The effect of time pressure on auditor attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting

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Abstract

Motivated by recent concern regarding the auditor’s role in fraud detection, this study predicts that (1) under time pressure auditors’ attention will become focused on the dominant task at the expense of attention to the subsidiary task and (2) the task of accumulating documentary evidence regarding frequency of misstatements will dominate the task of attending to qualitative aspects of misstatements. Results from an experiment were consistent with expectations.

1. Introduction

The objective of this research is to further the understanding of the effect of contextual factors on the cognitive processes associated with the auditor’s ability to attend to qualitative aspects of misstatements indicative of potential fraudulent financial reporting. Recent actions and statements of auditing policy makers have validated the importance of this topic to the auditing profession. This research empirically examines the effect of time budget pressure, a contextual feature of the audit environment, on auditor attention to the task of detecting potential fraudulent financial reporting. This study is unique in that the method of inquiry employs a dual cognitive task environment more representative of the audit setting in which a significant amount of the responsibility for detecting misstatements indicative of potential fraudulent financial reporting takes place. In so doing, it draws upon the Easterbrook hypothesis (Easterbrook, 1959) to provide theoretical support for the hypotheses presented and the dual-task approach to the audit setting.

1 This includes statements made by the National Commission on Fraudulent Financial Reporting (or the so-called Treadway Commission) (1988), the Board of Directors of the AICPA (1993), the Public Oversight Board of the SEC Practice Section, AICPA (1993), and the Auditing Standards Board through its issuance of SAS No. 82 entitled “Consideration of Fraud in a Financial Statement Audit” CAICPA, 1977 and its efforts geared toward continuous improvement. In addition, prominent figures in accounting research have recommended that cognitive research should consider the context in which accounting decisions are made (Ashton, 1990; Ashton, Klenmutz, Sullivan & Thomassini, 1988; Dopuch 1992; Hogarth 1991; Johnson & Kaplan, 1991)

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paradigm advanced in the psychology literature (Eysenck, 1982) to provide support for the method of inquiry. The Easterbrook hypothesis states that there is a progressive reduction in the range of attention accompanying increases in arousal. The dual-task paradigm of research has been advanced to test the Easterbrook hypothesis. By linking performance on dual tasks to attention, researchers have been able to draw conclusions regarding the effects of arousal on the range of attention. When attentional resources become scarce, they become focused upon the dominant task at the expense of attention to the subsidiary task. As a result, performance of the subsidiary task declines at levels of arousal where performance of the dominant task remains unaffected.

Although there are phases of the audit in which fraud risk assessment is the primary focus, especially the planning phase during which a separate assessment of the risk of misstatement due to fraud is required per Statement on Auditing Standards No. 82, much of the auditor’s responsibility for fraud detection occurs in a dual-task environment. Specifically, in order to detect an actual instance of fraudulent financial reporting, an auditor often must attend to qualitative aspects of misstatements while accumulating evidence regarding the frequency and amount of misstatements (AICPA, 1998, AU350.27, 42). In addition, time pressure, a factor capable of producing arousal, has been found to be salient in the auditing environment (Alderman & Deitrick, 1982; Cook & Kelly, 1988; Kelly & Margheim, 1990; Lightner, Adams & Lightner, 1982; Lightner, Leisenring & Winters 1983; Rhode, 1978; Waggoner & Cashell, 1991). Given the dual-task environment in which a portion of the auditor’s responsibility for fraud detection occurs and the salience of time pressure in the audit testing environment, an extrapolation of the Easterbrook hypothesis would hold that auditors would tend to focus attention on one task at the expense of the other.

Commentators on the auditing profession such as the Treadway commission (National Commission on Fraudulent Financial Reporting, 1988), the Public Oversight Board of the SEC practice Section, AICPA (1993), and the Board of Directors of the AICPA (1993) have suggested that the auditor may not view fraud detection as a primary responsibility. An analysis of institutional factors such as auditor performance evaluation and auditor familiarity with fraud supports such a conceptualization (Bell & Carcello, 1998, p. 5). As a result, I predict that auditors under time pressure will focus their attention on the dominant task of gathering evidence on the frequency and amount of misstatements at the expense of attention given to the subsidiary task of attending to qualitative aspects of misstatements indicative of potential fraudulent financial reporting.

Fifty auditors participated in a controlled experiment where they were instructed to execute audit procedures related to a hypothetical client’s inventory records. They were informed that they were to provide tick-mark\(^2\) documentation on the frequency and amount of misstatements and attend to and document any items that appear to be unusual, or indicative of a potential irregularity, or that may require further investigation. As predicted, the results indicated that time pressured auditors were less likely to attend to indicators of potential fraudulent financial reporting. Taken on its own, this finding may not be particularly noteworthy. When combined with the finding that these same time pressured auditors did not suffer decrements in the accuracy of the tick-mark documentation gathered regarding the frequency and amount of misstatements, however, the findings may illustrate a significant effect. In particular, they indicate that time pressure’s earliest effects may be manifested through the filtering out of cues related to qualitative aspects of misstatements.

