

The In-group Bias Effect on Auditors' Evidence Evaluation: Can a Decision Aid Make a Difference?

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## The In-group Bias Effect on Auditors' Evidence Evaluation: Can a Decision Aid Make a Difference?

**ABSTRACT:** In-group bias, a product of Social Identity Theory, may impair auditor independence by influencing auditor judgments in an analytical review task. Auditors rely on client representations to support their opinion of the financial statements; however, clients are sometimes former auditors of the external audit firm. This prior relationship could lead the auditor to exhibit unwarranted trust of client representations. In an online experiment, I test whether auditor judgments, confidence, and decisions to extend testing differ based on a client's prior affiliation. Participants include both novice and senior auditors. Preliminary findings indicate the existence of in-group bias, especially among inexperienced auditors. Practice and prior literature suggest using decision aids to counter biased judgments. In the same experiment, I find that a structured decision aid report effectively reduces bias. Auditors should be conscious of the potential for this bias when assigning personnel to engagements. They should also note the usefulness of decision aids in improving judgment.

**Keywords:** Experimental, judgment, decision-making, auditing, social identity, Sarbanes-Oxley

## 1. Introduction

This study examines whether in-group bias, an inclination to trust one's own group members, affects auditors' judgments and decisions in an analytical review task. It also explores whether a decision aid successfully mitigates in-group bias. Auditors perform analytical review 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<sup>1</sup> (Hirst 1994). In-group bias, which occurs when group members extend unjustified trust to other group members (Hewstone et al. 2002)<sup>2</sup>, could impact this evaluation. 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 could result in an ineffective audit.

Companies often hire employees from their external audit firm, (Beasley et al. 2000; Bleed 2002; Lennox 2004). In several of the most recent audit failures, high-ranking accounting personnel were also alumnae of the company's external audit firm (Barrionuevo 2002). Congress has recognized the potential for in-group bias to influence auditor judgments and has restricted public companies from hiring their

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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).

external auditors in positions of financial authority for a one-year period<sup>3</sup>. The AICPA also warns that hiring external auditors might impair independence (AICPA 2004b). Although the SEC and AICPA 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 (2004) 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, while Menon and Williams (2004) found evidence of abnormal accruals in firms with affiliated executives. These studies suggest that auditors may exhibit in-group bias.

Although Lennox (2004) demonstrated in-group bias effects among auditors, there are some reasons why individual auditors may be immune to this bias. Bamber (1995) notes several studies which suggest that auditors are less susceptible to psychological biases. These results could arise because auditors have strict professional standards, training in professional skepticism and independence, are subject to public accountability, and must meet stringent exam requirements. The AICPA's professional standards make an explicit reference to *familiarity* as a threat to independence. Auditors are cautioned that independence could be threatened by "...members who have a close or longstanding relationship with an attest client of their firm..." (AICPA 2004a). The above factors support an auditor's ability to assess accurately client objectivity, regardless of past associations.

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 regulations, I first test the extent of in-group bias on auditor judgments and decisions. If I find no significant evidence of

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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 (AICPA 2004c).

bias, results could inform regulators regarding the value, or lack thereof, of auditor employment restrictions. If I find that in-group bias significantly impacts the auditors' judgments and decisions, I explore whether a valid, objective decision aid can mitigate the bias.

Practitioners use decision aids to improve auditing. These aids support decision-making by overcoming human information processing limitations (Rose 2002), automating structured decisions (Abdolmohammadi 1991), and providing models and data to assist the auditor in choosing between alternatives in semi-structured tasks (Abdolmohammadi 1991). I use analytical procedures in this study because they are semi-structured tasks: they have a reasonably well-defined problem, with limited alternatives, requiring some judgment (Abdolmohammadi and Usoff 2001; Abdolmohammadi 1991). I supply auditors with a decision aid that lists plausible explanations for a given account fluctuation. If in-group bias causes auditors to extend *unjustified* trust to other group members, and this trust results in an incorrect judgment that a client explanation is plausible, when, in fact, it is not plausible, a decision aid that lists plausible explanations should alert the auditor to an implausible client assertion, thus mitigating the negative effect of in-group bias.

I use a 2 x 2 online experiment with one *between-subjects* variable, group affiliation (in and out) and one *within-subjects* variable, decision aid (pre and post). Practicing novice and senior auditors evaluate a client-provided explanation; the client is either a former audit team member or a longstanding client employee. Dependent variables, measured pre- and post-decision aid, include the auditor's plausibility judgment, his confidence in that judgment, and his decisions whether and how much to extend audit testing. After evaluating demographics (experience, firm, and gender) as possible covariates, I analyze data using repeated measures ANOVA or ANCOVA as indicated.

To summarize, first, I test for in-group bias in an audit context, exploring how this bias affects auditor judgment, confidence, and decisions to extend audit testing. Second, I test whether a decision aid can effectively mitigate the bias. Psychology demonstrates the robustness of in-group bias across multiple

contexts; regulatory agencies indicate their concern that this bias could impact auditor judgments. Should this bias negatively impact auditor judgment, an effective decision aid could mitigate the bias. Results of this research have implications for regulators, audit firms, shareholders, and clients.

The paper continues as follows: Section 2 includes the theory and development of the hypotheses, Section 3 describes the method and provides a listing of limitations, Section 4 discusses pilot test results and Section 5 provides expected conclusions.

## **2. Theory and Development of Hypotheses**

Section 2.1 discusses evaluation of source reliability during analytical procedures, 2.2 defines auditor affiliations and covers related research, 2.3 introduces biases in auditing and Social Identity Theory, 2.4 develops hypotheses related to in-group bias, 2.5 provides options for debiasing in auditing, 2.6 explores mitigation studies 2.7 details decision aid use in auditing, and 2.8 develops hypotheses related to decision aid use.

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

#### *2.1.1 Analytical Procedures*

Generally Accepted Auditing Standards (GAAS) require auditors to obtain sufficient evidence to support their opinion of a client's financial statement presentation and disclosures. *SAS No. 56* requires auditors to perform analytical procedures in both the planning and review phases of the audit (AICPA 2004d). When used during planning, analytical procedures help the auditor identify accounts that need further investigation, allowing them to budget more time and testing to these areas. *SAS No. 56* also suggests the use of analytical procedures in the testing phase to obtain assurance. Practicing auditors commonly place great reliance on these procedures (Anderson et al. 1994; Biggs et al. 1995; Hirst and Koonce 1996).

Auditors obtain explanations for unexpected fluctuations from multiple sources (Anderson et al. 2003). Changes in balances may relate to external events (*i.e.* a change in general economic indicators or competition), or may result from internal client decisions (*i.e.* discontinuation of a product line or replacement of depreciated assets). When changes result from external causes, auditors can 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, lower level auditors are more likely to ask the client first. Both experienced and novice auditors turn to the client either to confirm or to seek explanations regarding the causes of observed fluctuations. The degree of reliance the auditor places on these explanations depends on his assessment of the client's objectivity.

