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The effects of counterexplanation and audit groups on fraud detection

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THE EFFECTS OF COUNTEREXPLANATION AND AUDIT GROUPS ON FRAUD DETECTION


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THE EFFECTS OF COUNTEREXPLANATION AND AUDIT GROUPS ON FRAUD DETECTION


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THE EFFECTS OF COUNTEREXPLANATION AND AUDIT GROUPS ON FRAUD DETECTION

Abstract
Prior studies have found that auditors' fraud detection rates are relatively low (Bernardi 1994; Pincus 1991). The present study examines whether counterexplaining inaccurate judgments will increase fraud detection rates and whether audit groups can counterexplain more effectively compared to individual auditors. The possible negative effect of counterexplanation is examined by requiring audit groups and individual auditors to counterexplain accurate judgments. The purpose of this manipulation is to determine whether counterexplaining accurate judgments will lead to negative belief revision, and whether this negative belief revision will be mitigated by the use of audit groups. A 2 x 2 x 2 experiment which examined groups/individuals, initial judgment and explanation/counterexplanation was carried out. The results support the hypotheses that counterexplaining inaccurate judgments leads to more accurate judgments and counterexplaining accurate judgments leads to less accurate judgments. The finding on whether audit groups could counterexplain more effectively than individual auditors requires further explanation.

Key words: Explanations, causal explanations, belief revision, fraud detection, inventory audit.
THE EFFECTS OF COUNTEREXPLANATION AND AUDIT GROUPS ON FRAUD DETECTION

INTRODUCTION

An auditor's ability to detect fraud is generally low (Bernardi 1994; Pincus 1991; 1990). Such failure may be attributed to many factors, and prior auditing research has attempted to identify some of these. Bernardi (1994), Johnson et al. (1993), Reckers and Schultz (1993), and Pincus (1991; 1990) examined the effects of personality differences on fraud detection rates. While explaining auditor behavior is valid and important, audit judgment research should also discover means of correcting sub-optimal auditor behavior. There is evidence in the auditing literature of the beginnings of such a trend (e.g., Reckers and Schultz [1993] examined group-assisted judgment, and Kennedy [1993; 1995], Koonce [1992] and Heiman [1990] examined counterexplanation).

Prior auditing literature suggests that counterexplanation may result in more effective judgments.¹ This study considers whether the provision of a counterexplanation improves fraud detection. In counterexplaining, the decision maker is required to consider why his/her chosen judgment alternative may be incorrect and/or why the rejected alternative(s) may be correct (Koriat et al. 1980). Prior studies required auditors to counterexplain experimenter-prescribed hypothesis (e.g., Koonce 1992; Kennedy 1995) whereas another treatment of this technique in the psychology literature (e.g., Koriat et al. 1980) required participants to counterexplain their own hypotheses.² Decision makers' commitment to an experimenter-prescribed hypothesis may not be at the same level as their commitment to their own hypothesis. In addition, decision makers often generate their own hypothesis. Therefore, using Koriat et al.'s treatment of explanation/counterexplanation, this study provides evidence on counterexplaining by audit groups and individual auditors that serves two purposes.

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First, there is evidence in the literature of the increasing use of counterexplanation in practice. For example, Libby and Trotman (1993) found that audit reviewers pay greater attention to evidence inconsistent with the conclusions reached by their audit subordinates in analytical procedures. Before this practice of counterexplanation becomes widespread, there is a need to investigate whether there is(are) any negative effect(s) of counterexplanation. That is, the effectiveness of counterexplanation as a debiasing technique should be more rigorously tested. Researchers should question whether there are conditions where requiring an auditor to counterexplain would be counter-productive. In addition to examining the positive aspects of counterexplanation, this study also examines the potential negative effect(s) of counterexplanation.

Second, if there are potential negative effects of counterexplanation, the present study examines these effects on audit groups. The motivation for this is two-fold. First, we consider whether audit groups will enhance the positive aspects of counterexplanation and lead to higher fraud detection rates. Second, we consider whether the negative aspects of counterexplanation may be mitigated through the use of audit groups. Prior studies reported that the use of groups may lead to improved judgments. For example, groups were able to moderate extreme views (Fisher and Ellis 1990), and group-assisted judgments led to higher compliance with professional pronouncements (Reckers and Schultz 1993).

This study uses a modified version of the case materials used by Pincus (1991), which contained material management fraud. Both individual auditors and groups of auditors evaluated the case materials and made a judgment on whether an inventory balance was fairly presented. After making the judgment, half of the participants provided an explanation for their initial judgment, while the other half provided a counterexplanation. They then made a final judgment on the fair presentation of the inventory balance. The results showed that while counterexplaining inaccurate judgments led to more accurate judgments,
counterexplaining accurate judgments resulted in lower accuracy. We found weak evidence to suggest that audit groups may enhance the positive effects of counterexplanation and no evidence to support our hypothesis that audit groups mitigate the negative effects of counterexplanation.