Clearly, there are levels of time pressure at which attention to cues related to frequency and amount of misstatements may be affected. Indeed, McDaniel (1990) has demonstrated this. The results reported here suggest that the detrimental effects of time pressure may set in at lower levels.

\(^2\) Tick-mark documentation refers to the various check marks and “X” marks made by the auditors to indicate whether an item was correctly or incorrectly reported in the client records.
than those required to affect the accuracy of such
tests of details. That is, moderately pressured
auditors may allocate scarce attentional resources
in such a way that permits them to provide accu-
rate documentation of the frequency and amount
of misstatements without actually attending to
the qualitative aspects of the misstatements that
may be indicative of fraudulent financial rep-
porting.

2. Theoretical development

This research focuses on the cognitive responses
associated with the state of stress that arises from
the demand–capability imbalance occurring when
auditors operate under time budgets that they
perceive to be restrictive. Weick (1983) notes that
the demand–capability imbalance occurs when the
individual executing a task perceives that the
demands of the task are greater than the cap-
abilities possessed by that individual. When audi-
tors perceive the time budget to be too restrictive
to complete the audit procedures as assigned, the
arousal produces stress, an affective state. Among
the several responses through which stress may
manifest itself is the impediment of the ability to
deal with new or complex issues, resulting in a
tendency to avoid anything that may add to an
individual’s cognitive burden (Weick). This reduc-
tive effect may have serious implications for audi-
tors.

The source of the limitation on the ability to
execute cognitively complex procedures may reside
in individuals’ attentional processes. The East-
erbrook hypothesis links the constructs of arousal
and attention through its prediction that there is a
progressive reduction in the range of cue utiliza-
tion that accompanies increases in arousal (East-
erbrook, 1959). This hypothesis has been con-
firmed in several more recent studies (see Eysenck,
1982 for a review of 30 studies reporting such results). In routine tasks where attention
to only a narrow range of cues is required,
increased arousal should increase performance on
the task by reducing the extent to which attention
is paid to extraneous cues, thereby increasing pro-
cessing speed. When arousal increases to the point
that the filtered cues are crucial to task perform-
ance, performance decrements should be observed.

The Easterbrook hypothesis has typically been
tested using a dual-task methodology. By linking
performance on each of the tasks to attention,
measurements of performance under differing
conditions of arousal have provided insight into
the effects of arousal on attention. In general, stu-
dies examining the effects of time pressure on
attention have found that time pressure may be
imposed at levels where performance of the sub-
сидиary task will decline while performance of the
dominant task will not be affected. These findings
indicate that there is a progressive reduction in the
range of cue utilization accompanying increases in
arousal (Eysenck, 1982). Kahneman (1973, p. 38)
summarizes the research investigating the Easter-
brook hypothesis as follows:

This research demonstrates that high arousal
causes attention to be concentrated on the
dominant aspects of the situation at the
expense of other aspects. As Easterbrook
noted, such a change of allocation policy will
interrupt any performance in which attention
must be deployed over a wide range of
cues.

An extension of the Easterbrook hypothesis into
the domain of auditing research could be made
appropriately only if auditors are asked to execute
dual or multiple tasks concurrently under condi-
tions of arousal. Several studies cited previously
have established the salience of time pressure in
the auditing environment. McDaniel’s (1990)
study provided additional insight into the effects
of time pressure in this context. McDaniel, how-
ever, focused on the extent to which performance
of a single task was affected by time pressure. The
literature discussed previously indicates that the
earliest and most significant effects of time pres-
sure may not be detected with an analysis that
examines performance on only one task. It indi-
cates that the effects of arousal are likely to be
observable on a subsidiary task at lower levels of
manipulation than they would be on a dominant
task.
The question arises, then, as to whether or not auditors are faced with situations where they are required to perform multiple tasks concurrently. It seems quite clear that auditors do, indeed, perform concurrent tasks. It is also evident that the same audit procedures serve multiple purposes with respect to auditor judgment and decision (see AICPA, 1998, AU341.05). Furthermore, it appears that at least a portion of auditors’ responsibility for the detection of fraudulent financial reporting is dependent on auditors’ vigilance for potential indicators while executing other audit tasks.

This study recognizes that SAS No. 82 requires consideration of the risk of material misstatement due to fraud during the planning stage of the audit and that the task of detecting risk factors, or red flags, may be a primary task at this stage. Red flags, however, are not misstatements. Rather, they are attributes of the financial reporting environment that may indicate the existence of opportunity, incentive, or attitude to engage in fraudulent financial reporting. In order to detect fraudulent financial reporting, the auditor must detect a material misstatement. Absent such a misstatement, it would be inappropriate to conclude that financial statements have been fraudulently prepared, regardless of the number of red flags identified. As such, it is crucial that the auditor not only recognizes the risk factors present in the client’s environment, but also increases attention toward qualitative aspects of the actual deviations detected during the execution of audit procedures.

