

## **The Effects of In-Group Bias and Decision Aid Use on Auditors' Evidence Evaluation**

Keywords: Experimental, judgment, decision-making, auditing, social identity

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### **SUMMARY**

This study examines the effects of in-group bias and decision aid use on auditor judgments, confidence, and decisions to extend testing 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 a mixed design experiment using 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 insufficient evidence to support in-group bias among auditors in an analytical review task. Later in the same experiment, when I give auditors access to a decision aid, their judgments and decisions improve. Post decision aid confidence also significantly increased for auditors who initially provided correct answers. Audit managers can benefit from recognizing the effectiveness of decision aids in improving judgment.

## 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).<sup>1</sup> In-group bias, which occurs when group members extend unjustified trust to other group members (Hewstone et al. 2002), could impact this evaluation.<sup>2</sup> 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.

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-

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<sup>1</sup> 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.

<sup>2</sup> 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).

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.<sup>3</sup> *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 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.

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<sup>3</sup> 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).

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.

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). Analytical procedures 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.<sup>4</sup> 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.

I conduct a mixed design experiment with one *between-participants* variable, group affiliation (in and out) and one *within-participants* variable, decision aid (pre and post). 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

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<sup>4</sup> Even if auditors do not demonstrate in-group bias, decision aid use can still improve audit judgments.

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. I consider task experience, level, and auditor perceptions of client competence as possible covariates.

Auditors 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 paper continues with a literature review and development of hypotheses, a discussion of the research design, and the statistical analysis. The paper concludes with a discussion of the results, limitations, and future research.

## **LITERATURE REVIEW AND HYPOTHESES**

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 influence the audit. I follow this discussion by a review of the seminal literature on social identity theory (Tajfel 1981), moving toward a definition of in-group bias, and finally discussing how this bias can auditors' judgments. I then state hypotheses related to in-group bias.

The second part of this section provides a discussion of the audit-related debiasing literature, followed by a review of how decision aids can improve auditor judgment and decisions. I then state hypotheses related to decision aid effectiveness.

## **Analytical Procedures and Source Reliability Judgments**

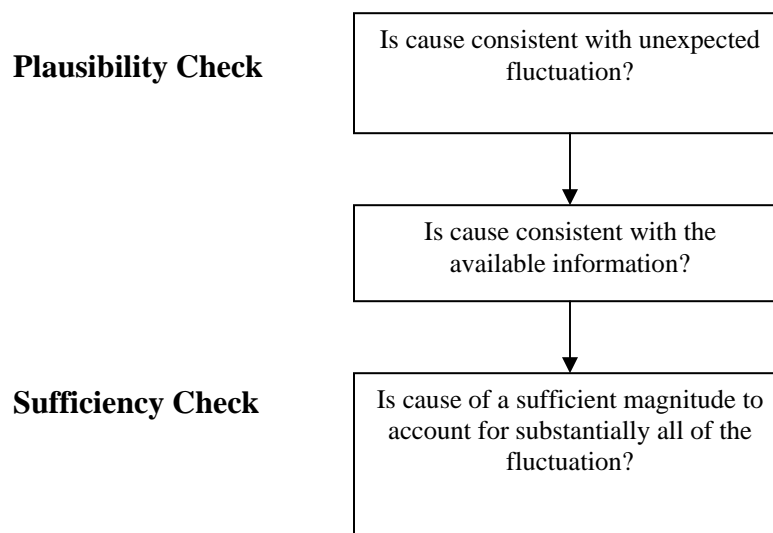
Generally Accepted Auditing Standards require auditors to obtain sufficient, competent, evidential matter to reasonably support their opinion of a client's financial statement presentation and disclosures (AICPA 2005). AU Section 329 "Analytical Procedures" defines these procedures as "...evaluations of financial information made by a study of plausible relationships among both financial and nonfinancial data" (AICPA 2005, 465). 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 (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. The degree of reliance the auditor places on these explanations depends on his assessment of the client's objectivity.

## *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.

**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. The current study uses an explanation that is consistent with the change in account balance, yet inconsistent with the 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.

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). 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. 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.

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.

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.

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 is 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 detect deception when it occurs.

#### ***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).

The timing of an auditor affiliation can occur in one of three ways (Lennox 2005). This study focuses on employment affiliations, which arise when the client company

hires a member of the recurring external audit team. I use employment affiliations, first, because they are the most common (Lennox 2005). Second, because they are particularly susceptible to bias as the auditor goes directly from being a member of the audit team to being an audit client.

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). Although there are benefits to hiring a former auditor, there are also costs. Beasley et al. (2000) identify three threats to the financial reporting process associated with such hiring. While one of these threats relates to the potential for auditor shirking before hiring, two relate to the period after the auditor is hired. The first threat, detailed previously, 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 hide improprieties in the financial statements from the current auditors. The second threat and the focus of this study, stems from the effect of in-group bias, explained shortly, which causes the auditor to overestimate the client’s objectivity, leading to underauditing. This bias can cause the current auditor to be reluctant 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 (2005, 202) observes “...no published archival evidence exists on the types of affiliations or whether affiliations impair audit quality.”