THEORY DEVELOPMENT

Counterexplanation

Decision makers are often required to explain their judgment by providing reasons that speak for or provide support for the chosen alternative, or reasons that point against the alternative rejected. Several theories explain why explaining one's own judgment would not improve accuracy. First, providing an explanation increases the availability of causal relations between the information and the explained event, and leads to an explanation effect (Tversky and Kahneman 1973). Second, the simulation heuristic suggests that decision makers build a series of steps which connects the information (evidence) to the judgment. This cognitive heuristic is premised on the assumption that “downhill events” (events that are easier to construct) are considered more likely to occur than “uphill events” (events that are less easy to construct) (Kahneman and Tversky 1982). Consequently, more “downhill events” are constructed compared to “uphill events” and an explanation effect is observed.

Third, decision makers selectively review the information available and encode only those cues which are consistent with the outcome explained (Sherman et al. 1983). Snyder and his associates (Snyder and Campbell 1980; Snyder and Cantor 1970; Snyder and Swann 1978) found that decision makers generally prefer information that confirms their impressions or hypotheses rather than information that disconfirms them. Consequently, they selectively review the data set for confirming information and ignore disconfirming information. This increases the availability of confirming information to decision makers and results in an
explanation effect. Fourth, the explanation effect may also be explained by what Hoch (1984) referred to as "interference". When a decision maker generates a set of reasons for (against) the occurrence of an event, this act interferes with his/her ability to generate reasons against (for) the occurrence of the event. The alternative explained first becomes encoded in long-term memory, whereas the encoding in long-term memory of the latter-explained alternative may be less prominent. Consequently, the alternative initially explained becomes more readily available to the decision maker and influences his/her likelihood judgments.

Counterexplanation is the provision of reasons that either speak against or provide evidence against the chosen alternative, or speak for or point towards the alternative(s) rejected (Koriat et al. 1980). While it is seldom required in decision making, research in the social psychology literature reports that counterexplanation could lead to more effective judgments. For example, in a general knowledge task, Koriat et al. (1980) used counterexplanation with some success in correcting over-confidence in their student participants. This was possible because over-confidence is partly due to decision makers' tendency to ignore disconfirming information (Koriat et al. 1980). Hoch (1985) also found over-confidence with his student participants and, like Koriat et al., showed that such over-confidence could be mitigated by the use of counterexplanation. Counterexplanation has also been shown to be effective in debiasing belief perseverance (Anderson 1982) and in correcting the explanation bias (Anderson and Sechler 1986). This is because explanation bias is partly due to the neglect of alternative theories. One way of reducing the effect of causal explanations is to increase the availability of opposing arguments. Anderson and Sechler (1986) and Anderson (1982) suggested that the technique used to debias belief perseverance, i.e., counterexplanation, may be effective in regulating the formation of causal explanations at both the individual and group level. As these studies involved the application
of counterexplanation in general knowledge tasks, the real test for counterexplanation as a debiasing technique is in domain-specific tasks.

While auditing studies are limited, the initial results from the use of counterexplanation among auditors appear encouraging (e.g., Heiman 1990; Koonce 1992; Kennedy 1995). The experimental treatment of counterexplanation in these studies required auditor participants to counterexplain experimenter-prescribed hypothesis. For example, Heiman (1990) required auditor participants to counterexplain an experimenter-prescribed hypothesis and showed that it caused auditors to revise their likelihood judgments. Her study also showed that auditors' likelihood judgments were affected by the number of counterexplanations considered. Koonce (1992) found that counterexplanation was effective in reducing the explanation effect, but only in the group of participants that explained before counterexplaining. Her participants also explained and/or counterexplained a hypothesis provided by the experimenter. Kennedy (1995) required participants to focus their concern on counterexplaining an experimenter-prescribed outcome prior to making predictions about other participants' estimate of the outcome, and predicted that this manipulation would weaken the tendency to construct causal explanations. Her findings were inconclusive.

While these studies made use of experimenter-prescribed hypotheses, in practice, auditors often generate their own hypotheses. Consequently, this study requires participants to provide the direction of their explanation/counterexplanation by making an initial judgment prior to explaining/counterexplaining. This treatment facilitates the examination of any change(s) participants may make to their initial likelihood judgment after explaining or counterexplaining. These changes are referred to as belief revision. Consistent with Koriat et al. (1980) and Hoch (1985), participants were not required to explain prior counterexplaining as they would have explained as a natural part of the judgment process. Counterexplanation makes opposing arguments more salient to the auditor, so that those who counterexplain
would re-examine the data set for opposing arguments that may have been overlooked or discounted as unimportant during the initial evaluation of the data set. As a consequence, they will revise their inaccurate judgment for a more accurate one. That is, they will make positive belief revision.