### *2.1.2 The Judgment Process*

According to the Anderson and Koonce (1998) model in Figure 1, auditors proceed through a two stage process when evaluating evidence. Auditors start with a two-step plausibility check. In the first step, they assess whether an explanation is consistent with the observed fluctuation. For example, if net income increases, an increase in sales would be a plausible reason; an increase in common stock would not be a plausible reason. Once auditors judge a cause consistent with the fluctuation, they then consider whether the cause is consistent with the available information. Did sales, in fact, increase? If the evidence shows that sales decreased, this explanation would not be consistent with the facts and auditors would judge this explanation implausible (Anderson and Koonce 1998). After compiling a list of plausible hypotheses, auditors perform the sufficiency evaluation task. This evaluation requires an assessment of how much of the variation in the account is explained by the hypotheses overall.

<<Insert Figure 1 about here>>

Although prior research has found that auditors often fail to adequately assess sufficiency (Anderson et al. 2003; Anderson and Koonce 1998; Hirst and Koonce 1996), little research has examined auditors' ability to assess plausibility. Since auditors recognize basic accounting relationships, it is likely that they would accurately complete *step one* of the plausibility judgment (explanation is consistent with change in account balance). However, because *step two* of the plausibility check requires auditors to search for confirming evidence, they could fail to identify explanations that are inconsistent with actual circumstances. Given a seemingly plausible client-provided explanation, novice auditors could fail to complete accurately step two, independent confirmation that the hypothesis fits the circumstances. The current study uses an explanation that is consistent with the change in account balance, yet inconsistent with the actual facts (as evidenced by changes in other account balances). To identify the explanation as implausible, auditors must search beyond the account of interest.

Prior research suggests that experienced auditors can detect implausible explanations when source objectivity is manipulated at two levels: client and some other outside source (i.e., 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, which should increase objectivity, and the client's current position within his or her firm, which should decrease objectivity.

### *2.1.3 Source Reliability Judgments*

Auditors weight client explanations based on their assessment of the client's source reliability. The *source reliability* judgment includes an evaluation of both competence and objectivity. 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.

Auditing standards require the auditor to approach the client with professional skepticism. Any bias that impairs auditor judgment of either the competence or the objectivity of a source could reduce the audit’s effectiveness and increase audit risk. When evaluating the *competence* of a client who was once an audit team member, the auditor’s past interaction with that individual on audit engagements, as well as the auditor’s knowledge of firm training and promotion policies, should result in an accurate competence judgment. Further, an individual’s competence is unlikely to decrease when he or she goes to work for a client firm.

Unlike competence, *objectivity* is subject to situational pressures. Clients, although knowledgeable, might not be objective (Hirst 1994). Compensation plans, promotion opportunities, and stock options provide motivation for clients to report untruthfully. *SAS No. 99* requires auditors to evaluate client assertions with professional skepticism, directing them to inquire about management incentives, pressures and motivations. Auditors must consider how these motivations can influence clients to provide untruthful explanations. When evaluating the objectivity of a former audit team member, the current auditor must consider how the ex-auditor’s objectivity may have changed, and how that change may affect the client’s overall source reliability.

#### *2.1.4 Clients’ Insider Knowledge of Audit Process*

The potential for client deception is especially relevant when the client is a former member of the current audit firm. A significant threat to financial reporting involves the ex-auditor’s specialized knowledge of the continuing audit firm’s processes and operations (Beasley et al. 2000). As a former audit team member, the client knows which tasks lower level auditors complete. He can apply this knowledge to hide strategically his 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. This insider information creates an opportunity for the client to anticipate and subvert those procedures. Admittedly, although a client might attempt to deceive the auditor, successful deception depends on the auditor's inability to detect the deception. The focus of this paper remains on the auditor's judgment of the plausibility of a client explanation; the above discussion merely highlights the *increased potential* for a client to plan his deception.

## **2.2 Auditor Affiliation and Related Studies**

Lack of independence is an often-cited cause of audit failure. In some audit failures, the top executives at the client corporations are also past employees of the firms that audited them. In the Enron case, both Richard Causey, Chief Accounting Officer, and Sherron Watkins, Vice President, were Andersen alumni (Barrionuevo 2002). The federal government has responded to the auditor affiliation threat to independence by restricting the employment options of audit team members (AICPA 2004c). In addition, the 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 2004b).

Auditor affiliation can occur in one of three ways (Lennox 2004). See Figure 2. This study focuses on employment affiliations, which arise when the client company hires a member of the recurring external audit team. There are two reasons I focus on employment affiliations. First, they are the most common (Lennox 2004). Second, they are particularly susceptible to bias because the auditor goes directly from being a member of the audit team to being a client. This change in circumstance could alter the ex-auditor's motivations, and potentially, his objectivity.

<< Insert Figure 2 about here >>

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). Three benefits accrue

from hiring former external auditors (Beasley et al. 2000). First, auditors are often highly trained by their firms. Second, auditors commonly have had exposure to varied clients, businesses, and complex financial transactions. Third, a client company's former auditors have an insider's knowledge of the client's current strategies and corporate environment and therefore can quickly acclimate themselves to client practices.

Beasley et al. (2000) also identify three threats to the financial reporting process associated with such hirings. While one of these threats relates to the potential for auditor shirking before hiring, two relate to the time period after the auditor is hired. The first threat, detailed previously in *Section 2.1.4*, relates to the client's advantage over the auditor. The ex-auditor's intimate knowledge of the audit firm's plans and procedures logically makes it easier for him to cover up improprieties in the financial statements. The second threat and the basis for this study, stems from the effect of an in-group bias, explained later in *Section 2.3.2*, which causes the auditor to overestimate the client's objectivity, leading to underauditing. This bias can cause a reluctance of the current auditors to question the assertions of clients who were once co-workers.

Although auditor affiliation threats have attracted the interest of regulators, researchers have published little on the subject. A review of the behavioral literature reveals experimental investigations of third party perceptions of affiliated auditor independence. Imhoff Jr. (1978) finds that time lapse and auditor rank affect CPA's and users' perceptions of auditor independence. Koh and Mahathevan (1993) explore managements' perception of auditor independence based on time lapse, past and current position, and prior audit opinion. Lennox (2004, 2) observes that "...no published archival evidence exists on the types of affiliations or whether affiliations impair audit quality." Lennox (2004) uses an estimation model to identify companies whose unfavorable opinion probabilities are greater than 10%. He then partitions these companies based on the presence or absence of an affiliated executive. Findings suggest that firms with affiliated executives were statistically more likely to have a clean audit opinion. Menon and Williams (2004), using an archival approach, identify higher abnormal accruals in companies with affiliated

executives. While the above studies examine either third party perceptions of auditor independence or affiliation's effect on a global audit opinion, the current study uses an experimental approach to explore the effect of auditor affiliation on individual audit judgments.

