacing them
- ◌ Client increased sales volume

Next Cancel

Appendix B Survey Instrument

Client Information and Controller's Explanation

The following scenario relates to Continental Transport, Inc., a fictitious, but realistic client company.

"Firm A" has audited Continental Transport Inc. for the past six years and has always issued a clean audit opinion.

You are currently conducting fieldwork on the audit FYE 2005. During fieldwork, you have gathered the following additional information. Carefully consider this information and answer the following questions.

Assignment - Evaluate the changes in expense accounts
Noticing that the current year's *repair and maintenance expense* shows an unexpected *increase*, you have asked Chris, the controller, to provide an explanation.

Chris's Background

Chris worked for *Firm A* for several years, where he was a manager on the Continental Transport audit.

He recently took a job at Continental as the controller.

Chris is technically proficient in accounting.

According to Chris,

"The unexpected increase in repair and maintenance expense comes from an internal decision to forego replacing certain capital equipment until next year. We were planning to replace our fleet of trucks with a new fleet, but due to the increase in interest rates, we decided to repair, rather than replace them."

Click here for the background information and financial statements

Clicking on the link above will open a new window. You can minimize or maximize this window at your discretion. The link will be available on subsequent pages should you close it and wish to reopen it later.

1. How **plausible** is Chris's explanation, given the accompanying financial and non-financial information?*
Base your response on a scale of 0 to 100, where 0 indicates highly implausible and 100 indicates highly plausible. The value must be between 0 and 100, inclusive.

2. How **confident** are you in the above response?*
Base your response on a scale of 0 to 100, where 0 is not at all confident and 100 is completely confident. The value must be between 0 and 100, inclusive.

3. On engagements of similar size and risk, 40 hours is a normal budget for the testing phase of expense accounts. Based on your answers above, would you choose to **extend testing** on this account, and if so, by how many *hours*?*
Please indicate the number of hours you would extend testing. If you choose not to extend testing, enter 0. The value must be greater than or equal to 0.

4. Considering your prior answers, would you choose to extend testing on other accounts?*
Check all that apply.

☐ Would not Extend Testing in Any Area ☐ Assets ☐ Liabilities ☐ Revenue

☐ Other, please specify

Appendix B Survey Instrument

Client Information and Controller's Explanation

The following scenario relates to Continental Transport, Inc., a fictitious, but realistic client company.

Firm A has audited Continental Transport Inc. for the past six years and has always issued a clean audit opinion.

You are currently conducting fieldwork on the audit FYE 2005. During fieldwork, you have gathered the following additional information. Carefully consider this information and answer the following questions.

Assignment - Evaluate the changes in expense accounts
Noticing that the current year's *repair and maintenance expense* shows an unexpected *increase*, you have asked Chris, the controller, to provide an explanation.

Chris's Background

Chris has worked for Continental Transport for several years.

He was recently promoted to Controller at Continental.

Chris is technically proficient in accounting.

According to Chris,

"The unexpected increase in repair and maintenance expense comes from an internal decision to forego replacing certain capital equipment until next year. We were planning to replace our fleet of trucks with a new fleet, but due to the increase in interest rates, we decided to repair, rather than replace them."

Click here for the background information and financial statements

Clicking on the link above will open a new window. You can minimize or maximize this window at your discretion. The link will be available on subsequent pages should you close it and wish to reopen it later.

1. How **plausible** is Chris's explanation, given the accompanying financial and non-financial information?*
Base your response on a scale of 0 to 100, where 0 indicates highly implausible and 100 indicates highly plausible. The value must be between 0 and 100, inclusive.

2. How **confident** are you in the above response?*
Base your response on a scale of 0 to 100, where 0 is not at all confident and 100 is completely confident. The value must be between 0 and 100, inclusive.

3. On engagements of similar size and risk, 40 hours is a normal budget for the testing phase of expense accounts. Based on your answers above, would you choose to **extend testing** on this account, and if so, by how many *hours*?*
Please indicate the number of hours you would extend testing. If you choose not to extend testing, enter 0. The value must be greater than or equal to 0.

4. Considering your prior answers, would you choose to extend testing on other accounts?*
Check all that apply.

☐ Would not Extend Testing in Any Area ☐ Assets ☐ Liabilities ☐ Revenue

☐ Other, please specify

Appendix B Survey Instrument

Client Information and Assistant Cont. Explanation

The following scenario relates to Continental Transport, Inc., a fictitious, but realistic client company.