Revising a judgment after providing a counterexplanation is only desirable when the switch is from inaccurate judgments to more accurate ones. Auditors who have made accurate judgments should not make negative revisions regardless of whether they are required to explain or counterexplain. At the time of requiring a counterexplanation, the audit superior cannot tell whether a certain audit subordinate's judgment is accurate. It is precisely for the purpose of soliciting more effective judgments in an uncertain environment that counterexplanation is required. So it is possible that both accurate and inaccurate auditors may be required to counterexplain.

Besides causing auditors to process opposing arguments, counterexplanation also affects auditors' confidence. Koriat et al. (1980) and Hoch (1985) demonstrated that counterexplanation resulted in reduced confidence. Used among auditors, it could produce such uncertainty that counter-productive belief revisions result, i.e., when accurate judgments are substituted for less accurate ones. The uncertainty resulting from counterexplaining may cause negative belief revisions, so that accurate auditors who counterexplain will become less accurate. That is, they will revise their accurate judgment because the opposing arguments they process cause them to lose confidence in their initial judgment. Consequently, they will revise their judgment in the direction of the opposing arguments and thus become less accurate. Those who explain accurate judgments are not exposed to opposing arguments and will not become less accurate. Because of this, auditors who counterexplain accurate judgments will make more negative belief revision compared to auditors who explain accurate judgments. This discussion leads to the following hypothesis:
Explaining and counterexplaining accurate and inaccurate judgments will have an effect on belief revision so that:

a) auditors who counterexplain an inaccurate judgment will make more positive belief revision compared to auditors who explain an inaccurate judgment, and

b) auditors who counterexplain an accurate judgment will make more negative belief revision compared to auditors who explain an accurate judgment.

Audit Groups

Prior literature reports that groups outperform individuals in three ways. First, groups are able to recall more information because this task is shared among group members. As group members may potentially recall different information items, the group discussion is enriched (Stasser 1992). Second, due to their corporate efforts, groups are able to process more information than individuals (Stocks and Harrell 1995; Chalos and Pickard 1985). They are able to select and weight cues more effectively than individuals (Stocks and Harrell 1995; Chalos and Pickard 1985). Third, groups have a larger information base to support their judgments. This occurs when group members pool their individual store of information and their processing of information cues and integrate these cues into a solution (Stasser 1988; Stasser and Titus 1985). Arising from the reasons discussed above, groups are expected to counterexplain more effectively than individual auditors. When required to counterexplain an inaccurate judgment, audit groups would make larger positive belief revision than individual auditors would. Their corporate processing efforts allow them to discover discrepancies and inconsistencies, and possibly, the fraud, in the data set. Individual auditors, working alone, may overlook these misstatements because they do not have the benefit of groups' corporate processing capacity.

Counterexplaining an accurate judgment would have a more negative effect on individual auditors than on audit groups, i.e., when required to counterexplain an accurate judgment, audit groups should make smaller negative belief revision than individual auditors.
As individual auditors have lower processing capacity compared to audit groups, they may have missed opposing arguments when they make their initial judgment. When required to counterexplain, they would process these opposing arguments for the first time, and the uncertainty created by these opposing arguments causes them to make belief revision in direction of the opposing arguments. When groups are required to counterexplain an accurate judgment, this forces them to go through the data set again. Unlike the individual auditors, the accurate groups are likely to have considered opposing arguments when they made their initial judgment as it is unlikely that all group members will have the same initial hypothesis. In addition, opposing arguments would not cause the same uncertainty expected among individual auditors as groups tend to be more confident than individuals are (Sniezek and Henry 1990; 1989). Consequently, an interaction effect between audit groups/individual auditors, initial judgment and type of explanation on belief revision is expected. Audit groups are expected to mitigate the negative effects of counterexplaining an accurate judgment more than individual auditors are. Audit groups will also enhance the positive effects of counterexplaining an inaccurate judgment more than individual auditors will. The interaction effect hypothesis is stated as:

\[ H_2 \] Audit groups will mitigate the negative effects of counterexplaining an accurate judgment and enhance the positive effects of counterexplaining an inaccurate judgment more than individual auditors will.

**THE EXPERIMENT**

**Task**

The inventory audit task used was a modified version of the task used by Pincus (1991). This task, which was based on an actual audit client in the restaurant business, contained a material misstatement of the inventory balance by management. The case
provided information on the background of the company as well as the current and prior years' inventory and other financial data. The information provided included both positive and negative indicators of the fair presentation of the inventory balance so the judgment was not clear cut. The results of the current year's audit procedures for inventory were also available together with selected client records. Management committed the fraud by overstating ending inventory quantities and values. This could be detected via the various risk indicators such as excessive ending inventory, inventory count procedures, management control, over-ride of internal control procedures by management, and inconsistent opening and closing inventory amounts for the year being audited.

Forty-eight information items out of the original 70 were used and only the information for the latest three years were given. A summary of these 48 information items is listed in Appendix A. The final version of the case was examined by two experts in the hospitality and restaurant industry for realism. Both experts were of the opinion that the case was realistic and reflective of current restaurant practice. Even though the case had been simplified, it still contained sufficient information to successfully test the variables manipulated in this study.