## **Auditing Judgment: Biases and Social Identity Theory**

### ***Biases in Audit 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.<sup>5</sup> Bias identification is particularly important in auditing since auditors are required to make many judgments, the results of which can significantly affect 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 sum of multiple judgments; therefore, the cumulative effect of these errors could significantly increase the risk of an audit failure (Moeckel and Plumlee 1989).

### ***Social Identity Theory and In-Group Bias***

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

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<sup>5</sup> For a discussion of the two types of biases, see Kunda (1990).

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.

An extensive literature search revealed only one behavioral study on the effects of in-group bias among auditors. King (2002) created a strong group identity among auditors by having them meet frequently with each other. This strong identity resulted in the auditors' increased ability to detect client deceptions. Auditors who interacted primarily with clients 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).

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.

### ***Statement of Hypotheses – In-group Bias***

The first part of this study tests whether auditors demonstrate in-group bias when assessing a client-provided explanation. On the one hand, auditors' experience should enable them to detect when a client-provided explanation is implausible. However, auditors' tenure with their firm could lead to a strong in-group association, heightening the potential for them to exhibit unwarranted trust of prior colleagues' explanations. I propose 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) states 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). 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. Bamber (1995) suggests that there is some underlying, unknown reason for underconfidence in an audit context.

It is important to explore auditor confidence, because under- or overconfidence could affect an auditor's decision about future audit procedures. In the present study, an auditor who correctly identifies an implausible explanation, but is underconfident about his judgment, could decide to give the client the "benefit of the doubt" and forgo additional testing. Because an auditor would not expect an in-group member to provide an implausible explanation, I propose that auditors who receive an implausible explanation from an in-group client will be less confident in their judgment than auditors who receive an implausible explanation 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 about the extent of further testing. Auditors who correctly identify an explanation as implausible could 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. 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.<sup>6</sup>

**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.**

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 the following sections, I develop an argument that a valid, objective decision aid will be successful in mitigating in-group bias.

### **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 in improving performance, 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

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<sup>6</sup> 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.

prevent auditors 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.<sup>7</sup> 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.

### ***Debiasing and Improving Judgment and Decisions with Decision Aids***

To evaluate in-group bias, I use Kennedy's (1993; 1995) framework, which 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. 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.

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<sup>7</sup> Decision aids can also 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).

Both Kennedy (1995) and Roy and Lerch (1996) suggest the following solutions for countering biases: modifying information presentation, training individuals to use appropriate information processing strategies, or replacing 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-group bias involves a subconscious leaning toward believing an in-group member. The debiasing agent used in this study 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 further in the Method section.

### ***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. Since validity and objectivity are both important to decision aid reliance, I confirm that participants judge the decision aid in the study to be both valid and objective.

### *Statement of Hypotheses – Decision Improvement*

In-group bias has the potential to influence auditor judgments, as posited above. Although an auditor can successfully complete step one of the plausibility check, plausibility of hypothesis given the change in account balance, he could 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).

In Hypothesis 4, I propose a simple effect of the decision aid on reducing plausibility judgments.

#### **H4: Auditors who are initially incorrect will decrease their plausibility ratings 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. 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.

**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.<sup>8</sup> 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 also 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

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<sup>8</sup> A judgment is an individual's inference about an external event or phenomenon. A decision is an individual's choice of action (Hastie 2001).

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.**

## **METHOD**

This section describes the sample selection, the experimental task, and the experimental design. It follows with a discussion of the client-provided explanation, description of the between-subjects manipulation - group affiliation, and the design of the within-subjects treatment – decision aid. It concludes with a description of the dependent variable measurement and establishment of validity.

### **Sample**

Participants are staff and senior auditors at the “Big Four” public accounting firms. Staff auditors are appropriate first, because clients will likely use their inside knowledge to deceive less-experienced (novice) auditors and second, because analytical procedures are often completed by assistant auditors (Abdolmohammadi 1999). I include 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.

I collected data both online and in person using a survey. All participation was voluntary. I provided no incentives for performance, however to encourage completion by those taking the survey online, I allowed them to direct a \$5.00 donation to their choice of charity (from a select list).

## **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: first, according to Abdolmohammadi (1999) it is an appropriate task for staff through senior auditors, second, it is amenable to decision aid use, and third, Hall (2004) notes that expense accounts have been used to hide fraud. 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.<sup>9</sup> After the first measurements, participants had access to a decision aid.<sup>10</sup>

## **Research Design**

Figure 2 details the mixed research design with one between-subjects factor (group affiliation) and one within-subjects factor (decision aid). Prior to completing the

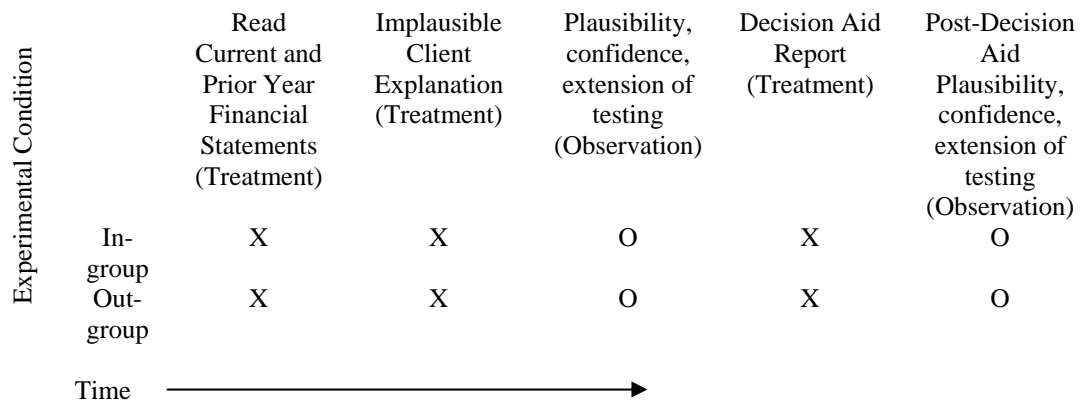
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<sup>9</sup> Overstatement of expenses is often an indication of asset misappropriation; a fraud which is more likely to be committed by mid to lower management (Hall 2004), such as a controller or assistant controller.