Firm A has audited Continental Transport Inc. for the past six years and has always issued a clean audit opinion.

You are currently conducting fieldwork on the audit FYE 2005. During fieldwork, you have gathered the following additional information. Carefully consider this information and answer the following questions.

Assignment - Evaluate the changes in expense accounts
Noticing that the current year's *repair and maintenance expense* shows an unexpected *increase*, you have asked Chris, the assistant controller, to provide an explanation.

Chris's Background

Chris worked at *Firm A* on the Continental Transport, Inc. audit as a senior for several years.

Chris recently went to work for Continental Transport.

Chris is technically proficient in accounting.

According to Chris,

"The unexpected increase in repair and maintenance expense comes from an internal decision to forego replacing certain capital equipment until next year. We were planning to replace our fleet of trucks with a new fleet, but due to the increase in interest rates, we decided to repair, rather than replace them."

Click here for the background information and financial statements

Clicking on the link above will open a new window. You can minimize or maximize this window at your discretion. The link will be available on subsequent pages should you close it and wish to reopen it later.

1. How **plausible** is Chris's explanation, given the accompanying financial and non-financial information?*
Base your response on a scale of 0 to 100, where 0 indicates highly implausible and 100 indicates highly plausible. The value must be between 0 and 100, inclusive.

2. How **confident** are you in the above response?*
Base your response on a scale of 0 to 100, where 0 is not at all confident and 100 is completely confident. The value must be between 0 and 100, inclusive.

3. On engagements of similar size and risk, 40 hours is a normal budget for the testing phase of expense accounts. Based on your answers above, would you choose to **extend testing** on this account, and if so, by how many *hours*?*
Please indicate the number of hours you would extend testing. If you choose not to extend testing, enter 0. The value must be greater than or equal to 0.

4. Considering your prior answers, would you choose to extend testing on other accounts?*
Check all that apply.

☐ Would not Extend Testing in Any Area ☐ Assets ☐ Liabilities ☐ Revenue

☐ Other, please specify

Appendix B Survey Instrument

Client Information and Assistant Cont. Explanation

The following scenario relates to Continental Transport, Inc., a fictitious, but realistic client company.

Firm A has audited Continental Transport Inc. for the past six years and has always issued a clean audit opinion.

You are currently conducting fieldwork on the audit FYE 2005. During fieldwork, you have gathered the following additional information. Carefully consider this information and answer the following questions.

Assignment - Evaluate the changes in expense accounts
Noticing that the current year's *repair and maintenance expense* shows an unexpected *increase*, you have asked Chris, the assistant controller, to provide an explanation.

Chris's Background

Chris has worked at Continental Transport Inc. for the past several years.

He recently was promoted to Assistant Controller.

Chris is technically proficient in accounting.

According to Chris,

"The unexpected increase in repair and maintenance expense comes from an internal decision to forego replacing certain capital equipment until next year. We were planning to replace our fleet of trucks with a new fleet, but due to the increase in interest rates, we decided to repair, rather than replace them."

Click here for the background information and financial statements

Clicking on the link above will open a new window. You can minimize or maximize this window at your discretion. The link will be available on subsequent pages should you close it and wish to reopen it later.

1. How **plausible** is Chris's explanation, given the accompanying financial and non-financial information?*
Base your response on a scale of 0 to 100, where 0 indicates highly implausible and 100 indicates highly plausible. The value must be between 0 and 100, inclusive.

2. How **confident** are you in the above response?*
Base your response on a scale of 0 to 100, where 0 is not at all confident and 100 is completely confident. The value must be between 0 and 100, inclusive.

3. On engagements of similar size and risk, 40 hours is a normal budget for the testing phase of expense accounts. Based on your answers above, would you choose to **extend testing** on this account, and if so, by how many *hours*?*
Please indicate the number of hours you would extend testing. If you choose not to extend testing, enter 0. The value must be greater than or equal to 0.

4. Considering your prior answers, would you choose to extend testing on other accounts?*
Check all that apply.

☐ Would not Extend Testing in Any Area ☐ Assets ☐ Liabilities ☐ Revenue

☐ Other, please specify

Appendix B Survey Instrument

Additional Case Information

In addition to the previous information, you also have access to an auditing decision aid. After reviewing the following decision aid report, please answer the questions.