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

### *2.3.1 Biases in Auditing Judgments*

Much has been written regarding the process, and particularly the weakness of human judgment and decision-making (Bamber et al. 1995; Hogarth 1980; Kahneman et al. 1982; Libby 1991). One such weakness is bias, defined as “a preference or an inclination, especially one that inhibits impartial judgment” (American Heritage 2000). Biases can be strategic (individuals are conscious of their bias) or implicit (individuals are unaware of their bias). Auditors' professional skepticism likely prevents them from exhibiting strategic biases<sup>4</sup>; however, implicit biases may persist. Bias identification is particularly important in auditing since auditors are required to make many judgments, the results of which can significantly impact multiple stakeholders. For example, if an auditor *incorrectly* believes there is sufficient evidence to support an account balance (overweighting), he could wrongly curtail further testing on that account. While a single judgment error is not likely to increase risk considerably, the final audit opinion is the sum of multiple judgments; therefore, the cumulative effect of these errors could significantly increase the risk of an audit failure (Moeckel and Plumlee 1989).

Some frequently researched biases in the audit literature include: anchoring and adjustment (Hogarth and Einhorn 1992), primacy/recency effects (Kahneman et al. 1982), base rate frequency (Tuttle 1996), common information-sampling bias (O'Donnell et al. 2000), and information search strategy (Kida 1984). The roots of these biases reside in the psychology field. However, Bamber et al. (1995) suggest that auditing has unique attributes that prevent indiscriminate application of psychology findings to auditors.

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<sup>4</sup> For a discussion of the two types of biases, see Kunda (1990).

Indeed, research results are mixed. While auditors performed better than non-auditors in a representativeness judgment (Joyce and Biddle 1981), and demonstrated a better understanding of subpopulation error rates (Tuttle 1996), in anchoring and adjustment studies they exhibited a recency effect consistent with general psychology findings. (Bamber et al. 1995). Although auditors are professionals, trained to detect errors and misstatements, they are still human, and as such, demonstrate many of the biases long established through years of psychology research.

### *2.3.2.1 Social Identity Theory*

In-group bias, based on Social Identity Theory, influences human decision-making in social contexts (Tajfel 1981). This theory proposes that group members are an extension of the self, and as such, each group member has a “...systematic tendency to evaluate...*(his)*... own membership group (the in-group) or its members more favorably than a nonmembership group (the out-group) or its members” (Hewstone et al. 2002, 576). In-group bias, characterized by one’s unquestioning belief in the assertions of a fellow group member, provides an individual with a positive social identity, thereby satisfying his need for self-esteem (Hewstone et al. 2002). This bias is quite robust; Oakes et al. (1994) note that discriminatory behavior and attitudes can be brought about by a mere cognitive division of people into groups. Towry (2003) successfully manipulated team identity simply through the use of colored props and seating assignments. Auditors become part of an audit firm’s in-group when they are hired. As they work together on the same audit team, they develop familiarity through repeated interactions, increasing the level of in-group bonding. Although auditors who eventually leave the firm to go work for a client are technically no longer members of the audit team, this change in employment does not necessarily exclude them from the audit in-group. Levine et al. (1998) notes that individuals may simultaneously be members of multiple groups. When an auditor becomes a client, the remaining audit team members may view the ex-auditor as part of both the client and the audit groups. Therefore, even after auditors go to work for a client,

remaining audit team members could continue to identify them as group members; they are, in fact, still working together on the same audit, albeit on opposite sides.

### *2.3.2.2 Inter-group Bias in Social Psychology*

Three characteristics define inter-group bias. First, in-group members view themselves as a homogeneous group; second, in-group members view out-group members as a homogeneous group; and third, in-group members view themselves as different from out-group members (Apfelbaum and Lubek 1979). Inter-group bias causes people to draw distinctions based on group membership, rather than on individual traits. Inter-group bias can take the form of in-group trust or out-group derogation. In-group favoritism results in the “extension of trust, positive regard, cooperation, and empathy to in-group, but not out-group members” Hewstone et al. (2002, 578). Out-group derogation is the underlying source of stereotyping and discrimination. Interestingly, much of the psychology research seeks to reduce out-group derogation, and, in turn, reduce the inter-group conflict (Hewstone et al. 2002; Tajfel 1981). In this study, the problem lies not with unwarranted out-group skepticism, but with unjustified in-group trust. The danger comes from overweighting assertions made by an in-group member, not from underweighting assertions made by an out-group member.

Self and social identity theories are often used to explain an individual’s behavior in groups (Ellemers et al. 2002; Oakes et al. 1994; Tajfel 1981). Ellemers et al. (2002) presents a taxonomy of the primary concerns and motives of the social self. The two axes are level of group commitment (high and low) and level of perceived threat (none, individual, and group). The taxonomy in Figure 3 details concerns and motives for each response. For the purposes of this study, I classify both senior and novice auditors as belonging to Cell #4: high commitment to the group and exposure to individual-directed threats. Both novice and senior auditors are likely to be highly committed to their firm; seniors have chosen to stay with their firms by accepting promotions, and novices have just completed years of training and study, as well as

a competitive interview process. The individual threat is one of exclusion from the group. Senior and novice auditors are more likely to make decisions that further their acceptance as part of the group than decisions that might lead to their rejection by the group.

<< Insert Figure 3 about here >>

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

Within a single organization, there are both in-group and out-group members. Napier and Ferris (1993) note that, among other factors, the higher the perceived similarity between supervisors and subordinates, the lower the psychological distance. In turn, “...less Psychological Distance is associated with greater attraction and liking, greater subordinate satisfaction, and higher supervisor evaluations of subordinate performance” (Napier and Ferris 1993, 333). Given these benefits, it is likely that both novice and senior auditors would seek to nurture perceived similarity between themselves and their superiors.

### *2.3.2.3 In-group Bias in Auditing*

An extensive literature search revealed only one behavioral study on the effects of in-group bias among auditors. King (2002) challenged the idea that auditors are subservient to self-serving biases, and that they are unable to objectively audit a client upon whose business they depend. He created a strong group identity among the auditors by having them meet frequently with each other. This strong identity resulted in the auditors’ increased ability to detect client deceptions. Auditors in the weak group treatment interacted primarily with clients and were less likely to detect client deception. In the strong group, the

auditors' motivation to perform appropriate audits overcame their self-serving biases<sup>5</sup>. This result demonstrated the power of in-group bias to influence auditors' judgments of client assertions.