<sup>10</sup> The decision aid was labeled as "firm developed", but was developed by the author and was the same decision aid for all participants.

task, participants completed a demographic questionnaire.<sup>11</sup> I randomly assigned participants to either an in-group or an out-group treatment. 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 2**  
**Diagram of the Experimental Design**



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 questions regarding plausibility, confidence, and extent of testing. A post-test questionnaire included manipulation checks and further measures as described earlier, including the participants' perceptions of client competence, prior analytical procedures experience, and experience with affiliated clients.

<sup>11</sup> Demographics also include age, gender, certifications held, and highest education level.

### ***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. Therefore, I use a client-provided explanation that is plausible, given an increase in the repair and maintenance account.<sup>12</sup> Step two 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. 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.

### ***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.<sup>13</sup> 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

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<sup>12</sup> A manipulation check confirmed that the participant has sufficient accounting knowledge to identify the explanation as plausible, given the fluctuation.

<sup>13</sup> 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.

competence constant between treatment groups. Manipulations occur after this brief introduction.

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.

<u>In group</u> <b>Chris's Background</b>	<u>Out group</u> <b>Chris's Background</b>
Chris worked for ( <i>your firm</i> ) for the last several years, where he was a manager ( <i>senior</i> ) 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 ( <i>assistant controller</i> ).	He was recently promoted to Controller ( <i>Assistant Controller</i> ) at Continental.
Chris is technically proficient in accounting.	Chris is technically proficient in accounting.

***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.

### *Dependent Variables*

Three dependent variables are measured both pre- and post-decision aid—plausibility, confidence, and extension of testing. Prior source reliability studies (Bamber 1983; Hirst 1994), used a 100-point scale to evaluate participants' judgments. This study uses a 0-100 point scale: end points are “not at all plausible” and “highly plausible”. Likewise, I measure confidence on a 0-100 point scale; end points are “not at all confident” and “completely confident.”

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 participants to answer “0” if they choose not to extend testing. 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.

### *Discussion of Potential Covariates*

I consider the following potential covariates: task experience, level in the firm, and perceptions of client competence.<sup>14</sup> 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). In this study, I find no significant evidence that task experience affects performance. Level in the firm (staff or senior) could influence the effects of in-group bias, as discussed above. I find differences based on level and therefore include it as a covariate. Hirst (1994) finds that competence and objectivity interact in an auditor's determination of

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<sup>14</sup>Task experience and client competence are measured post-task to avoid confounds within the research design.

source reliability. To control for this possible interaction, I confirm that there is no significant difference between participants' evaluations of client competence.

### ***Discussion of Validity***

Participants, task, and time are all limitations to generalizability of findings. I designed this study and collected data from only staff and senior auditors at "Big 4" accounting 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 unsupported. Audit research indicates that task structure and complexity influence outcomes and should be adequately considered (Abdolmohammadi and Usoff 2001). Because this study makes use of a single audit task, analytical procedures, readers should be cautious 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. Findings may not be generalizable to future periods.

## **RESULTS**

I collected data during two periods. In the first period, which lasted three months, auditors accessed an online survey. 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. In the second period, approximately eight months later, auditors at a single firm training session answered the survey using a paper-and pencil approach. One hundred eighty-three auditors completed the survey; fifty-one failed the manipulation check, and nine failed the accounting knowledge check, resulting in one hundred twenty-

three usable responses.<sup>15</sup> Usable responses for both sessions in total were one hundred sixty four.<sup>16</sup>

Table 1, Panel A includes the descriptive statistics. Participants included one hundred thirty-five seniors and twenty-nine staff auditors. Average age was about twenty-seven and a half (28 for seniors and 26 for staff). Mean experience with analytical procedures was twenty-three times (about twenty-six times for seniors and only three times for staff). Table 1, Panel B shows the number of participants per treatment group. Ninety were in-group and seventy-four were out-group.

**TABLE 1 – PARTICIPANT DEMOGRAPHICS FOR GROUP BIAS  
HYPOTHESES TESTS  
(All participants n = 164)**

**Panel A- Descriptive Statistics**

	Seniors (n=135)	Staff (n=29)	Overall (n=164)
<b>Gender</b>			
Male	79	15	94
Female	56	14	70
<b>Age</b>			
Mean	27.99	26.03	27.64
Standard Deviation	5.73	4.71	5.61
Minimum	23	23	23
Maximum	55	41	55
<b>Analytical Procedures Experience (# of times)</b>			
Mean	26.14	2.63	21.81
Standard Deviation	32.55	2.74	27.42
Minimum	0	0	0
Maximum	200	10	200

<sup>15</sup> The manipulation check failure rate is high for both sessions (20% and 28% respectively) and indicates that these individuals either did not attend to the manipulation or could not recall the manipulation post-task. I excluded all participants who failed the manipulation check from the analysis of hypotheses related to group. I also excluded the twelve auditors who failed the accounting knowledge check from all analyses because they did not demonstrate sufficient accounting knowledge to complete the task.