Several studies have examined the issue of fraud risk assessment at the planning phase of the audit (Knapp & Knapp, 1996; Loebbecke, Eining & Willingham, 1989; Pincus, 1989; Shibano, 1990; Zimbelman, 1997). Glover (1997) addresses the issue during the results analysis phase. This study extends the literature on fraud detection by focusing on auditor attention during the testing phase. The actual identification of fraudulent financial reporting, by definition, depends on detecting an instance where the financial statements misrepresent the underlying economic events. It is only through an attentive examination of the accounting records and underlying accounting data, usually the type of examination associated with the testing phase, that fraudulent financial reporting can be detected.3

While all audit procedures are ostensibly directed toward the task of “detecting misstatements,” the operationalization of this single task may involve multiple component tasks. The two component tasks addressed by this study are the task of accumulating evidence regarding the frequency and amount of misstatements, and the task of attending to qualitative aspects of misstatements indicative of potential fraudulent financial reporting. Auditing standards explicitly support such a characterization of the auditor’s responsibility:

In addition to the evaluation of the frequency and amounts of monetary misstatements, consideration should be given to the qualitative aspects of the misstatements. These include (a) the nature and cause of misstatements, such as whether they are differences in principle or in application, are errors or irregularities, or are due to misunderstanding of instructions or to carelessness, and (b) the possible relationship of the misstatements to other phases of the audit. The discovery of an irregularity ordinarily requires broader consideration of possible implications than does the discovery of an error (AICPA, 1998, AU350.27; similar guidance is also given in AU 350.42, emphasis added).

It is possible for an auditor to execute audit procedures in such a way that evidence sufficient for an evaluation of the frequency and amount of misstatements (i.e. tick-marks documenting deviation rates) is gathered, while evidence concerning qualitative aspects of misstatements is ignored. Detection of potential fraudulent financial reporting may be impaired to the extent that it relies upon such consideration of qualitative aspects of misstatements.

3 This discussion is not meant to detract from the importance of studies aimed at auditor performance in the other phases of the audit. The intent is to demonstrate a dimension upon which this study extends the research.
Having provided standards-based support for the notion that auditors are expected to execute concurrently the dual tasks of attending to qualitative aspects of misstatements indicative of potential fraudulent financial reporting and accumulating evidence regarding the frequency and amount of misstatements, the analysis now considers which task is dominant in the normal audit context. Several factors contribute to the tendency for the task of accumulating evidence regarding the frequency and amount of misstatements to dominate. Two factors discussed here are differences in auditor knowledge or familiarity with the tasks and differences in the incentive structure associated with performance of the two tasks. These two factors are implicated in Bell and Cacello’s (1998, p. 5) assessment of auditor fraud detection performance, “...few auditors ever encounter a material financial statement fraud. Therefore, auditors receive minimal feedback on their ability to accurately assess fraud risk.” Even less potential for feedback exists for assessing the professional skepticism with which audit tests are conducted.

As stated in SAS No. 82, the auditor’s responsibility for detecting material misstatements arising from fraud often involves attention to complex interaction of risk factors, alteration of the nature, timing, and extent of audit procedures, and an increase in the professional skepticism with which audit procedures are conducted. The auditor’s lack of familiarity with fraud and effective detection procedures (Zimbelman, 1997) adds to the difficulty of this task. Clearly, attention to fraud adds considerable complexity to the audit. The Yerkes–Dodson law (Yerkes & Dodson, 1908) holds that there is an inverted-U shaped relationship between arousal and performance and that the optimum level of arousal for complex tasks is lower than the optimum level of arousal for simple tasks. These findings are important in this context because the task of being attentive to qualitative aspects of misstatements indicative of potential fraud while accumulating frequency data regarding misstatements is much more complex than simply accumulating frequency data alone. As a result, the optimum level of arousal for accumulating tick-mark data alone may be much higher than the optimum level for the more complex task of attending to indicators of fraud while accumulating tick-marks. Because of the relative complexity of the fraud detection component task, auditors would be less likely to attend to this task under time pressure than they would be under less stressful conditions. The effect is circular in that continued avoidance of the complex fraud detection task makes it more difficult to gain the knowledge and familiarity that would make it simpler, and thus more likely to draw attention in the future.

In addition to lack of auditor knowledge and familiarity with the fraud detection task, the incentive structure under which auditors operate may contribute to the tendency to subordinate the fraud detection task during the execution of tests of details. Clearly, auditors perceive that providing documentary evidence of their ability to complete audit procedures within the budgeted time is important to their advancement in the firm (Alderman & Deitrick, 1982; Cook & Kelly, 1988; Kelly & Margheim, 1990; Lightner et al., 1982; Lightner et al., 1983). Most auditors receive prompt feedback on the efficiency with which they performed this aspect of their assignment. While the accumulation of evidence regarding the frequency and amount of misstatements produces measurable documentary evidence (i.e. tick-marks), attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting generally produces little documentation and may be perceived by auditors as unmeasurable. In addition, because the vast majority of clients are not involved in fraudulent financial reporting, feedback on performance in this area is generally rare. Apparently, the incentive structure and the lack of effective benchmarks for the task of attending to qualitative aspects of misstatements would tend to subordinate this task when attentional resources are constrained.