In the above study, auditors' in-group bias toward other auditors resulted in better audits yet individuals belong to many groups simultaneously, resulting in differing degrees of group identity (Ellemers et al. 2002). I might identify myself as a graduate of a particular university, an accountant, an auditor, an employee of a large audit firm, and specifically, an employee of a particular firm. Depending on how strongly I identify with each group, I will exhibit a concomitant level of in-group bias. In an auditor/client relationship, auditors may view clients as fellow group members based on their common socio-economic class, college alma mater, religious affiliation, or, where the client was once an auditor, professional association. In the case of employment affiliation, the auditor could still view the ex-auditor, now the client, as an audit firm group member.

In-group bias is particularly relevant in auditing because it can affect the auditor's professional skepticism. Analytical procedures require auditors to gather and evaluate explanations from clients. A key part of this evaluation involves the auditor's ability to judge correctly the client's objectivity, 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. I assume 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 will cause the auditor to accept the client's implausible explanation, resulting in an incorrect audit judgment.

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

#### *2.3.2.4 A Normative View*

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

Hirst (1994) suggests that both competence and objectivity should be considered in a source reliability judgment. Based on an insider's knowledge of hiring criteria, professional certifications, firm training and evaluation procedures, along with the direct experience of working together, auditors should correctly assess their former co-worker's competence. The validity of this assessment should not change regardless of the fellow co-worker's employment. Auditors must also assess a client's objectivity -- an individual's motivation to communicate his beliefs honestly. In fulfilling their obligation to reduce the risk that accompanies the principle-agent relationship characteristic of owners and managers, auditors must maintain objectivity. Auditor objectivity arises from the motivation to provide a quality audit. Contrary to this, client objectivity arises from the motivation to present the financial statements in the best possible light. Because of this difference in motivations, it is likely that a client's representations are more biased (less objective) than those of an auditor.

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

The first part of this study tests whether senior and novice auditors demonstrate in-group bias when assessing a client-provided explanation. As noted earlier, senior auditors are more experienced, and are thus more likely to detect an implausible explanation. However, senior auditors have also worked at their audit firm for several years, developing a strong group association. This association could strengthen the in-group bias resulting in unjustified trust of former colleagues (especially their prior audit team manager). Novice auditors, although less experienced, have a need for acceptance by the group. Therefore, they are likely to align themselves with classic group members. A novice auditor could identify strongly with the

current audit team members and look to impress them by demonstrating skepticism of client explanations. On the other hand, in a client affiliation situation, the novice could still see the client as an audit team member, and thus be reluctant to question the client's assertions. In sum, both seniors and novices have the potential to exhibit in-group bias. I propose that in-group bias persists from the original association between the client and auditor, making each more likely to overrate the plausibility of a client explanation.

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

**Hypothesis 1 (unwarranted trust): 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 express confidence in their judgments. Firms design audit programs to minimize risk and maximize efficiency. This design requires auditors to achieve minimum confidence levels. Rose (2002) notes that individuals may exhibit either overconfidence (“...increases in confidence without the associated improvements in decision quality...”)(114), or underconfidence (failure of the individual to recognize when the decision is accurate). General psychology research finds overwhelmingly that individuals are overconfident (Fischhoff 1982). Overconfidence itself is a bias, in that it negatively impacts resulting decisions. This phenomenon is seen with both general knowledge, as well as with tasks completely unfamiliar to the participants (Fischhoff 1982).

Confidence has also been studied within the audit literature (Ahlawat 1999; Bamber and Ramsay 2000; Einhorn and Hogarth 1978; Moeckel and Plumlee 1989). Results are mixed. In an audit-related task, Tomassini et al. (1982) find that auditors demonstrate less overconfidence than suggested by the general psychology literature. Solomon et al. (1982) found that auditors were underconfident in an audit task; however, similar to general psychology findings, they were overconfident in a general knowledge task. Contrary to earlier findings, in an audit evidence recall task, Moeckel and Plumlee (1989) find that participants are equally confident in their inaccurate memories as in their accurate memories. Bamber (1995) suggests that there is some underlying, unknown reason for underconfidence in an audit context.

I propose that even though auditors may accurately judge an explanation as implausible, they would not expect an in-group client to present an implausible explanation. Thus, when auditors recognize an in-group client-provided explanation as implausible, they may question their own judgment, causing their confidence to be lower than it would be if the implausible explanation came from an out-group client. This discussion leads to the following hypothesis:

**Hypothesis 2: Given an implausible explanation, auditors will be less confident in their judgment when the explanation comes from an in-group client than when it comes from an out-group client.**

Auditors rely on their judgments to adjust future audit plans (Cohen and Kida 1989). It is important to evaluate whether in-group bias has an effect on auditors' decisions to extend or curtail further testing. Auditors who correctly identify an explanation as implausible could still suspend testing on that item because a fellow group member supplied the explanation. On the other hand, they could compensate for a 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. I propose the following hypothesis<sup>6</sup>.

**Hypothesis 3: 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 sections 2.5 - 2.7, I develop an argument that a valid, objective decision aid will be successful in mitigating in-group bias.

## **2.5 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

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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.

performance on audit tasks. Although research has shown the prior methods to be effective, there are three noteworthy drawbacks to using them. First, since the cost of an audit depends on the number of hours worked, efficiency is of key importance. The review process, while effective, takes both the auditor's and the reviewer's time. Second, review and documentation procedures are detective or corrective controls - they do not prevent staff members from making initial errors in judgment. Third, because individuals implement the above 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.

## **2.6 Debiasing with Decision Aids**

Several studies establish the effectiveness of decision aids in mitigating audit judgment biases (Butler 1985; Eining et al. 1997; Emby and Finley 1997; Rose and Rose 2003). Kennedy's (1993; 1995) framework classifies biases are either "data-related" or "effort-related." Effort-related biases occur when the decision-maker either has either insufficient capacity or insufficient motivation to complete the task. Suggested solutions include increasing internal capacity, providing incentives, or introducing accountability. Data-related biases occur when either internal or external information (or both) are imprecise. Internal data (individual memory) is the source for individual biases such as framing (Emby and Finley 1997), first impression bias (Lim et al. 2000), and anchoring and adjustment (George et al. 2000). External data biases arise when the information provided to the individual is unclear, irrelevant, or

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<sup>7</sup> Decision aids can create new judgment biases, especially in the presence of other debiasing strategies such as accountability and incentives (Ashton 1990). For a discussion of the literature on decision aids, see Rose (2002).

presented in complex format. In the current study, I classify in-group bias as an internal data bias because the in-group influence arises from the individual's biased perception of the affiliated client's trustworthiness.