<sup>16</sup> A statistical analysis revealed no significant differences between participants in the two sessions on all three dependent variables (plausibility, confidence, and extent of testing), age, gender, and analytical procedures experience. Therefore, I combined the two sessions into a single sample.

**Panel B – NUMBER OF PARTICIPANTS IN EACH TREATMENT CONDITION**

Participants per Treatment			
	N	Senior	Staff
In-group	90	71	19
Out-group	74	64	10
Total	164	135	29

The purpose of this section is to report the findings on whether in-group bias affects auditor plausibility judgments. Prior to testing this hypothesis, I confirmed that there was no statistically significant difference between treatment groups in auditors' ratings of client competence ( $p=.11$ ). Table 2, Panel A displays the initial plausibility judgment mean, standard deviation, range and number of participants by level and treatment group. I first reviewed the plausibility raw means for the total sample, noting that means were in the expected direction. Using ANOVA, there was insufficient evidence to support H1 for the group as a whole. I segregated the participants by level (staff and senior) and re-evaluated the data for evidence of in-group bias. Means were in the opposite direction than predicted for staff members; findings indicate insufficient evidence to support H1 ( $p=.389$ ) for seniors. I further analyzed the potential for in-group bias among seniors by adding Analytical Procedures (AP) experience, and an interaction term between group and AP experience to the model. Table 2, Panel B includes findings. The overall model was marginally significant ( $p=.11$ ), group was insignificant ( $p=.55$ ), AP experience was significant and negatively related to initial plausibility ( $p=.05$ ) and the interaction term was insignificant ( $p=.93$ ). Removal of the interaction term improved the overall model to ( $p=.04$ ), group was still insignificant ( $p=.42$ ) and AP experience was significant ( $p=.02$ ).

**TABLE 2 – TEST OF IN-GROUP BIAS ON INITIAL PLAUSIBILITY JUDGMENT (a)**  
**(mean, standard deviation, range, n)**

Panel A

	Senior	Staff
In-Group	48.30 (30.60) 0-95 71	50.63 (36.93) 1-100 19
Out-Group	43.95 (27.57) 5-90 64	62.00 (26.58) 25-95 10
	p = .389	(b)

- a- Plausibility is measured on a 101-point scale where 0 is “not at all plausible” and 100 is “highly plausible”
- b- No tests conducted as means are opposite from prediction.

Panel B

Variable	Parameter Estimate	Pr >  t	Power (Alpha=.05)
Group	3.71	.55	.091
AP Experience	-.18	.05	.498
Group by AP Experience	.01	.93	.051

Hypothesis 2 predicts that participants who receive an implausible explanation from an in-group client will be *less* confident in their initial judgment than auditors who receive an implausible explanation from an out-group client. Table 3 displays the mean, standard deviation, range and number of participants by treatment group for the initial confidence variable. Means are in the predicted direction (in-group 58.92 and out-group 64.24), however, they are not statistically different (p=.258). Further analysis revealed that AR experience and initial confidence were marginally significantly related (p = .08); however, the interaction term (AP experience by group) was insignificant.

**TABLE 3 – TEST OF IN-GROUP BIAS ON INITIAL CONFIDENCE <sup>a</sup>**  
**(mean, standard deviation, range, n)**

	Total Sample
In-Group	58.92 (30.69) 5-100 90
Out-Group	64.24 (28.88) 0-100 74
	p=.258

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

Hypothesis 3 predicts that in-group bias could affect 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 correct responses (those who rated plausibility less than 50%). For initial plausibility, seventy-four auditors (45%) met this criterion. This number increased to one hundred and four (63%) post-decision aid. Table 4 displays, by group, the mean, standard deviation, and range for the dependent variable extent of testing. Extent of testing represents the number of hours participants chose to extend analytical procedures. An analysis of the raw means for each group indicates that extent of testing is in the predicted direction for both pre-decision aid extent of testing (in-group 11.26 and out-group 12.34) and post-decision aid (in-group 14.54 and out-group 15.81). Using ANOVA, I found insufficient evidence to support Hypothesis 3 (p=.65 for initial extent of testing, p=.61 for post-decision aid extent of testing). I also tested for a relationship between AR experience and extent of testing; pre-decision aid the relationship was insignificant (p = .14), however, post-decision aid, AP experience was significantly *negatively* related to extent of testing (p= .05). This finding indicates that more experienced auditors extended testing by fewer hours than did

auditors with less experience. The addition of an interaction term (AP experience by group), improved the overall model ( $p = .06$ ). The interaction term was negative and marginally significant ( $p=.08$ ), indicating that in-group experienced auditors extended testing less than out-group experienced auditors. This provides limited support for H3.