Participants

Participants were 271 accountants attending a national training program that prepared them for the Institute of Chartered Accountants' Professional Year examinations in auditing. At the time of the experiment, all the participants had at least one year working experience. They had also completed five days of audit training. Their average age was 24 years (sd 2.4 years) and their average working experience was 34 months (sd 27 months). Sixty-one percent of participants had audit experience and these ranged from one to 72 months. The average audit experience of all participants was 11.25 months (12.8 months). The average
The number of inventory audits performed was three. The participants were paid A$20 each for their efforts.

**Procedures**

The experiment was carried out during one of the training sessions. The $2 \times 2 \times 2$ full factorial experiment tested explanation/counterexplanation, initial judgment and audit groups/individual auditors. Table 1 shows the experiment design.

| Insert Table 1 here |

All the participants received the case materials in a booklet. The front of the booklet provided introductory information which explained the purpose of the experiment and provided an assurance of confidentiality. In the group condition, participants were formed into groups of three at the start of the experiment. For both the group and individual conditions, participants were asked to spend 15 minutes familiarizing themselves with the case materials. They read the initial information of the case materials which contained a general description of the operations of a chain of fast-food restaurants. The instructions to all participants read:

**Instructions**

In order for you to perform an audit of Tucker House's inventory balance, the following information items are available. You should only evaluate those information items you consider are necessary for forming an opinion on whether or not the inventory balance is fairly stated.

Following these instructions were the content pages showing the types of information available, followed by 48 information items. After acquainting themselves with the information for about 15 minutes, participants in the group condition were instructed to assume that they had been assigned as a member of an audit group for the audit of the
inventory balance of a client. A large envelope was provided and the participants were required to insert each completed task into the envelope before proceeding to the next task. A message on the envelope stated “Do not remove materials that have been inserted into the envelope”. Individual auditors received the same instructions except they worked alone.

The first task required participants in the group condition to discuss and work on the case as a group to arrive at a consensus on whether or not the inventory balance is fairly presented. They recorded their consensus judgment on two scales – a dichotomous scale comprising “fairly presented” and “not fairly presented” and a nine-point Likert-type scale anchored by “fairly presented” (1) and “not fairly presented” (9). In addition, they also recorded their confidence on a 101-point scale anchored by “not at all confident” (0) and “very confident” (100). The procedures for individual auditors were similar except they performed the tasks on their own and recorded their individual judgment. In the second task, explanation type was manipulated. Half of the participants in the group and individual conditions were assigned to the explanation condition while the other half were assigned to the counterexplanation condition. Participants in the explanation condition were required to consider the reasons why their answer in task one may be correct and/or why the alternative(s) they rejected, may be incorrect. Participants in the counterexplanation condition considered the reasons why their answer in task one may be incorrect and/or why the alternative they rejected, may be correct. Participants in both conditions then recorded their reasons in the space provided as part of task three. Participants in the group condition performed these tasks as a group while those in the individual condition worked alone.

In task four, the participants were required to make a final judgment on whether or not the inventory was fairly presented using both the dichotomous and the nine-point scales. The groups recorded a consensus group judgment whereas the individual recorded their individual judgment. They also recorded their confidence on a scale similar to the one described above.
In the post-test questionnaire, the participants provided various demographic as well as some diagnostic information.\textsuperscript{8}

**RESULTS**

Table 2 shows the ANCOVA results. The model tests the interaction effects between explanation/counterexplanation, groups/individuals and initial judgment. Because the explanation/counterexplanation and the groups/individuals variables were categorical, initial judgment was dichotomized at the mid-point to yield two groups – inaccurate and accurate auditors.\textsuperscript{9,10} As the participants had varying levels of audit experience, the ANCOVA analysis included audit experience as a covariate. Table 2 shows that audit experience did not have a significant effect on belief revision (F < 1, p > .1). Also included as a covariate was confidence revision. Confidence revision refers to the difference in confidence associated with the initial judgment and confidence related to the final judgment. Koriat et al. (1980) and Hoch (1984) reported that explanation/counterexplanation affect confidence judgments. The results show that confidence revision has a significant effect on belief revision (F = 5.93, p = .016).

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H_1 \text{ predicts an interaction between initial judgment and explanation/counterexplanation. Specifically, it states that auditors who counterexplain an inaccurate judgment will make more positive belief revision compared to auditors who explain an inaccurate judgment. In addition, auditors who counterexplain an accurate judgment will make more negative belief revision compared to auditors who explain an accurate judgment. The results are shown in Table 2. As expected, the initial judgment had a significant effect on belief revision (F = 5.50, p = .021). There were no significant main effects for groups/individuals and explanation/counterexplanation. No significant two-way interaction effects on belief revision were observed between initial judgment and }
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groups/individuals (F = 1.85, p > .1), and between groups/individuals and explanation/counterexplanation (F < 1, p > .1). There was a significant two-way interaction effect between initial judgment and explanation/counterexplanation (F 8.98, p = .003). Panel A, Table 3 shows the means (SDs) and Figure 1 shows the interaction effect. When required to counterexplain an inaccurate judgment, participants increased their accuracy by 0.66 (1.25), while those who explain an inaccurate judgment increased their accuracy by 0.20 (1.08). Planned comparisons showed this difference to be significant (t = 1.66, p = .05 [one-tailed]).