In the language of the dual-task paradigm, because of the relative complexity of the task and the lack of auditor knowledge and familiarity, attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting may be a subsidiary task to be executed concurrently with the explicitly stated dominant task of accumulating evidence regarding the frequency
and amount of misstatements. Further support for this conceptualization of the auditing environment may be found in recent statements made by the Public Oversight Board of the SEC Practice Section, AICPA (1993, p. 42, emphasis added):

Before the turn of the century both auditors and the users of audited financial information regarded the detection of fraud as one of the primary purposes of an audit. For many reasons the profession has moved from an acceptance of that purpose to the view that its role in detecting fraud is secondary to the other purposes of audits. In contrast, the public has continued to regard fraud detection as an important goal of the audit process — and now attaches even greater importance to that goal.

The recommendations of the National Commission on Fraudulent Financial Reporting, the so-called Treadway Commission, provide further support for the discussion of time pressure’s effects on the ability of auditors to detect fraudulent financial reporting, “Public accounting firms should recognize and control the organizational and individual pressures that potentially reduce audit quality” (National Commission on Fraudulent Financial Reporting, 1988, p. 56).

The following assertions, then, can be drawn from the relevant accounting and psychology literature: (1) time budget pressure is a salient feature of the auditing environment; (2) increased arousal, which may be associated with the perceived demand–capability imbalance accompanying restrictive time budgets, can cause attention to become more focused on dominant-task-related cues at the expense of attention given to secondary-task-related cues; and, (3) the auditing context is a multiple cognitive task environment in which the complex task of attending to aspects of misstatements indicative of potential fraudulent financial reporting may be considered subordinate to other tasks. The prediction that time budget pressure may cause auditors’ attention to become focused on cues related to the accumulation of evidence regarding frequency and amount of misstatements at the expense of attention to qualitative aspects indicative of potential fraudulent financial reporting emerges from these assertions. The following research hypothesis is proposed to test this prediction:

$H_0$: Time pressure may be imposed at levels where the rate of detection for the task of attending to qualitative aspects of misstatements indicative of potential fraudulent financial reporting will decrease as time pressure increases while the accuracy of the evidence regarding frequency of misstatements will not be affected.

3. Method

The method employed to test this hypothesis was an experiment in which participants were presented with materials detailing the objectives for the audit of inventory for a hypothetical audit client. Fifty auditors representing the offices of several different accounting firms in two different cities participated in the experiment. The size of the offices represented ranged from large Big 6

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4 One concern with the primary task is that it involves frequency learning. Prior work in psychology (Hasher & Zacks, 1979, 1984) and accounting (Ashton, 1991; Butt, 1988; Nelson, 1993, 1994) has provided mixed results investigating whether frequency learning is an automatic process that consumes little or no attentional resources. Automaticity of frequency learning would bias against support for $H_0$, as it would imply that the primary task would not divert attentional resources from the secondary task.

5 There were 63 original participants. One of the participants was excluded from the analysis for failing to comply with instructions. This participant reopened the experimental materials and marked on them after completing the post-experimental questionnaire. Twelve of the remaining 62 participants had either less than 1 year or more than 6 years of auditing experience, resulting in their exclusion from the analysis on the grounds that their experience level was not consistent with the assigned task. This basis for exclusion is consistent with McDaniel (1990) whose sample included only auditors with more than 1 year of experience. All of the statistical tests were performed on the entire sample including the 12 excluded individuals. None of the tests conducted on the full sample as significantly different from the reduced sample. Consequently, results are reported only for the reduced sample of 50 auditors.
offices to smaller offices of regional accounting firms that provide audit services. Auditors from several firms were chosen to reduce the effects that one firm’s specific training on the detection of fraudulent financial reporting may have on the results (Cushing & Loebbecke, 1986). This type of sample may enhance the generalizability of the findings of this experiment. To alleviate any concern that firm effects could drive results, random assignment across treatment level occurred within firm.

3.1. Experimental task

The experimental task used was based on McDaniel (1990). McDaniel’s task was a test of details of inventory for a medium-sized manufacturing client in which the participating auditors were given background information on the client and instructed to gather evidence to test the valuation and completeness assertions for finished goods inventory and inventory reserve. The tests to be performed were outlined in a partial year-end audit program. The data upon which these audit procedures were executed consisted of inventory and inventory reserve record prices and amounts for 25 products sold to each of the 60 customers of a hypothetical audit client. The audit program detailed the sample size and the source of the data for each of the four tests of details. The auditors were instructed to document whether each item selected for investigation from the client’s records was correctly reported in the records or reported erroneously based on criteria that were provided in the background materials. McDaniel chose this type of task because it is representative of the types of tasks that are typically performed under time pressure and because performance could be objectively measured.