Both Kennedy (1995) and Roy and Lerch (1996) suggest the following solutions to minimize data-related bias. First, firms can modify information presentation. This approach is used successfully by Lim et al. (2000) to reduce reinterpretation of secondary data (a framing bias) and present the secondary data in such a way that it could not be ignored. Second, firms can train individuals to use appropriate information processing strategies. Firms can provide feedback during a task so that individuals can adjust their decision processes and subsequently apply the improved process to similar situations. Eining et al. (1997) uses this approach in designing a decision aid that includes constructive dialogue. Third, firms can replace decision-makers with a model that suggests a normative answer. Libby and Libby (1989) find less variability and better performance when auditors used a decision aid to combine multiple judgments into a global answer. Rose and Rose (2003) also find that decision aids mitigated recency bias in an audit evidence evaluation task.

In this study, in-group bias involves a subconscious leaning toward believing an in-group member. The debiasing agent will display information in a structured format, as well as provide cues to guide the auditor in his search for support. I fully discuss the decision aid design in *Section 3.4.2*.

## **2.7 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). Currently, audit firms use a variety of decision aids, decision support systems, and expert systems in the audit process. 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. Anderson et al. (2003) find that auditors judged decision aid explanations as more sufficient than client-provided explanations, when, in fact, such explanations were insufficient. Overreliance on the decision aid resulted from the auditor's assessment of the decision aid's objectivity. Since validity and objectivity are both important to decision aid reliance, my decision aid will be valid and objective.

## **2.8 Statement of Hypotheses - Mitigation**

I propose that a decision aid will counter the effects of in-group bias by directing auditors' attention to the implausibility of the client-provided explanation. The decision aid will provide more information, lowering cognitive effort. Additionally, 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).

The second set of hypotheses proposes a mitigating effect of the decision aid on in-group bias. I test the simple effect of the decision aid in Hypothesis 4. I then examine the effectiveness of the decision aid in light of the auditor's initial judgment (H4a) where I expect decreases in plausibility to be greater for those auditors who initially judged the explanation as plausible.

**H4: Auditors will decrease their plausibility ratings after using a decision aid.**

**H4a: The decrease in plausibility ratings will be greater for auditors who make an incorrect judgment than for auditors who make a correct judgment.**

Confidence increases with an increase in the amount of information provided (Ahlawat 1999). 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, they can classify it as either confirming or disconfirming. As evidence builds, confidence in the conclusion increases. Thus, the following hypothesis is proposed.

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

Finally, auditors who deem the client explanation as implausible after they use a decision aid will likely extend testing in the search for a plausible explanation. In addition, if their judgment has changed from more plausible to implausible, they will likely reassess the client's objectivity, which would also lead to extended testing. Therefore, I propose the following hypothesis.

**H6: The increase in extent of testing (between pre and post-decision aid) will be greatest for those auditors with the greatest decrease in plausibility ratings.**

### **3. Research Method**

This section proceeds as follows: 3.1 describes the sample; 3.2, the experimental task; 3.3, the research design; 3.4 the independent variables; 3.5 the dependent variables; and 3.6, the controls and manipulation checks.

#### **3.1 Sample**

Participants are practicing novice and senior (in-charge) auditors. I chose novice auditors because, as noted, clients will likely use their inside knowledge to deceive less-experienced (novice) auditors. Further, analytical procedures are often completed by assistant auditors (Abdolmohammadi 1999). I chose senior (in-charge) auditors to explore whether in-group bias affects multiple levels within the firm. Seniors, because of their experience, should accurately detect implausible explanations. However, their longer affiliation with the firm may increase their in-group bias. The use of practicing auditors is necessary to establish the in-group treatment. Practicing auditors have had time to develop in-group feelings toward their co-workers, and should also have sufficient task experience.

Online access to the experimental materials simplifies data collection from various locations. I am recruiting participants from several national firms. The variety of participants enhances generalizability and may provide useful insights as to possible regional and firm-related differences.

All participation is voluntary; I will contact firms, asking them to distribute the web link to their novice and senior auditors, along with a letter endorsing the study. I provide no incentives for performance; however, participants can voluntarily provide contact information if they want individual feedback. To encourage completion, I allow participants to direct a \$5.00 donation to their choice of charity (from a select list).

### **3.2 Experimental Task**

The experimental task requires a senior/novice auditor to perform an analytical procedure on the repair and maintenance expense account during the substantive testing phase of the audit. There are three reasons for this choice of task: it is appropriate for novice and senior auditors, expense accounts have been used to hide fraud (high inherent risk), and the analytical review of expenses is amenable to decision aid use. First, practicing auditors identify this task as appropriate for a junior auditor to conduct (Abdolmohammadi 1999). Second, earnings manipulation often occurs in expense accounts (GAO 2002). Third, analysis of repair and maintenance expense is a substantive testing task that is amenable to the development of decision support systems (Abdolmohammadi 1999). Analytical procedures are a semi-structured task; they include a reasonably well-defined problem, with limited alternatives, requiring some judgment (Abdolmohammadi 1991). Although a decision aid can list plausible reasons for an account balance fluctuation, auditors must also consider many intangible, non-financial factors. Auditors must use their judgment to make a final determination regarding the likelihood that a given explanation is plausible.

Task materials include 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<sup>8</sup> highlighted), a description of the client's background (to establish the varying group treatments), and the client's explanation for the unexpected fluctuation. After the first measurements, participants will have access to a firm-developed decision aid.

### **3.3 Research Design**

#### *3.3.1 Procedure*

Figure 4 details the repeated measures research design. Prior to the experiment, participants will complete an online informed consent, as well as a demographic questionnaire<sup>9</sup> to elicit the identity of their current employer, as well as their level in the firm (novice or senior). It is necessary to gather this information before the experiment to operationalize the group manipulation. I will randomly assign participants to either an in-group or an out-group treatment.

<< Insert Figure 4 about here >>

All participants will then have access to the above-referenced task materials. They will make 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 I collect these measurements, all participants will have access to a firm-developed decision aid report, as well as to the materials provided earlier (with the exception of their prior responses). They will then answer the same questions regarding plausibility, confidence, and extent of testing. A post-test questionnaire includes manipulation checks and further measures that may be significant. I will thank them for their participation in and allow them to self-direct a charitable contribution.

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<sup>8</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>9</sup> Demographics also include age, gender, years of education, CPA certification, and years of audit experience.

### 3.3.2 Characterization of Client Explanation

There are two steps to the plausibility check; see Figure 1. The first step relates to how well the explanation fits with the unexpected fluctuation. This judgment is a test of accounting knowledge (Libby 1985). The auditor need only do a search of his internal knowledge base to judge the explanation's plausibility. It is also unlikely that a client, especially a competent client, would present an explanation that violates the accounting relationships. Therefore, I use a client-provided explanation that is plausible, given an increase in the repair and maintenance account<sup>10</sup>.