When a counterexplanation was provided for an accurate judgment, accuracy decreased by -0.31 (0.96), while explaining an accurate judgment resulted in an increase in accuracy of 0.22 (0.68). Planned comparisons showed this difference to be significant (t = -2.65, p = .005 [one-tailed]). Participants who counterexplain an accurate judgment made significantly more negative belief revision compared to participants who explain an accurate judgment. These results support H1.

Panel B, Table 3 shows the initial judgment of both accurate and inaccurate auditors. The mean score for the inaccurate auditors is less than five (the mid-point) whereas the mean score for the accurate auditors is greater than 5. After counterexplaining an inaccurate judgment, the mean score did not shift up to the mid-point so that the average judgment was still inaccurate. Similarly, after counterexplaining an accurate judgment, the negative belief revision did not take the mean score below 5. That is, average accuracy was not affected. In order to understand this further, the specific judgments were examined next. When required to counterexplain an inaccurate judgment, ten (29%) participants out of 34 adjusted their judgment up to or passed the mid-point. In contrast, four (11%) participants out of 37 adjusted their accuracy score up to or passed the midpoint when they were required to explain
an inaccurate judgment. The difference between these two changes was marginally significant ($X^2 = 2.61, p = .053$ [one-tailed]). Three (9%) participants out of 34 reduced the accuracy score below the midpoint when they counterexplain an accurate judgment. However, none of the 34 participants who explain an accurate judgment reduced their accuracy score below 5. The difference between these revisions was similarly significant ($X^2 = 2.78, p = .048$ [one-tailed]). These results provide further support for H1.

Following this, the dichotomous judgment was analyzed. When required to counterexplain, five (12%) out of 43 auditors switched from an inaccurate judgment to an accurate judgment. Two (5%) out of 41 auditors who explain an inaccurate judgment switched to an accurate judgment. The difference between these changes was not significant ($X^2 = 1.56, p = .105$ [one-tailed]). Those who counterexplain an accurate judgment ($n = 25$) did not change their judgment. Similarly, those who explain an accurate judgment ($n = 30$) did not alter their judgment. These results do not support H1.

H2 predicts that audit groups will mitigate the negative effects of counterexplaining accurate judgments and enhance the positive effects of counterexplaining inaccurate judgments. The results in Table 2 shows an insignificant three-way interaction effect between explaining/counterexplaining, initial judgment and groups/individuals ($F = 1.03, p > .1$). To further test H2, analyses using the dichotomized judgment were examined next. Two (17%) out of 12 inaccurate groups made an accurate judgment after counterexplaining whereas none of the individual auditors ($n = 31$) changed their inaccurate judgment. These changes were significant ($X^2 = 5.42, p = .010$ [one-tailed]). However, neither audit groups ($n = 18$) nor individual auditors ($n = 7$) changed their accurate judgment for an inaccurate one when they were required to counterexplain. Audit groups did not appear to reduce the negative effects of counterexplaining and they enhanced the positive effects of counterexplaining by very little.
DISCUSSIONS AND CONCLUSIONS

This study examines the effects of audit groups and counterexplanation on fraud detection. The purpose of such an examination is to determine whether counterexplanation improves fraud detection. An experiment that manipulated audit groups/individual auditors, initial judgment and two explanation types was carried out. Participants were required to evaluate an inventory balance that contained material misstatements by management. The judgment on the fair presentation of the inventory balance was made twice with an intervening explanation or counterexplanation. The purpose of this manipulation is to examine the positive and negative aspects of counterexplanation by examining belief revision.

This study predicts a two-way interaction effect between initial judgment and type of explanation on belief revision. Specifically, it predicts that counterexplaining an inaccurate judgment will lead to a more positive belief revision compared to explaining an inaccurate judgment. It also predicts that counterexplaining an accurate judgment will lead to more negative belief revision compared to explaining an accurate judgment. The results (using a continuous scale) showed this to be so. Participants who counterexplain an inaccurate judgment made more positive belief revision compared to those who explain an inaccurate judgment. However, participants who counterexplain an accurate judgment made more negative belief revision than those who explain an inaccurate judgment. In spite of this, the results on Table 3 show that these belief revisions are rather small. The belief revisions did not cause the average accuracy score to cross the mid-point (5). When the specific scores were examined, counterexplanation did cause more inaccurate participants (both groups and individuals) to adjust their accuracy score up to or beyond the mid-point than accurate participants did. It caused significantly more accurate participants to adjust their accuracy score below the mid-point compared to accurate participants who explain. Results using the
dichotomous scale, however, reported no significant difference between the effects of explanation and counterexplanation and initial judgment on belief revision.