As discussed previously, auditors are required to be attentive to qualitative aspects of misstatements indicative of potential fraudulent financial reporting while accumulating evidence regarding frequency and amount of misstatements. In order to create a multiple task environment in which a dominant and subsidiary task could be measured, McDaniel’s task was altered to make it clear to the participants that, in addition to accumulating evidence on frequency of misstatements, they were responsible for being attentive to qualitative aspects of misstatements indicative of potential irregularities or fraud and for following up on them, just as they are in actual auditing situations.6

In order to be able to measure performance of the dual tasks, a situation indicative of fraudulent financial reporting was seeded in the materials. The potential instance of fraudulent financial reporting was related to two of the client’s largest customers for whom all items of inventory were overstocked. This situation was a potential instance of fraudulent financial reporting because the overstocked inventory was not disclosed in the reserve for slow-moving and obsolete inventory despite a strict industry-wide policy of establishing a reserve for all such overstocked items. The qualitative aspects of the misstatements strongly suggested the presence of a material misstatement of the inventory records. Several contextual factors were added to the materials that, when taken as a whole, indicated an increased probability that the misstatement was intentional (e.g. statements indicating increased risk, increased competition, difficulty in retaining customers, a slowing-down of the movement of inventory, the presence of a financial statement-based incentive plan, and the centralization of authority). These contextual factors are consistent with the conditions and motivating factors described in SAS No. 82 (AICPA, 1997).

The diagnosticity of contextual risk factors has been widely debated in auditing literature (Bell & Carcello, 1998; Loebbecke et al., 1989; Pincus, 1989; Winters & Sullivan, 1994). Some have suggested that analytical procedures provide more reliable evidence regarding the likelihood of fraud. In order to be responsive to such concerns, the experimental task included both contextual risk factors and results of analytical procedures indicating a heightened risk of fraud.

6 The terms “irregularities” and “fraud” and the “phrase review for unusual items” appeared a combined total of 10 times in the experimental materials. There were five statements instructing auditors regarding their responsibility for reviewing for unusual items, following up on them, and documenting them. The instructions indicated that their responsibility was the same as it would be in an actual audit situation. They were informed that any situation requiring further audit attention required written documentation.
The task that was ultimately presented to the subjects was developed through an iterative process relying heavily on input from auditing professionals. First, it was based upon the task developed by McDaniel (1990) through extensive consultation with accounting professionals. In modifying it to include contextual and data-related risk factors, sources of professional guidance and partners and managers were consulted. Seven different pretests were administered. Following each administration, a debriefing and feedback session was conducted. The final version of the task included several modifications suggested by pretest auditors as factors that would be diagnostic of increased fraud risk. All of the pretest participants agreed that the situation involving the overstocking of inventory for two of the largest customers would be an issue that should be identified for further review. Further validating the realism of the instrument was the fact that two of the firms providing participants and assistance in the development of the task also based a 2 h fraud detection training session on this task following the administration of the experiment.

3.2. Procedure

The auditors participating in the experiment were instructed by superiors that they would be participating in a professional development session dealing with inventory auditing. In each of the experimental sessions, the auditors were handed a closed packet of materials as they arrived and were directed to a seat. The packets were arranged such that assignment to each treatment group was random. After all were seated, task instructions were distributed and read aloud verbatim for the entire group. Afterward, they were informed that an audit program in the experimental materials would indicate the total time allotted for the task and were shown the timer that they should use to document the time taken. Following these instructions, they were told to open their packets and begin working on the assigned task. In order to gather information as to the timing of the documentation provided by the auditors, they were instructed to use different colored writing utensils during different time periods (these pencils were provided with the questionnaires). After the timed portion of the task was completed, a post-experimental questionnaire was administered.

3.3. Design

3.3.1. Independent variable

The only independent variable, time pressure, was manipulated at four different levels. Each auditor was randomly assigned to either the 45, 55, 65, or 75 min condition. The time allowed was based upon pilot tests and an extrapolation of McDaniel’s results adjusted for differences in the nature and number of mechanical procedures required. The manipulation of the independent variable was checked by asking auditors to

7 As discussed later, auditors did not have to reach a conclusion regarding the existence of fraud in order to be classified as “detected.” They simply had to signal that they noted anything unusual for one of the two customers, thus identifying the customer for further review.

8 A copy of the instrument is available from the author upon request.

9 The groups were segregated to the greatest extent possible in the room. Those in the higher time pressure conditions were given additional materials that required them to continue working in their seats until the experimental materials for all groups were collected. Exit interviews with participants indicated that they were unaware of the different completion times and were unaffected by the activities of the other participants.