**TABLE 4– 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	11.26 (9.59) 0-40 39	14.54 (10.11) 0-40 57
Out-Group Extent of Testing	12.34 (11.05) 0-40 35	15.81 (14.99) 0-60 47
Two tailed ANOVA	$p = .65$	$p = .61$

#### Analysis of Decision Aid Hypotheses

Although many participants failed to answer the group manipulation check correctly, there is no reason to exclude them from the decision aid effectiveness hypotheses. I test the decision aid hypotheses using the complete sample, minus those who failed the accounting knowledge check. Usable responses totaled two hundred twenty-four. Table 5 includes descriptive statistics for the entire sample.

**TABLE 5– PARTICIPANT DEMOGRAPHICS FOR DECISION AID HYPOTHESES TESTS (All participants n = 224)**

	Seniors (n=180)	Staff (n=44)	Overall (n=224)
Gender			
Male	115	24	139
Female	65	20	85
Age			
Mean	27.99	25.91	27.58

Standard Deviation	5.60	4.27	5.42
Minimum	21	23	21
Maximum	55	41	55
Analytical Procedures Experience (# of times)			
Mean	22.56	2.16	19.30
Standard Deviation	30.36	2.61	28.82
Minimum	0	0	0
Maximum	200	10	200

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. One hundred twenty auditors met this criterion. As shown in Table 6, plausibility judgments decreased significantly ( $p < .0001$ ) post-decision aid (initial plausibility mean of 75.77 and post-decision aid plausibility mean of 49.76), supporting Hypothesis 4.

**TABLE 6– EFFECT OF DECISION AID ON AUDITOR PLAUSIBILITY JUDGMENTS**  
(mean, standard deviation, range, n)

	Initially Incorrect Auditors Only
Pre-decision Aid Plausibility	70.92 (15.90) 120
Post-decision Aid Plausibility	51.97 (29.39) 120
Repeated Measures Sig.	$p < .0001$

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 7 Panel A includes the mean, standard deviation, range and number of observations. Pre-decision aid confidence ratings ranged from 0 to 100, with a mean of 60.64. Post-decision aid confidence ratings ranged from 0-100 with a mean of 56.49. Contrary to expectations, raw mean confidence scores decreased for the total sample. I partitioned the sample by level to determine whether there was a relationship between level and change in confidence. Table 7 Panel B includes the mean, standard deviation, range and number of observations for each level. Although staff confidence changed negligibly, senior confidence decreased by approximately 9% post-decision aid.

For further explore changes in confidence, I partitioned the data based on initially incorrect and initially correct auditor responses (judgments greater than or equal to 50% are incorrect). *Panel C* contains the relevant statistics. Post decision aid confidence increased approximately 7% for initially correct auditors. This increased was statistically significant when tested using repeated measures ( $p < .0001$ ), supporting Hypothesis 5 for initially correct auditors only. Post decision aid confidence for initially incorrect auditors dropped over 15%. This decrease was statistically significant using repeated measures ( $p < .0001$ ). Findings suggest that although initially incorrect auditors improved their judgments, they were less confident about those new judgments.

**TABLE 7–CHANGE IN CONFIDENCE POST-DECISION AID  
(mean, standard deviation, range, n)**

*Panel A*

	Total
Pre-decision Aid Confidence	60.64 (31.11) 224
Post-decision Aid	56.49

Confidence	(34.48) 221
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*Panel B*

	Seniors	Staff
Pre-decision Aid Confidence	59.15 (32.06) 0-100 180	66.75 (26.32) 2-95 44
Post-decision Aid Confidence	53.99 (35.01) 0-100 178	66.83 (30.41) 0-100 43

*Panel C*

	Initially Correct	Initially Incorrect
Pre-decision Aid Confidence	50.39 (37.41) 0-100 102	69.21 (21.27) 10-100 122
Post-decision Aid Confidence	53.92 (39.19) 0-100 101	58.65 (29.94) 0-100 120

It is insufficient to examine auditor judgments alone, as auditor decisions ultimately influence audit effectiveness. Hypothesis 6 predicts that auditors who initially make an incorrect judgment will increase their extent of testing after using a decision aid.<sup>17</sup> Table 8 includes the mean, standard deviation, and range for the dependent variable extent of testing both pre- and post-decision aid. After accessing the decision aid, participants increased testing by 54 %, from 7.00 hours to 10.81 hours. Using repeated measures analysis, this increase in the extent of testing is significantly greater post-decision aid overall (p=.005).

**TABLE 8 – TEST OF EFFECT OF DECISION AID ON EXTENT OF TESTING**

<sup>17</sup> In keeping with prior procedures, I partition the sample based on a cutoff of 50% or greater initial plausibility.

(INITIALLY INCORRECT AUDITORS ONLY)  
**(mean, standard deviation, range, n)**

	Total
Pre-decision aid Extent of Testing	7.00 (8.06) 120
Post-decision aid Extent of Testing	10.81 (13.37) 117
	p=.005

**CONCLUSION**

**Discussion of Results**

Table 9 includes a summary of findings. I no support for in-group bias among auditors, with respect to judgment, confidence and decisions to extend testing. I found strong support for the effect of a decision aid on improving auditor plausibility judgments and decisions to extend testing. I found mixed support for an increase in confidence post-decision aid (significant only for initially correct auditors). I follow with a discussion of findings and possible reasons for lack of significant findings.