The second step requires the auditor to confirm that the explanation fits the circumstances. The auditor must search for information to confirm or disconfirm the client's explanation. To judge implausibility, the auditor conducts an external information search, rather than an internal accounting knowledge search. This search requires additional effort. In a situation where in-group bias exists, the auditor could subconsciously choose to forego the additional work and rely instead on his positive assessment of the client's source objectivity.

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

The 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.

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<sup>10</sup> A manipulation check will confirm that the participant has sufficient accounting knowledge to identify the explanation as plausible, given the fluctuation.

### 3.4 Independent and Dependent Variables

#### 3.4.1 Between-subjects 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<sup>11</sup> from the recurring audit team. Out-group clients have worked only for the client firm. I expect the manipulation to affect the auditor's judgment of the client's objectivity. However, since source reliability includes both competence and objectivity, I hold competence constant between treatment groups.

Manipulations occur after this brief introduction.

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, where he was a manager ( <i>senior</i> ) on the Continental Transport audit.	Chris has worked for Continental Transport for the last several
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.

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<sup>11</sup> Senior (in-charge) auditors will receive an explanation from a former audit team manager who became a controller for the client. Novice auditors will receive 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.

### 3.4.2 *Within-subjects treatment: Decision Aid*

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

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

Past experience indicates that DecisionSERVE provides valid explanations.

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

## **3.5 Dependent Variables**

Three dependent variables are measured both pre- and post-decision aid. See the instrument.

### 3.5.1 *Plausibility*

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

### *3.5.2 Confidence*

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

### *3.5.3 Extension of Testing*

Extension of testing measures the effect of in-group bias on auditor decisions. I will inform participants that a normal budget for expense testing for this type of client and risk level is 40 hours. The measure allows for the participant to answer “0” if they choose not to extend testing. For those who choose to extend testing, the scale will go up to 10 additional hours, which, based on the 40-hour budget, would equate to a 25% allocation. Although novice auditors generally do not make decisions to increase testing, they have leeway to investigate items further and/or make recommendations to their superiors. Senior auditors do make decisions regarding extension of testing therefore this measure mirrors practice. Following prior research (Cohen and Kida 1989), I use number of hours budgeted to measure planned increases in testing. The scale has end points of 0 hours and 10 hours.

## **3.6 Manipulation Checks**

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

The first series of questions measures the participant’s judgment of client competence and client and decision aid objectivity. Noting prior findings of interaction between objectivity and competence, participants will first rate client competence. Consistency of competence ratings between group treatments

rules out the possibility that perceived differences in client competence influenced plausibility judgments. If competence judgments significantly differ between treatments, I will include them as a covariate in the model.

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

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

The second set of questions elicits information about the participants' past experience and general opinions. Participants answer questions about their experience with auditing, former audit team members, and analytical procedures. I also ask whether their firm alumnae are more or less competent than are alumnae of other audit firms, or non-firm accountants.

### **3.7 Limitations**

A reduction in plausibility post decision-aid could be due to a recency effect, rather than a mitigation of in-group bias. Recency<sup>12</sup> argues that auditors overweight information received later in a sequence. In this study, auditors receive the decision aid report last, and therefore, could place too much weight on its recommendation. Both Hogarth and Einhorn (1992) and Ashton and Ashton (1988) find recency effects for a series of conflicting evidence, leading to a possibility that order effects could explain the results of this study. However, the tasks used in those studies were not analytical procedures tasks. Asare and Messier (1991) note that in an unpublished study, Bonner and Butler (1989) did not find recency effects in an analytical procedures task.

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<sup>12</sup> Asare and Messier (1991) provide an in-depth summary of belief adjustment audit research.

Confirmation bias (Church 1990) could also mitigate the effectiveness of the decision aid.

Confirmation bias exists when individuals tend to overweight evidence that supports their initial beliefs. Auditors who initially believe the client could be more likely to disregard the decision aid report, resulting in a non-significant finding. However, Smith and Kida (1991) find that auditor's conservatism precludes the use of confirmatory strategies. Since participants are practicing auditors, confirmation bias is unlikely.

This study is also limited a positive prior relationship between the parties. Circumstances in which the past relationship is negative could have different results.

## **4.0 Pilot Study Results**

### **4.1 Pilot Study Background and Descriptive Statistics**

I conducted a pilot test to gather preliminary data and assess the instrument's validity<sup>13</sup>. Participants were undergraduate audit students at a large accredited university. Since students are unaffiliated with a particular audit firm, I manipulated group as follows: in-group clients were graduates of the participant's university and out-group clients were graduates of an unnamed university. I collected additional demographic data relating to GPA and courses taken. All other items remained the same.

Twenty-three students participated; I excluded four because they failed the manipulation check and six because they took under 10 minutes to complete the experiment (given the instrument length, I presumed they did not exert sufficient cognitive effort). Of the remaining thirteen participants, five were in-group and eight were out-group. The mean time to complete was approximately 24 minutes, average age was 25 years, and mean GPA was 3.3. I found no significant differences between groups on demographics. Table 1 includes descriptive statistics and mean results for plausibility.

<< Insert Figure 5 about here >>

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<sup>13</sup> Prior to the pilot test, two audit partners previewed the instrument to determine face validity, realism, and clarity. Experts indicated that the task and background information was both believable and appropriate for novice auditors. I made several small changes to the text to improve clarity.

<<Insert Tables about here>>

Figure 5 presents a summary of all hypotheses and findings<sup>14</sup>. GPA is significant and included as a covariate. A preliminary examination of the mean plausibility indicates that in-group auditors assessed a higher plausibility to an implausible explanation than did out-group auditors (57.00 versus 49.50). Statistically, in-group bias is significant and in the predicted direction ( $p < .105$ ) (Table 2, Panel A)<sup>15</sup>. Hypothesis 2 predicted that participants who received an implausible explanation from an in-group client would be *less* confident in their judgment than auditors who received an implausible explanation from an out-group client. Hypothesis 2 was supported ( $p < .004$ ) (Table 2, Panel B) indicating that in-group bias affects confidence.

Hypothesis 3 explores whether in-group bias persists in an auditor's decision to extend testing, even when the auditor correctly identifies the explanation as implausible. Recall that the pilot subjects are not auditors, and therefore, have little experience in making this judgment. I found no support for Hypothesis 3 either pre or post decision aid respectively ( $p \leq .904$ ,  $p \leq .533$ ), suggesting that when auditors correctly identify an implausible explanation, their decision to extend testing is not affected by group affiliation.