10 McDaniel (1990) reported average work rates in the structured condition ranging from 3.07 items per minute (moderate time pressure) to 3.55 items per minute (high time pressure). There were 185 items to be processed on the audit program under McDaniel’s structured condition. There were 150 items to be processed on this audit program. The procedures were identical with the exception that the auditors were asked to execute the procedures while being attentive to indications of irregularities. The same processing speeds with 150 items would result in times of approximately 49 and 42 min, respectively. Pretest trials, which were later substantiated by self-reports of the auditors involved in the actual experiment, indicated that it took 8 min to read and comprehend the background materials. A slow processing speed and a shorter than average time taken with the background materials would result in a completion time of under 65 min. This was considered to be low time pressure. A relatively fast processing speed and a shorter than average time taken with the background materials would be necessary to complete the task within 55 min. This was considered to be high time pressure.
respond on a seven-point scale to the amount of
time pressure experienced in this task and in daily
work (with 1 representing “very little time pres-
sure” and 7 representing “substantial time pres-
sure”). Although the analysis of variance revealed
that there was no statistically significant differ-
ce between treatment groups in the level of time
pressure experienced while completing the experi-
ment, when the 45 and 55 min groups were con-
solidated into one “high” time pressure condition
and the 65 and 75 min groups were consolidated
into one “low” time pressure condition, a significant
difference was observed. Under this grouping
method, the mean difference between the level of
time pressure experienced during the experiment
and the time pressure experienced in daily work
for the high time pressure group (−0.28) was sig-
ificantly different than that of the low time pres-
sure group (−1.80) [t(d.f. = 47) = 2.21, p < 0.032].
All subsequent analyses will report on the aggre-
gated data. Consistent with McDaniel’s (1990)
findings, the mean reported level of time pressure
experienced in daily work for the high time pres-
sure group was not significantly different from
that of the low time pressure group, suggesting a
homogeneous sample.

3.3.2. Dependent variables

The dependent variables were the performance
metrics associated with each of the dual tasks of
accumulating accurate evidence regarding fre-
quency of misstatements in support of specific
tests of details and attending to qualitative aspects
of misstatements indicative of potential fraudulent
financial reporting while executing tests of details.

The processing accuracy component of the per-
formance metric developed by McDaniel (1990)
was used to measure accuracy of the evidence on
frequency of misstatements. Specifically, proces-
sing accuracy (denoted \( Y_1 \)) is measured as the sum
of the four individual processing accuracy scores
(\( Y_{1i} \)) relating to each of the audit program steps,
and is calculated as follows:

\[
Y_1 = \sum (Y_{1i}), \text{ where}
\]

\[
Y_{1i} = \frac{(n_i - e_i)}{n_i} \times 100
\]

and: \( n_i \) = the number of items examined in procedure
\( i, \ i = 1-4, \)
\( e_i \) = the number of auditor errors (i.e. incorrect
rejections or incorrect acceptances) made
in applying procedure \( i \) to each of the \( n_i \)
items selected.\(^{11} \)

Subsidiary task performance is related to the
auditors’ ability to detect and analyze qualitative
aspects of misstatements in the client’s accounting
records. The additional documentation provided
by the auditors was analyzed and classified
according to the extent to which the subjects noted
the discrepancies in the records for the two mis-
stated customers. Each set of experimental mate-
rials was reviewed for indications that the auditor
attended to the situation involving the two mis-
stated customers. Two main classifications pur-
porting to capture different depths of processing
are summarized here.

The first such classification was designed to be
the most sensitive to any indication that the audi-
tor attended to any qualitative aspect of the situa-
tion involving the understated reserve for the two
customers. Each set of materials was thoroughly
reviewed for any indication that the auditor noted
that one (or both) of these customers was (were)
different in any way from the others. For the pur-
poses of this measurement, any set of materials
with any relevant auditor notations pertaining to
the two misstated customers was classified as
“detected.” Sets without any such notation were
classified as “not detected.”\(^{12} \) The second classifi-
cation was designed to capture a slightly deeper

\(^{11} \) For example, auditor number 4147 examined 25, 25, 25,
and 75 items for audit procedures associated with finished
goods item omission, reserve item pricing, reserve item oми-
sion, and finished goods item pricing, respectively. This auditor
made 0, 0, 0, and 1 accuracy errors in executing the respective
procedures. The accuracy scores for the respective procedures
are 100, 100, 100 and 98.67, resulting in a total score of 398.67.
The accuracy score for each procedure is obtained by dividing
the number of items processed correctly by the total number of
items processed.

\(^{12} \) Two student assistants also reviewed the materials and
classified them as “detected” or “not detected.” Their classifi-
cations agreed with the original scoring for all of the cases. The
assistants had no knowledge of the assignment to treatment
groups.
level of processing of the cues indicating the presence of irregularities. A classification as “detected” required a proposed adjustment of inventory or some indication that the auditor realized that several items relative to one of the two misstated customers were left off the inventory reserve record.

4. Results

4.1. Documentation accuracy of test of details

The test of the hypothesis involved the comparison of the mean level of accuracy between the high (397.11) and the low (398.47) time pressure groups. The results of the pooled-variance t-test indicated that there was no significant difference in the mean level of accuracy between the groups \(t(d.f. = 45) = -1.15, p \leq 0.257\). These results are consistent with the research hypothesis. Recall that this study intended to manipulate time pressure at a lower level than did McDaniel’s. Although McDaniel found that processing accuracy did decrease significantly from low to high time pressure among auditors who attempted to execute procedures in accordance with an audit program this study did not attempt to replicate McDaniel’s findings. The result, then, is consistent with the intended manipulation.