**TABLE 9 SUMMARY OF FINDINGS**

Hypothesis	IV	DV	Supported	p-value
1	Group	Plausibility	No	.385
2	Group	Confidence	No	.258
3 (pre-decision aid)	Group	Extent of Testing	No	.650
3 (post-decision aid)	Group	Extent of Testing	No	.610
4	Decision Aid	Plausibility	Yes	< .0001
5	Decision Aid	Confidence	Yes	Mixed
6	Decision Aid	Extent of Testing	Yes	.005

In the current study, I find no evidence that auditors exhibit in-group bias in an analytical procedures task. When insufficient evidence exists to disprove the null

hypothesis, there are two explanations. Either experimental validity is lacking, or the effect does not exist (or is too small to detect). I attended to several items to increase experimental validity. I excluded participants who failed manipulation and accounting knowledge checks, I collected the majority of the data in a controlled environment, and I used a large sample of auditors. Although it is possible that in-group bias cannot be manipulated in an experimental survey, prior studies have demonstrated the ease with which in-group bias can be generated. Therefore, given the experimental controls, it is quite possible that there is no (or a very small) effect.

Although individuals exhibit in-group bias in many other arenas, there are several reasons auditors may not exhibit bias. Auditors have attended accounting and continuing education classes that typically cover professional standards and skepticism. The emphasis on skepticism could cause staff auditors to pay close attention to client source reliability, thus mitigating in-group bias. Further, auditors' professional reputations depend on their independence from the client. Their awareness of independence rules may cause them to make a conscious effort to overcompensate against in-group 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 auditors demonstrate a mean confidence level of 58.92 while out-group auditors demonstrate a higher mean confidence of 64.24.

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. 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 who judge plausibility low extend testing more than those who judge plausibility high. This finding also indicates that participants expended the requisite cognitive effort for the task.

In addition to testing for group biases, I also examined whether a simple decision aid would 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. 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 72.89 to 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. 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 significant decrease. This decreased confidence is possibly a result of the disconfirming evidence provided to those auditors by the decision aid, reducing their overall confidence.

Hypothesis 6 predicted that the use of a decision aid would improve auditors' decisions to extend testing. I found that auditors who gave an incorrect initial judgment (high plausibility), 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). These findings support the hypothesis that decision aids improve decisions to extend testing. Findings also suggest that auditors will rely on decision aids and change not only their judgments, but decisions resulting from those judgments.

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.

## **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 of group bias among auditors on judgments, confidence, or decisions to extend 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 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. There is insufficient evidence to suggest that auditors demonstrate in-group bias in an analytical procedures task.

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 reinforcement 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.

### **Limitations**

Several hypotheses were unsupported or marginally supported. Given that I designed the study with careful attention to internal validity, I estimate that my failure to detect a strong group bias is a result of small (no) bias effects in fact. While there is insufficient evidence to reject the null hypothesis for in-group bias for staff auditors, and for increases in confidence post-decision aid overall, I likewise cannot conclude that these effects do not exist for auditors.

Another limitation is a demand effect. Given the heightened awareness of threats to independence resulting from auditor affiliation, participants could have engaged in hypothesis guessing. 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. The experimental context is another limitation. The sterility of online and paper/pencil experiments 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 experiment.

### **Future Research**

There are several avenues for future research including using alternative research methods and extending research parameters, and altering the decision aid. 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. Using managers and partners in an experimental study could reveal 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 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.

## References

- Abdolmohammadi, M. and C. Usoff. 2001. A Longitudinal Study of Applicable Decision Aids for Detailed Tasks in a Financial Audit. *International Journal of Intelligent Systems in Accounting, Finance and Management*, 10(3): 139-154.
- Abdolmohammadi, M. J. 1991. A Test of the Relationship Between Task Structure and Decision Aids Type in Auditing. In L. A. Ponemon, & D. R. L. Gabhart (Eds.), *Auditing Advances in Behavioral Research*. New York: Springer Verlag.
- Abdolmohammadi, M. J. 1999. A Comprehensive Taxonomy of Audit Task Structure, Professional Rank, and Decision Aids for Behavioral Research. *Behavioral Research in Accounting*, 1999(11): 51-79.
- Ahlawat, S. S. 1999. Order Effects and Memory for Evidence in Individual versus Group Decision Making in Auditing. *Journal of Behavioral Decision Making*, 12(1): 71-88.
- AICPA. 2005. *AICPA Professional Standards*. New York: American Institute of Certified Public Accountants, Inc.
- Anderson, J. C., K. K. Moreno, and J. M. Mueller. 2003. The Effect of Client vs. Decision Aid as a Source of Explanations upon Auditor's Sufficiency Judgments: A Research Note. *Behavioral Research in Accounting*, 15: 1-11.
- Anderson, U. and L. Koonce. 1998. Evaluating the Sufficiency of Causes in Audit Analytical Procedures. *Auditing: A Journal of Practice and Theory*, 17(1): 1-12.
- Anderson, U., L. Koonce, and G. Marchant. 1994. The effects of source-competence information and its timing on auditors' performance of analytical procedures. *Auditing: A Journal of Practice and Theory*, 13(Spring): 137-148.