Hypothesis 4 examines changes in plausibility judgments post decision aid. Group means (Table 1 Panel B) demonstrate that in-group participants *decreased* their initial plausibility judgments about 10% (57.00 to 51.25). However, out-group participants *increased* their plausibility judgments about 12% post decision aid (49.50 to 55.63), although not to the level of the in-group's initial judgments. Overall, these results negate each other and there is no significant decrease in plausibility post decision aid<sup>16</sup>. Therefore, Hypothesis 4 is unsupported. One possible reason is a regression to the mean, which occurs over repeated samples; extreme responses gravitate toward the mean. Low plausibility judgments increase and high

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<sup>14</sup> Given the small sample size, I use an Alpha of .10 for all statistical tests.

<sup>15</sup> A linear regression model produced Beta coefficients of -65.02 ( $p < .004$ ) for GPA and -24.65 ( $p < .105$ ) for out-group. While GPA explains some of the variation in plausibility ratings, group bias also accounts for some variation. Both variables are negatively associated with plausibility.

<sup>16</sup> Using repeated measures analysis, there is no significant decrease in plausibility judgments across the groups.

plausibility judgments decrease. Another alternative is that individuals felt that in order to justify using the decision aid (85% said it was valid), they had to change their plausibility ratings after using the decision aid, regardless of its recommendation.

Hypothesis 4a tested whether the decrease in plausibility ratings would be greater for auditors who rated plausibility high (measured as plausibility rating  $>50$ ) than for those who rated plausibility low ( $<50$ ). Raw data reveals that, on average, those who rated plausibility high decreased their judgments by 16 points. Participants who started with low initial plausibility judgments increased their judgments by 17 points. Statistically, the change in plausibility did not differ based on initial plausibility judgments and Hypothesis 4a is unsupported.

Hypothesis 5 suggests that auditor confidence would increase post decision aid. Table 3 includes means and test results for this hypothesis. Mean confidence increased from 72.50 to 78.33 or 8%. A paired samples test marginally supports this difference ( $p < .08$ ) one tailed. Hypothesis 6 predicts that a decrease in plausibility would be associated with an increase in extent of testing. Table 4 includes support for this hypothesis ( $p < .029$ ) two-tailed.

## **4.2 Discussion of Pilot Results and Ensuing Changes to Study Design**

Several differences exist between the pilot test and the planned study. Experimental incentives differed from those planned for the main study (\$10 incentive paid to the student participant versus \$5 charitable contribution directed by the auditor participant). I believe that the pilot test incentive caused some participants to focus on completing the survey in the least amount of time. Although I expect auditors to exert a sufficient effort, I will exclude participants who take less than 10 minutes to complete the survey. In addition, the group manipulation in the pilot study did not exactly replicate the group manipulation in the main study (university rather than audit firm affiliation). It is possible that findings will differ when the group is a work group, rather than a school group.

I found support for several hypotheses. Group bias (Hypothesis 1) was a significant predictor of pre-decision-aid plausibility. GPA was also an important covariate. In the main study, it is not feasible to ask for participant's GPA. Instead, I plan to use months of audit experience as a measure of expertise. I also found group bias to affect confidence. Participants who correctly identified the explanation as implausible were less confident in their judgment when the explanation came from an in-group member. Although findings for group bias were strong, the sample size was small and future results may differ. In addition, 4 of the 21 (19%) participants could not recall the group manipulation. Based on feedback from participants and other knowledgeable researchers, I have made the group manipulation more salient by presenting the controller/assistant controller's background in bullet point form. I found that in-group bias does not appear to affect an auditor's decision to extend testing. As noted, student participants have little experience in making this decision while practicing auditors likely to be more familiar with this task.

The effect of a decision aid on plausibility was to bring both sides closer to the center. I expected the high plausibility participants to decrease their ratings, and they did. However, low plausibility participants incorrectly raised their ratings post decision aid. Other than a regression to the mean or need to change explanation, I am unsure why these results occurred. In the main study, I simplify the decision aid in order to make its content more salient.

Expert auditors indicate that staff auditors often complete tasks similar to the one in the study. However, they also noted that many alternative explanations exist for the change in repair and maintenance expense. Peecher and Solomon (2001) suggest that internal validity is more important than mundane realism. Therefore, I reduced the amount of information in the financial statements and client background to make the task more manageable for the participants. This change also reduces noise and eliminates alternative explanations for the change in account balance.

I continue to use the 0 – 100 scales, as they enable participants to specify their judgments and confidence levels more precisely. I also maintain the incentive structure (contribution to a charity), as the feedback from expert auditors was positive.

As this stream of research is still in its infancy, internal validity is a primary concern. In light of this, I made the following changes to improve the research design. I strengthened the group manipulation, simplified the task, and enhanced the decision aid. Given an adequate sample size, and the use of practicing auditors, I expect these changes to improve the study.

## **5.0 Conclusion**

This project has two objectives: first, to investigate whether in-group bias extends to auditor judgments and decisions, and second, to see whether a decision aid is effective in mitigating such a bias.

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. Audit firms should be aware of the extent of this bias, so that they can reduce possible risk of audit failure. Informed managers can strategically assign personnel to avoid in-group affiliation. Alternatively, firms can provide a simple decision aid. Technology provides a practical solution to a significant behavioral bias.

Congress and the AICPA already warn that the hiring of former audit team members could lead to an impairment of independence. This study clarifies both the existence and extent of this claim. Results will either confirm or refute the appropriateness of the recent SEC regulation. If auditor affiliation significantly impacts judgment, future studies can explore the impact at various levels of affiliation. In particular, is there a difference in the bias related to degree of group affiliation? Further, does this bias persist based on experience level and across various auditing tasks? There are many opportunities to extend this research.