Translated to fraud detection, counterexplanation did cause some auditors to detect fraud. It also caused some auditors who detected fraud to abandon their initial hypothesis. Given the serious implications of fraud detection, these results have some implications for audit management. Notwithstanding that these results are not as strong as predicted, they do provide evidence on both the positive and negative aspects of counterexplanation. They suggest that in some situations, the use of counterexplanation may be justifiable and that in others, care should be exercised in requiring a counterexplanation. For example, it may be advantageously used on auditors who have a history of making inaccurate judgments. However, it should be cautiously used on auditors who have consistently made accurate judgments.

Confidence revision (used as a covariate) had a significant effect on belief revision. This is consistent with prior literature which finds that auditors tend to be under-confident. The psychology literature suggests that counterexplanation works by moderating over-confidence (Koriat et al. 1980). It works on inaccurate auditors by requiring them to reconsider opposing argument and thereby reducing their confidence. Unfortunately, it has similarly effects on accurate auditors. This study showed that while it may be effective on those who did not detect the fraud, it was counter-productive on those who did (for both audit groups and individual auditors). Not all audit superiors have a record of their audit subordinates' prior judgments. For example, the subordinate may be new to the firm or the subordinate may not have worked with a particular superior. In such cases, counterexplanation should be sparingly prescribed. As this is the first study which found counterexplanation to be counter-productive, more research would have to be conducted before definite conclusions could be drawn.
When belief revision caused by counterexplaining accurate and inaccurate judgments is compared between audit groups and individual auditors, our hypothesis that audit groups could counterexplain inaccurate judgments more effectively than individual auditors was only supported when the dichotomous judgment was analyzed. However, in counterexplaining accurate judgments, both audit groups and individual auditors did not change their accurate judgment after counterexplaining. These results provide only limited evidence that there may be advantageous in counterexplaining by groups, and that counterexplaining by groups leads to higher fraud detection rates. An explanation for this insignificant result may be due to the fact that the initial judgment of the groups had already been adjusted to take into account opposing arguments. When asked to counterexplain subsequently, they did not significantly alter their judgment. Evidence of this is provided in the results. The groups' initial judgment was significantly more accurate compared to the individuals' [means were 5.54 (sd 2.02) (groups), and, 4.26 (sd 7.97) (individuals)] (t = 3.78, p = .000).

This study makes use of participants that are relatively inexperienced auditors. An interesting extension of this study would be to examine the effects of audit groups and counterexplanation on more experienced auditors. Future studies could also examine the effects of these two variables on other audit tasks.

References:


Appendix A
The Client: Tucker House Ltd

Tucker House Ltd operates a chain of fast food restaurants. The company began in 1991 and by the end of 1996 had grown to 41 units, located primarily in the eastern states. Tucker House uses a financial accounting year end of 31 October.

Restaurants
The atmosphere of the restaurants is similar to most fast food restaurants, attractive, bright and clean. All of the restaurants open 7 days a week for lunch and dinner. The busier restaurants open for breakfast as well. The menu is more up-market than most hamburger outlets serving steak sandwiches, beef burgers, selected chicken items, and the usual drinks and desserts.

Operational control has been maintained through a computerized information system. Each restaurant is equipped with specially designed computerised cash registers that have the menu items incorporated on them. This system is used to compute on a daily, weekly and monthly basis, separately for each of the restaurant units, profit and loss, sales and cost breakdown by product, labour productivity, payroll and variations from budget.

The Purchasing and Warehousing Division
The company operates its own purchasing and warehousing division (PWD) from which all the restaurants are supplied with portion-controlled units of meat, poultry and other food items, as well as paper and other supplies.

The PWD includes meat cutting rooms, refrigeration and freezer storage space. The PWD processes much of the meat required by the restaurants and makes all the sauces and dressings. The company purchases other items in large quantities in anticipation of seasonal price fluctuations.

The effort to control meat cost is the most important area of cost control at Tucker House. Meat represents 80% of food costs, or almost 33% of sales, and management feels that one of the keys to Tucker House’s success is the PWD which makes it possible for Tucker House to cope with changes in the prices of meat.

The Account: Inventory at financial year end 31.10.96

<table>
<thead>
<tr>
<th>Type of Inventory</th>
<th>$</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>2,615,546</td>
<td>75.0%</td>
</tr>
<tr>
<td>Other (non-meat) food/beverages</td>
<td>335,620</td>
<td>10.0%</td>
</tr>
<tr>
<td>Total food/beverages</td>
<td>2,951,166</td>
<td>85.0%</td>
</tr>
<tr>
<td>Supplies</td>
<td>266,942</td>
<td>7.5%</td>
</tr>
<tr>
<td>Others</td>
<td>269,286</td>
<td>7.5%</td>
</tr>
<tr>
<td>Total: All inventory</td>
<td>3,487,394</td>
<td>100.0%</td>
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</tbody>
</table>