4.2. Detection of potential fraudulent financial reporting

The first measurement of subsidiary task performance purported to capture any attention at all that may have been given to the two customers for whom the inventory records were likely to be misstated. Panel A of Table 1 presents the data arranged in contingency table format for this measurement. Fisher’s exact probability test was used to analyze whether the two groups differ in the proportion with which they fall into the two classifications. The results of the Fisher’s exact test \((p \leq 0.040)\) indicated that the two groups differ with respect to the probability that their members will be classified as “detected.” The implication is that auditors under time pressure may be less likely to detect the qualitative aspects of the accounting records that signal possible misstatement due to fraudulent financial reporting. This finding is consistent with the hypothesized effect of time pressure and thus lends support to the theory advanced previously. When combined with the finding that documentation accuracy of tests of details was not significantly affected by the manipulation of time pressure, this result indicates that under arousal attention may become more focused on dominant-task-related activities, accumulating evidence regarding frequency of misstatements, at the expense of subsidiary-task-related activities, attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting.

The second measurement of subsidiary task performance required some understanding of the financial statement implications in order to achieve a “detected” classification. Panel B of Table 1 presents the data arranged in contingency table format for this measurement. Again, Fisher’s exact probability test was used to analyze differences between the groups. The results again indicated that the two groups were significantly different with respect to the probability that their members will be classified as “detected” \((p \leq 0.026)\). Alternatively stated, auditors under high time pressure were less likely to attend to and understand the implications of misstatements and indicators of potential fraudulent financial reporting than those under low time pressure. This finding is also supportive of the research hypothesis.

13 The analysis of processing accuracy was also conducted when the metric was not weighted by step. Weighting by step reduces the impact of a given error for steps with large sample sizes but increases the impact of a given error for steps with smaller sample sizes. Consistent with the weighted metric, the results indicated that there was no significant difference between the high and low time pressure groups \((p \leq 0.14)\).

14 The analysis was also conducted where auditors were grouped into high and low time pressure groups based on self-reported perceptions of the difference between the time pressure experienced during the experiment and time pressure experienced on the job. Using this grouping, all six auditors who were classified as “detected” were in the low time pressure group. As a result the results would have been stronger had they been grouped by time pressure perception.
These findings invite the question as to whether it is time budget pressure, or simply time available driving the results. This consideration is important because the theoretical development discussed the effects of time pressure on the range of attention. Specifically, it was asserted that auditors under low time pressure were more likely to be attentive to a broad range of cues while executing tests of details than were those under high time pressure. If, for example, an auditor in the low time pressure condition who was classified as “detected” executed all of the tests of details in the first 55 min and then found an unusual item while browsing through the materials for the remaining 20 minutes, this result would have little bearing on the theory regarding the range of attention. It would be inappropriate to say that this hypothetical auditor was more attentive to indicators of potential fraudulent financial reporting while executing tests of details. It would simply mean that auditors with excess time on their hands may be more likely to uncover potential misstatements. In audit practice, however, it is very rare that auditors will spend extra time on “completed” procedures as there is always another set of procedures waiting. If, on the other hand, the auditors under the low time pressure condition who were classified as “detected” were to provide documentation demonstrating that misstatements were attended to during the first 45 min of the task, it would reinforce the conclusions discussed earlier.

In order to monitor when the documentation of the potentially misstated customers occurred, the auditors were instructed to use regular graphite pencils for the first 45 min and different colored pencils for each of the 10 min intervals thereafter (the pencils were provided to them). The color of the documentation provided information on whether those who were classified as “detected” actually detected and investigated the items during the normal execution of audit procedures or whether they did so only after completing all audit steps. Alternatively stated, this measurement technique was used to assess whether the dominant and subsidiary tasks were performed concurrently or sequentially. In each of the six cases where an unusual item was identified, the auditor provided documentation indicating that it was detected within the first 45 min. This result may indicate that the significant difference obtained for this measurement was not simply due to the case where auditors under low time pressure had more time to hunt for problems at the end. Rather, it indicates that auditors under less time pressure may be attentive to a broader spectrum of cues as they execute audit procedures. This result is consistent with the theoretical development predicting a narrowing of the range of attention under time pressure. In short, the evidence provided by the use of multiple writing instruments suggests that time budget pressure, rather than time available, may be driving the results.