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Figure 1

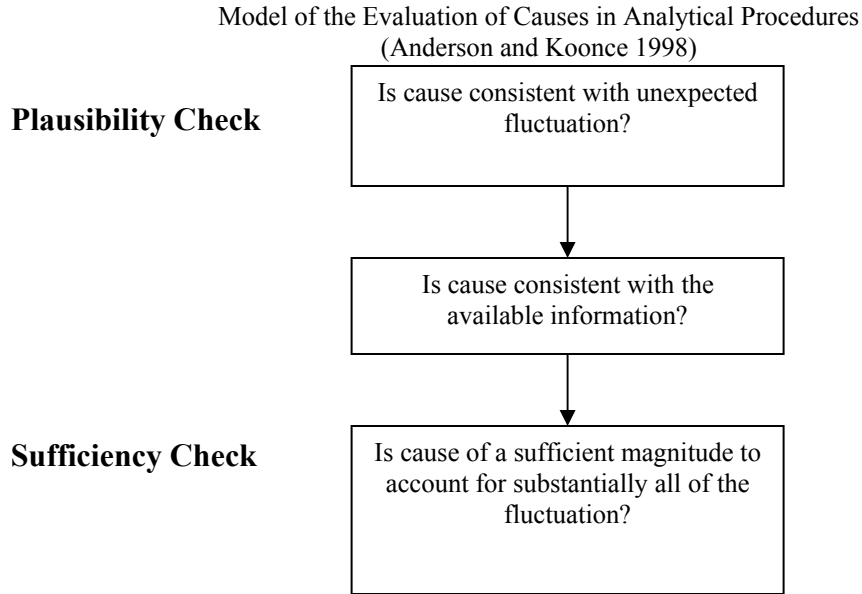


Figure 2  
Auditor Affiliations  
(Lennox 2004) p.12

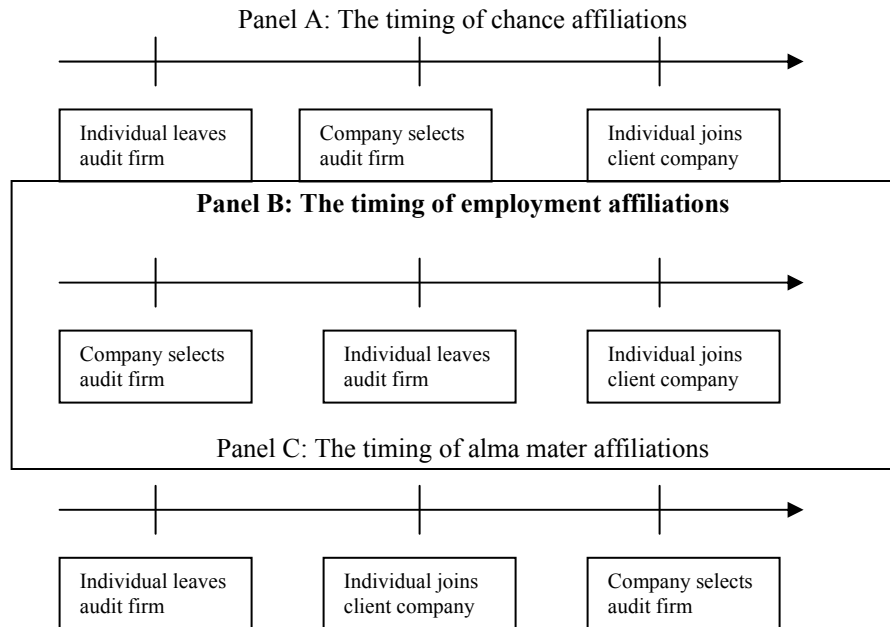


Figure 3  
 Primary concerns and motives of the social self: a taxonomy  
 (Ellemers et al. 2002)

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

Figure 4

Diagram of the Experimental Design

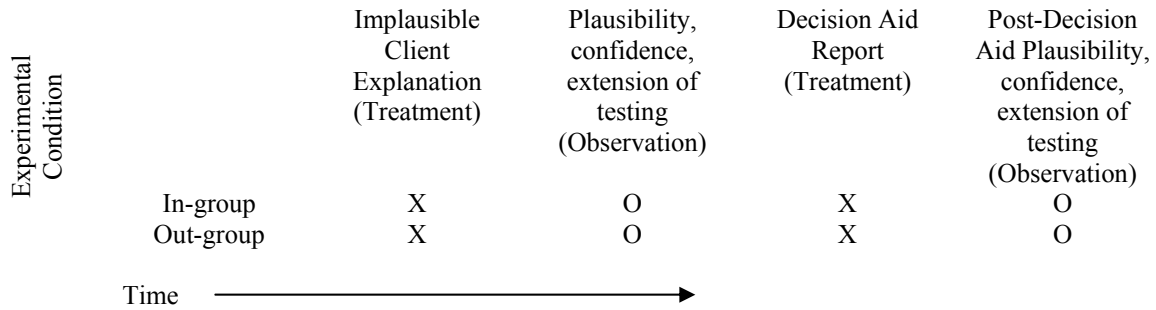


Figure 5

Hypothesis	IV	DV	Supported	p-value (one-tailed)
1	Group	Plausibility	Yes	.05
2	Group	Confidence	Yes	.002
3 pre DA	Group (low plausibility only)	Extent of Testing	No	.452
3 post DA	Group (low plausibility only)	Extent of Testing	No	.267
4	Decision Aid	Plausibility	No	---
4a	Plausibility	Change in Plausibility	No	---
5	Decision Aid	Confidence	Yes	.08
6	Change in Plausibility	Change in Extent of Testing	Yes	.015

Table 1

Panel A

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Time to Complete	13	16	36	24.08	8.077
Age	13	21	36	24.92	4.821
GPA	13	2.3	3.8	3.312	.3990

Panel B

Plausibility and Confidence Pre and Post Decision Aid

Randomization		Plausibility1	Confidence1	Plausibility2	Confidence2
In-Group	Mean	57.00	50.00	51.25	73.75
	N	5	5	4	4
	Std. Deviation	21.360	21.602	23.936	23.585
Out-Group	Mean	49.50	78.75	55.63	80.63
	N	8	8	8	8
	Std. Deviation	27.733	13.296	24.118	14.252
Total	Mean	52.38	67.69	54.17	78.33
	N	13	13	12	12
	Std. Deviation	26.828	24.462	23.045	17.100

Table 2

Panel A – Test of Hypothesis 1

Dependent Variable: Plausibility Pre Decision Aid

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5067.191	2	2533.595	7.097	.012
Intercept	7598.997	1	7598.997	21.286	.001
GPA	4894.114	1	4894.114	13.709	.004
<b>Group (In/Out)</b>	1133.385	1	1133.385	3.175	<b>.105</b>
Error	3569.886	10	356.989		
Total	44311.000	13			
Corrected Total	8637.077	12			

R Squared = .587 (Adjusted R Squared = .504)

Panel B- Test of Hypothesis 2

Dependent Variable: Confidence Pre-decision Aid by Treatment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3125.694(a)	2	1562.847	6.872	.013
Intercept	3877.087	1	3877.087	17.047	.002
GPA	1752.569	1	1752.569	7.706	.020
Group	3038.570	1	3038.570	13.360	.004
Error	2274.306	10	227.431		
Total	60325.000	13			
Corrected Total	5400.000	12			

a. R Squared = .579 (Adjusted R Squared = .495)

Table 3

**Change in Confidence Post Decision Aid – Test of Hypothesis 5**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Confidence1	72.50*	12	18.028	5.204
Confidence2	78.33	12	17.100	4.936

\* Mean includes only participants with measurements on both confidence variables.

**Paired Samples Test**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Confidence1b Confidence2b	-5.833	13.456	3.884	-14.383	2.716	-1.502	11	.161

Table 4  
**Test of Hypothesis 6**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.229	1.234		.186	.856
Change in Plausibility	-.113	.045	-.627	-2.544	.029

Dependent Variable: Change in Extent of Hours

## Appendix A

### Background Material<sup>17</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>17</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.		