Instructions
In order for you to perform an audit of Tucker House’s inventory balance, the following information items are available. You should only evaluate those information items you consider are necessary for forming an opinion on whether or not the inventory balance is fairly stated.
ADDITIONAL INFORMATION AVAILABLE

Information about Tucker House Directors, Management and Employees ..................................................... pg 4
1. Key management personnel
2. Members of the Board of Directors
3. Board structure and number of meetings
4. Board members comments regarding managing director and financial director

Other Information about Tucker House ........................................................................................................ pg 6
5. Menu prices for main meals, 1994-96; average bill per customer
6. Main meal sales by type (percentages)
7. Number of restaurant units in operation, 1994-96
8. Expansion costs and plans
9. History of share offerings and debt financing
10. Management forecast of 1996 sales/earnings

Inventory and Inventory-related Financial Report Data/Ratios ........................................................................ pg 8
11. Weighted average annual sales per restaurant unit, 1994-96
12. Cost of Sales as a percentage of Sales, 1994-96
13. Cost of Sales percentage breakdown (food/beverages vs. labour), 1994-96
14. Total purchases of food and beverages, 1994-96
15. Total inventories ($), 1994-96
16. Inventory turnover and number of days sales in ending inventory, 1994-96
17. Inventory location (Restaurants vs PWD), 1995-96
18. Percentage breakdown of inventory by type, 1994-96
19. Percentage breakdown of meat inventory by type, 1996
20. Purchase commitments ($) for meat at financial year end, 1994-96

Other Financial Report Information ................................................................................................................. pg 11
21. Current assets, by type, as a percentage of total assets, 1994-96
22. Current liabilities, by type, as a percentage of total liabilities and shareholders equity, 1994-96
23. Gross sales, 1994-96
24. Net income as a percentage of Sales, 1994-96

Financial Ratios (Other than inventory-related) .................................................................................................. pg 12
25. Current ratio and Quick ratio, 1994-96
26. Receivables turnover & Number of days sales in ending accounts receivables, 1994-96
27. Earnings per share, 1994-96
28. Price-Earnings ratio, 1994-96

Results of 1996 Audit Procedures .................................................................................................................... pg 13
29. Results of physical inventory observation at restaurants
30. How restaurant test units for inventory observation were chosen
31. Results of analytical comparisons/reviews for unobserved restaurants
32. Results of physical inventory observation at PWD
33. Results of inventory pricing tests
34. Results of inventory cutoff tests
35. Audit procedures performed related to purchase commitments
36. 1996 Management Letter comments re internal control weaknesses
37. Evaluation of effectiveness of Internal Audit function
38. 1996 Solicitor's Letter
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>39.</td>
<td>PWD history (size, expansions) - 1992-96</td>
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<tr>
<td>40.</td>
<td>Beef processing and purchasing policies</td>
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<tr>
<td>41.</td>
<td>Accounting records/internal controls for PWD inventory</td>
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<tr>
<td>42.</td>
<td>Sources (vendors) for food, beverage and supply purchases</td>
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<tr>
<td>43.</td>
<td>Client records: Receiving Log, Week 52, FY 96</td>
</tr>
<tr>
<td>44.</td>
<td>Client records: Receiving Log, Week 1, FY 97</td>
</tr>
<tr>
<td>45.</td>
<td>Client records: Weekly Inventory Summary, Week 51, FY 96</td>
</tr>
<tr>
<td>46.</td>
<td>Client records: Weekly Inventory Summary, Week 52, FY 96</td>
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<tr>
<td>47.</td>
<td>Client records: Physical Inventory Counts, 3 largest items, FY 95</td>
</tr>
<tr>
<td>48.</td>
<td>Client records: Weekly Inventory Summary, Week 1, FY 97</td>
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<tr>
<td>Groups/Individuals</td>
<td>Initial Judgment</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>Inaccurate</td>
</tr>
<tr>
<td></td>
<td>Accurate</td>
</tr>
<tr>
<td>Individuals</td>
<td>Inaccurate</td>
</tr>
<tr>
<td></td>
<td>Accurate</td>
</tr>
<tr>
<td>Total</td>
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*Numbers indicate cell size.
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<thead>
<tr>
<th>Source of Variation</th>
<th>MS</th>
<th>df</th>
<th>F</th>
<th>p*</th>
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<tbody>
<tr>
<td>Covariates:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audit experience</td>
<td>.078</td>
<td>1</td>
<td>.077</td>
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<tr>
<td>Confidence revision</td>
<td>5.986</td>
<td>1</td>
<td>5.932</td>
<td>.016</td>
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<td>Main effects:</td>
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<tr>
<td>Initial judgment (J)</td>
<td>5.548</td>
<td>1</td>
<td>5.498</td>
<td>.021</td>
</tr>
<tr>
<td>Explanation/counterexplanation (C)</td>
<td>.358</td>
<td>1</td>
<td>.355</td>
<td>ns</td>
</tr>
<tr>
<td>Groups/individuals (G)</td>
<td>1.863</td>
<td>1</td>
<td>.197</td>
<td>ns</td>
</tr>
<tr>
<td>Two-way interactions:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J x G</td>
<td>1.863</td>
<td>1</td>
<td>1.846</td>
<td>ns</td>
</tr>
<tr>
<td>J x C</td>
<td>9.060</td>
<td>1</td>
<td>8.978</td>
<td>.003</td>
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<tr>
<td>C x G</td>
<td>.023</td>
<td>1</td>
<td>.025</td>
<td>ns</td>
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<td>Three-way interaction:</td>
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<td></td>
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<tr>
<td>J x C x G</td>
<td>1.037</td>
<td>1</td>
<td>1.028</td>
<td>ns</td>
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R² = 16%, Adjusted R² = 10%
* ns = not significant
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<tr>
<th>Panel A – Belief Revision Variations:</th>
<th>Initial Judgment</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inaccurate</td>
<td>Accurate</td>
<td></td>
</tr>
<tr>
<td>Counterexplanation</td>
<td>0.66</td>
<td>-0.31</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.25)</td>
<td>(0.96)</td>
<td></td>
</tr>
<tr>
<td>Explanation</td>
<td>0.20</td>
<td>0.22</td>
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</tr>
<tr>
<td></td>
<td>(1.08)</td>
<td>(0.68)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B – Accuracy Score Variations:</th>
<th>Initial Judgment*</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Inaccurate</td>
</tr>
<tr>
<td>Counterexplanation</td>
<td>3.19</td>
</tr>
<tr>
<td></td>
<td>(0.64)</td>
</tr>
<tr>
<td>Explanation</td>
<td>2.77</td>
</tr>
<tr>
<td></td>
<td>(0.85)</td>
</tr>
</tbody>
</table>