- Ashton, R. H. 1990. Pressure and performance in accounting decision settings: Paradoxical effects of incentives, feedback, and justification. *Journal of Accounting Research*, 28(Supplement): 148-180.
- Ashton, R. H. 1992. Effects of justification and a mechanical aid on judgment performance. *Organizational Behavior and Human Decision Processes*, 52: 292-306.
- Ballou, B. 2001. The relationship between auditor characteristics and the nature of review notes for analytical procedure working papers. *Behavioral Research in Accounting*, 13: 25-49.
- Bamber, E. M. 1983. Expert Judgment in the Audit Team: A Source Reliability Approach. *Journal of Accounting Research*, 21(2): 396-413.
- Bamber, E. M., P. R. Gillett, T. J. Mock, and K. T. Trotman. 1995. Audit Judgment. In T. B. Bell, & A. M. Wright (Eds.), *Auditing Practice, Research, and Education*: 210. New York: American Institute of Certified Public Accountants, Inc.
- Bamber, E. M. and R. J. Ramsay. 2000. The effects of specialization in audit workpaper review on review efficiency and reviewers' confidence. *Auditing*, 19(2): 147-158.
- Barrionuevo, A. 2002. Questioning the Books: Court Documents Show Andersen's Ties With Enron Were Growing in Early '90s, *Wall Street Journal*, Eastern ed.: A.6. New York.
- Beasley, M. S., J. V. Carcello, and D. R. Hermanson. 2000. Should You Offer a Job to Your External Auditor? *Journal of Corporate Accounting & Finance*, 11(4): 35-42.
- Bedard, J. C. and L. E. Graham. 2002. The Effects of Decision Aid Orientation on Risk Factor Identification and Audit Test Planning. *Auditing*, 21(2): 39-56.

- Biggs, S. F., W. R. Knechel, N. R. Walker, W. A. Wallace, and J. J. Willingham. 1995. Analytical Procedures. In T. B. Bell, & A. M. Wright (Eds.), *Auditing Practice, Research, and Education*: 110-143. New York: American Institute of Certified Public Accountants, Inc.
- Bleed, J. 2002. Industry Official Says Accounting Firms Face Unprecedented Challenge, *Knight Ridder Tribune Business News*: 1. Washington.
- Brazel, J. F., C. P. Agoglia, and R. C. Hatfield. 2004. Electronic versus Face-to-Face Review: The Effects of Alternative Forms of Review on Auditors' Performance. *The Accounting Review*, 79(4): 949-966.
- Bukszar, E. 2003. Does Overconfidence Lead to Poor Decisions? A Comparison of Decision Making and Judgment Under Uncertainty. *Journal of Business and Management*, 9(1): 33-43.
- Butler, S. A. 1985. Application of a decision aid in the judgmental evaluation of substantive tests of details samples. *Journal of Accounting Research*, 23: 513-526.
- Cohen, J. and T. Kida. 1989. The Impact of Analytical Review Results, Internal Control Reliability, and Experience on Auditors' Use of Analytical Review. *Journal of Accounting Research*, 27(2): 263-276.
- Einhorn, H. J. and R. M. Hogarth. 1978. Confidence in judgment: Persistence of the illusion of validity. *Psychological Review*, 85(5): 395-416.
- Eining, M. M., D. R. Jones, and J. K. Loebbecke. 1997. Reliance on Decision Aids: An Examination of Auditors' Assessment of Management Fraud. *Auditing: A Journal of Practice and Theory*, 16(2): 1-19.
- Emby, C. and D. Finley. 1997. Debiasing Framing Effects in Auditors' Internal Control Judgments and Testing Decisions. *Contemporary Accounting Research*, 14(2): 55-77.

- George, J. F., K. Duffy, and M. Ahuja. 2000. Countering the anchoring and adjustment bias with decision support systems. *Decision Support Systems*, 29: 195-206.
- Hall, J. A. 2004. *Accounting Information Systems* (Fourth ed.): Thomson Southwestern.
- Hastie, R. 2001. Problems for Judgment and Decision Making. *Annual Review of Psychology*, 52: 653-683.
- Heritage, A. 2000. *The American Heritage Dictionary of the English Language* (Fourth ed.): Houghton Mifflin Company.
- Hewstone, M., M. Rubin, and H. Willis. 2002. Intergroup Bias. *Annual Review of Psychology*, 53: 575-604.
- Hirst, D. E. 1994. Auditor's sensitivity to source reliability. *Journal of Accounting Research*, 32(Spring): 113-126.
- Hirst, E. and L. Koonce. 1996. Audit analytical procedures: A field investigation. *Contemporary Accounting Research*, 13(Fall): 457-486.
- Hogarth, R. M. 1980. *Judgment and Choice*. Chichester: John Wiley & Sons.
- Independence Standards Board. 2000. *A Conceptual Framework for Auditor Independence. Exposure Draft on Statement of Independence Concepts*. New York: ISB.
- Joyce, E. J. and G. C. Biddle. 1981. Are Auditors' Judgments Sufficiently Regressive? *Journal of Accounting Research*, 19(2): 323-349.
- Kahneman, D., P. Slovic, and A. Tversky. 1982. *Judgment under uncertainty: Heuristics and biases*. Cambridge, MA: Cambridge University Press.
- Kaplan, S. E., C. Moeckel, and J. D. Williams. 1992. Auditors' Hypothesis Plausibility Assessments in Analytical Review Setting. *Auditing*, 11(2): 50-66.
- Kennedy, J. 1993. Debiasing Audit Judgment with Accountability: A Framework and Experimental Results. *Journal of Accounting Research*, 31(2): 231-245.