The following report was generated by "DecisionSERVE" audit software, developed by the *Firm A* national office research department. Auditors should use the report to assist them in evaluating client explanations. The process uses the client's current and past year's financial data to generate possible explanations for changes in account balances.

Past experience indicates that DecisionSERVE provides valid explanations.

DecisionSERVE output should be used to guide the auditor's search for evidence.

DecisionSERVE Report
Possible Explanations for Unexpected Increases in Repair and Maintenance
Client: Continental Transport, FYE 2005

Reason	Information Source	Related Accounts	Expected Direction
Increase in volume	Income Statement	Sales	Increase
Increase in labor rates	Income Statement	Salary	Increase
Repair rather than replace			Either No

fixed assets	Balance Sheet	PP&E	Change or Decrease
Fictitious Payments/Billings	Evidence may be found through additional substantive testing.		

Client Explanation:

According to Chris,

"The unexpected increase in repair and maintenance expense comes from an internal decision to forego replacing certain capital equipment until next year. Specifically, we were planning to replace our fleet of trucks with a new fleet, but due to the increase in interest rates, we decided to repair, rather than replace them."

Click here for the background information and financial statements

Clicking on the link above will open a new window. You can minimize or maximize this window at your discretion. The link will be available on subsequent pages should you close it and wish to reopen it later.

1. How **plausible** is Chris's explanation, given the accompanying financial and non-financial information?*
Base your response on a scale of 0 to 100, where 0 indicates highly implausible and 100 indicates highly plausible. You may indicate the same plausibility level as your prior response. The value must be between 0 and 100, inclusive.

2. How **confident** are you in the above response?*
Base your response on a scale of 0 to 100, where 0 is not at all confident and 100 is completely confident. You may indicate the same confidence as your prior response. The value must be between 0 and 100, inclusive.

3. On engagements of similar size and risk, 40 hours is a normal budget for the testing phase of expense accounts. Based on your answers above, would you choose to **extend testing** on this account, and if so, by how many *hours*?*

Please indicate the number of hours you would extend testing. If you choose not to extend testing, enter 0. You may indicate the same number of hours as your prior response. The value must be greater than or equal to 0.

4. Considering your prior answers, would you choose to extend testing on other accounts?*

Check all that apply. You may indicate the same accounts as your prior response.

☐ Would not Extend Testing in Any Area ☐ Assets ☐ Liabilities ☐ Revenue

☐ Other, please specify

Next Cancel

Appendix B Survey Instrument

Final Case-related Questions

Thank you for your participation. There are just a few more questions related to the case for you to answer.

1. How competent is Chris, the Continental Transport, Inc. controller?*
   Base your response on a scale of 0 to 100, where 0 is incompetent and 100 is highly competent. The value must be between 0 and 100, inclusive.

2. How likely is Chris, the Continental Transport, Inc. controller, to tell you a false reason for the increase in repair and maintenance expense, given that he knows the true reason?*
   Base your response on a scale of 0 to 100 where 0 is very likely and 100 is very unlikely. The value must be between 0 and 100, inclusive.

3. In the above case, which of the following best describes Chris's work history?*
   - ◌ unable to determine from the information given
   - ◌ long-time Continental Transport, Inc. employee
   - ◌ former manager at your current audit firm
   - ◌ former manager at an audit firm other than your own

4. In the above case, the repair and maintenance expense account had an unexpected:*
   - ◌ Decrease

- ◌ Increase
- ◌ Unable to determine from the information given

5. In your opinion, is the repair and maintenance account materially misstated?*

- ◌ Yes
- ◌ No

6. Which of the following best describes the controller's explanation for the change in the repair and maintenance account?*

- ◌ Continental negotiated a new contract for repair and maintenance at a lower cost
- ◌ Interest rates were up and Continental had chosen to repair, rather than replace their vehicles
- ◌ Parts and labor had increased in price

7. How valid is the DecisionSERVE output?*

- ◌ Valid
- ◌ Neither Valid nor Invalid
- ◌ Invalid

8. How helpful was the decision aid report in your second assessment of Chris's explanation?*
Base your response on a scale of 0 to 100 where 0 is very unhelpful and 100 is very helpful. The value must be between 0 and 100, inclusive.