*The accuracy scale was anchored by “fairly presented” (1) and “not fairly presented” (9).
Figure 1
Interaction Effect between Initial Judgment and Explanation/Counterexplanation

![Graph showing the interaction effect between initial judgment and explanation/counterexplanation. The graph plots belief revision against initial judgment. Points are marked at specific values of belief revision and initial judgment.](image-url)
Endnotes:

1 Counterexplanation has been shown to result in higher belief revision (Koonce 1992; Heiman 1990); debias the curse of knowledge (the curse of knowledge is the inability of people to ignore their own knowledge when making predictions about other people's knowledge) (Kennedy 1995), and reduce the effects of confirmation bias (Church 1991).

2 Koonce (1992) required her participants to consider opposing arguments prior to judging whereas Koriat et al. (1980) and Heiman (1990) required participants to counterexplain subsequent to judging.

3 Explanation effect is the tendency of decision-makers to make decisions consistent with their explanation.

4 Belief perseverance is the tendency of decision makers to adhere to certain beliefs even after the information that formed these beliefs were discredited.

5 Causal explanation is the bridge decision-makers build between the information and the judgment.

6 The data were collected from participants at a national training course and the course convenor had allowed an hour for the experiment. Pincus's participants took about an hour to complete the task. Since this experiment required participants to perform more tasks, we had to reduce the number of information items so that the participants could complete the task in the time allotted. On average, participants took about 55 minutes to complete the tasks.

7 One group and three individuals did not complete the experiment, this resulted in 64 (groups) and 75 (individuals) useable responses. There were two groups of two participants.

8 All participants were required to record the amount of effort they expended on the task and their motivation to provide answers they could justify on nine-point Likert-type scales. The effort expended scale was anchored by "very little effort" (1) and "a great deal of effort" (9). The mean scores are 5.98 (groups) and 5.82 (individuals). These scores are not significantly different ($F = .54, p = .46$) and show that participants in both groups and individuals conditions expended reasonable amounts of effort. The motivation scale was anchored by "not at all motivated" (1) and "a great deal of motivation" (9). The mean scores are 6.34 (groups) and 6.18 (individuals), and are not significantly different ($F = .53, p = .47$). These scores show that participants were reasonably motivated to provide answers they felt they could justify.

To test the success of the group manipulation, participants in the group condition were required to rate their satisfaction with their group's judgments on a seven-point Likert-type scale where one indicated dissatisfaction and seven indicated satisfaction. The mean satisfaction score is 5.48 (sd 1.14). In addition, participants in the group condition were also required to rate the amount of interaction in their group on a nine-point Likert-type scale anchored by "no interaction at all" (1) and "a lot of interaction" (9). The mean score is 6.50 (sd 1.26). Both these scores show that the group manipulation was successful.

9 Dichotomizing the data set using the median (4) and the mean (4.85) yielded similar results, and this applied to all tests of significance using the dichotomized data as no participant made judgments of between 4 to 5.

10 The initial judgment of inaccurate participants who explain and counterexplain showed a significant difference ($t = 2.42, p < .018$) while the initial judgment of accurate participants in the explanation and counterexplanation conditions were not significantly different ($t = 1.31, p = .193$). This potential problem was overcome by examining participants' belief revision.