- Kennedy, J. 1995. Debiasing the Curse of Knowledge in Audit Judgment. *The Accounting Review*, 70(2): 249-273.
- King, R. R. 2002. An Experimental Investigation of Self-Serving Biases in an Auditing Trust Game: The Effect of Group Affiliation. *The Accounting Review*, 77(2): 265-284.
- Kunda, Z. 1990. The Case for Motivated Reasoning. *Psychological Bulletin*, 108(3): 480-498.
- Lennox, C. 2005. Audit quality and executive officers' affiliations with CPA firms. *Journal of Accounting and Economics*, 39(2): 201-231.
- Levine, J. M., R. L. Moreland, and C. S. Ryan. 1998. Group Socialization and Intergroup Relations. In C. Sedikides, J. Schopler, & C. A. Insko (Eds.), *Intergroup Cognition and Intergroup Behavior*: 283-308. Mahwah: Lawrence Erlbaum Associates, Inc.
- Libby, R. 1985. Availability and the Generation of Hypotheses in Analytical Review. *Journal of Accounting Research*, 23(2): 648-667.
- Libby, R. 1991. *Auditing: Advances in Behavioral Research*. New York: Springer-Verlag.
- Libby, R. and D. M. Frederick. 1990. Experience and the Ability to Explain Audit Findings. *Journal of Accounting Research*, 28(2): 348-367.
- Libby, R. and P. A. Libby. 1989. Expert Measurement and Mechanical Combination in Control Reliance Decisions. *The Accounting Review*, 64(4): 729-747.
- Lim, K. H., I. Benbasat, and L. M. Ward. 2000. The Role of Multimedia in Changing First Impression Bias. *Information Systems Research*, 11(2): 115-136.
- Menon, K. and D. D. Williams. 2004. Former Audit Partners and Abnormal Accruals. *The Accounting Review*, 79(4): 1095-1118.

- Moeckel, C. L. and R. D. Plumlee. 1989. Auditors' Confidence in Recognition of Audit Evidence. *The Accounting Review*, 64(4): 653-666.
- Oakes, P. J., S. A. Haslam, and J. C. Turner. 1994. *Stereotyping and Social Reality*. Oxford: Blackwell Publishers.
- Peecher, M. 1996. The Influence of Auditors' Justification Processes on Their Decisions: A Cognitive Model and Experimental Evidence. *Journal of Accounting Research*, 34(1): 125-140.
- Rose, A. M. and J. M. Rose. 2003. The Effects of Fraud Risk Assessments and a Risk Analysis Decision Aid on Auditors' Evaluation of Evidence and Judgment. *Accounting Forum*, 27(September): 312-338.
- Rose, J. M. 2002. Behavioral Decision Aid Research: Decision Aid Use and Effects. In V. Arnold, & S. Sutton (Eds.), *Researching Accounting as an Information Systems Discipline*: 111-133. Sarasota: American Accounting Association.
- Roy, M. C. and F. J. Lerch. 1996. Overcoming Ineffective Mental Representations in Base-rate Problems. *Information Systems Research*, 7(2): 233-247.
- Sarbanes-Oxley Act (SOX). 2002. *Public Law No. 107-204*. Washington D.C.: Government Printing Office.
- Solomon, I., J. L. Krogstad, and M. B. Romney. 1982. Auditors' Prior Probability Distributions for Account Balances. *Accounting, Organizations and Society*, 7(1): 27-41.
- Srivastava, R. P. and T. J. Mock. 2004. Belief Functions in Accounting Behavioral Research. *Advances in Accounting Behavioral Research*, 3: 225-242.

- Tajfel, H. 1981. *Human groups and social categories: Studies in social psychology*.  
Cambridge: Cambridge University Press.
- Tetlock, P. E. 1983. Accountability and the Perseverance of First Impressions. *Social Psychology Quarterly*, December: 285-292.
- Tomassini, L. A., I. Solomon, M. B. Romney, and J. L. Krogstad. 1982. Calibration of Auditors' Probabilistic Judgments: Some Empirical Evidence. *Organizational Behavior and Human Performance*, 30(3): 391-407.
- Towry, K. L. 2003. Control in a Teamwork Environment-The Impact of Social Ties on the Effectiveness of Mutual Monitoring Contracts. *The Accounting Review*, 78(4): 1069-1095.
- Trotman, K. 1985. The Review Process and the Accuracy of Auditor Judgments. *Journal of Accounting Research*, 23: 740-752.
- Tubbs, R. M., J. William F. Messier, and W. R. Knechel. 1990. Recency Effects in the Auditor's Belief-Revision Process. *The Accounting Review*, 65(2): 452-460.
- Ye, L. R. and P. E. Johnson. 1995. The Impact of Explanation Facilities on User Acceptance of Expert Systems Advice. *MIS Quarterly*, 19(2): 157-172.

## Appendix A

### Background Material<sup>18</sup> 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.

(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%

<sup>18</sup> 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.		