Appendix B Survey Instrument

Final Demographic Questions

Almost done... please answer the following demographic questions, after which, you will be asked to indicate where you would like to send your charitable donation.

1. Have you ever had training in professional skepticism?*

- ☐ No
- ☐ Yes
- ☐ If Yes, please indicate how many hours of training.

2. How many times have you completed an analytical review of expenses?*
The value must be greater than or equal to 0.

3. How familiar are you with the shipping industry?*

- ○ Very Familiar
- ○ Familiar
- ○ Neutral

- ◌ Unfamiliar
- ◌ Very Unfamiliar

4. What percentage of audits have you worked on in which the controller was also a former member of your audit firm?*
The value must be between 0 and 100, inclusive.

5. Think about the last three audits you worked on...*

	Was the client firm publicly held? (Enter yes or no)	What industry was the client in?	What size was the client? (in sales $)	Was the controller a former member of your audit firm? (Enter yes or no)	Did you have significant interaction with the controller? (Enter yes or no)
Audit 1					
Audit 2					
Audit 3					

6. Are past employees of *Firm A* , relative to past employees of other *large, national audit firms* likely to be more competent or less competent when providing an explanation for a change in account balance?*

- ◌ Much More Competent
- ◌ More Competent
- ◌ Neither More Competent nor Less Competent
- ◌ Less Competent

- ◯ Much Less Competent

7. Are past employees of *Firm A* , relative to past employees of other *large, national audit firms* likely to be more objective or less objective when providing an explanation for a change in account balance?*

- ◯ Much More Objective
- ◯ More Objective
- ◯ Neither More Objective nor Less Objective
- ◯ Less Objective
- ◯ Much Less Objective

8. Are past employees of *Firm A* , relative to *private sector accountants* likely to be more competent or less competent when providing an explanation for a change in account balance?*

- ◯ Much More Competent
- ◯ More Competent
- ◯ Neither More Competent nor Less Competent
- ◯ Less Competent
- ◯ Much Less Competent

9. Are past employees of *Firm A* , relative to *private sector accountants* likely to be more objective or less objective when providing an explanation for a change in account balance?*

- ◯ Much More Objective
- ◯ More Objective
- ◯ Neither More Objective nor Less Objective
- ◯ Less Objective

○ Much Less Objective

10. Please indicate whether you have used the following decision aids in practice. If so, rate your opinion of their usefulness.*

	Not Available	Available but Never Used	Not at all Helpful	Somewhat Helpful	Very Helpful
Checklists	○	○	○	○	○
Audit Software	○	○	○	○	○
Statistical Sampling	○	○	○	○	○

Next Cancel

Appendix B Survey Instrument

Conclusion of Survey

1. Thank you for your participation. Please select one of the following charities, and we will make a $5.00 donation to your selected charity.*
   - ◌ ASPCA - American Society for the Prevention of Cruelty to Animals
   - ◌ American Cancer Society
   - ◌ University of South Florida Accounting Circle Scholarship Fund
   - ◌ American Red Cross
   - ◌ I do not wish to have money donated.

2. If you want to receive a summary of results when the study has concluded, please enter your e-mail address. (optional)

3. We welcome any comments/questions you have about the study. (optional)

Appendix B Survey Instrument

Survey Completed

Thank you for your time.

About the Author

Dr. Eileen Zalkin Taylor was born in Liberty, New York and raised in Tampa, Florida. She is married to Glenn Taylor and has three children, Adam, Jordan, and Isabella. She earned her Bachelor of Science in Business Administration, Master of Accountancy, and Doctor of Philosophy degrees at the University of South Florida (USF) in Tampa.

Before enrolling in the Ph.D. program, Dr. Taylor worked for Deloitte and Touche, was a controller for the Tampa Orlando Pinellas Jewish Foundation, and taught as an adjunct for the USF School of Accountancy.

She has received several awards and scholarships during her time at USF. She was awarded best research paper at the American Accounting Association's Accounting Information System's mid-year meeting, 2004.

Dr. Taylor is interested in behavioral research that aids accounting and audit practice. She plans to investigate accounting information systems and knowledge sharing in organizations, as well as ethics in auditing firms.