Analysis of self-reported time to complete the audit program steps further substantiates the conclusion that the less time pressured auditors appeared to attend to a broader range of cues while executing audit procedures. The cues related to the potential fraud were associated with the third audit program step. It was important for the auditors to have enough feedback on the time they were taking in order to perceive pressure (or less pressure, depending on the treatment group). It was also important for all auditors to have the

| Table 1 | Contingency tables: detection of potential fraudulent financial reporting |
|-----------------|-----------------|-----------------|-----------------|
|                  | Time pressure level |                  |                  |
|                  | High   | Low  |                  |                  |
| Performance      |                  |                  |                  |
| Not detected     | 28     | 16   | 44               |                  |
| Detected         | 1      | 5    | 6                |                  |
|                  | 29     | 21   | 50               |                  |
| "Detected" = Documented anything unusual about either of the two misstated customers. |

| Panel B: Measurement two — understood misstatement |
|-----------------|-----------------|-----------------|-----------------|
|                  | Time pressure level |                  |                  |
|                  | High   | Low  |                  |                  |
| Performance      |                  |                  |                  |
| Not detected     | 29     | 17   | 46               |                  |
| Detected         | 0      | 4    | 4                |                  |
|                  | 29     | 21   | 50               |                  |
| "Detected" = Documentation indicated that there may be a misstatement with regard to one or both of the misstated customers. |
opportunity to complete this audit program step within the allotted time so that they would all be exposed to the relevant cues. The mean of the self-reported time taken to complete the first three audit program steps for the high time pressure group (36.8) was significantly less than that of the low time pressure group (44.7), \[ t_{(d.f. = 43)} = -3.60, p \leq 0.001 \]. This indicates that the less time pressured auditors were taking more time to complete the procedures rather than working through the procedures at the same pace and then going back after they were finished with the task. The additional time taken may be indicative of a broader range of attention to the cues to which they were exposed. If this is the case, such an expanded range of attention may facilitate the type of evaluation of evidence and attention to qualitative aspects of misstatements discussed previously. The fact that the high time pressured auditors completed the first three steps reduces the likelihood that the results could be explained by the lack of an opportunity to be exposed to the relevant cues.

4.3. Individual differences

Differences between the two treatment groups with respect to demographic variables were also examined. Table 2 presents summary demographic information for the two treatment groups. None of the data could help explain why the low time pressure group outperformed the high time pressure group on the potential fraud detection task. The number of auditors encountering a material irregularity on a previous audit engagement was significantly higher for the high time pressure group, however. In addition, most of the other variables appeared to indicate that the high time pressure group appeared to have more relevant experience (e.g. experience in inventory auditing and in months on the job, age, continuing education, etc.).\(^{15}\) The demographic data for those classified as having detected the potential fraud is also provided in Table 2. These data indicate that those detecting the potential fraud are relatively diverse with respect to the demographic variables collected.\(^{16}\)

5. Discussion

This study was conducted to investigate the effects of time pressure on auditors’ attention to indicators of potential fraudulent financial reporting in a dual cognitive task environment. Based upon the tenets of the Easterbrook hypothesis, it was predicted that under time pressure attention would become more focused on the dominant task (i.e. the task of accumulating evidence regarding frequency and amount of misstatements) at the expense of attention given to the subsidiary task (i.e. the task of attending to qualitative aspects of misstatements indicative of potential fraudulent financial reporting). Several authoritative sources were cited that supported this conceptualization of primary and subsidiary tasks in the auditing environment. The study reported evidence consistent with the prediction. This conclusion is based upon findings that the accuracy of the evidence on frequency of misstatements did not suffer under time pressure but the rate of detection and investigation of qualitative aspects of misstatements indicative of potential fraudulent financial reporting did decline. Further evidence suggested that those under low levels of time pressure attended to a broader range of cues while executing detailed tasks.

These results appear to support the Treadway Commission’s point regarding the pressures that may not be conducive to professional skepticism and the recognition of indications of possible improprieties. This effect may be important to auditors because the lack of attention to qualitative aspects of misstatements is a dysfunctional

\(^{15}\) This analysis recognizes the potentially significant effects of task specific knowledge as advanced by Bonner (1990). Perhaps greater significance of results would have been obtained if the random assignment to treatment groups had produced a more even distribution of experience. Of course, further study would be required to advance this discussion beyond the level of speculation.

\(^{16}\) There may be some other demographic variable not included on the post experimental questionnaire that could provide further insight. In particular, the instrument did not gather information on abilities such as problem solving ability, ability to organize work and prioritize activities, perseverance, motivation, etc.
audit behavior that may be unnoticeable to a supervisor. The audit program step of reviewing for items, amounts, products and customers that appear unusual is one that produces no documentation unless such a characteristic is found. Professional skepticism has been defined as “an attitude that includes a questioning mind and a critical assessment of audit evidence.” (AICPA, 1998, AU230.7) Lack of attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting may be a manifestation of a lack of professional skepticism. The data appear to indicate that those under time pressure may not have maintained a questioning mind and may not have critically examined audit evidence to the same extent as those under less time pressure. The ramifications of a decrease in skepticism may be significant to the profession.

5.1. Limitations

This study did not provide evidence that would permit a general statement to be made on how well auditors execute the task of attending to qualitative aspects of misstatements indicative of fraudulent financial reporting. While care was exercised in designing the experimental task to be analogous to an actual audit situation, it would be inappropriate to make broad generalizations to actual audit practice. Further limiting the implications that may be drawn from this study is the fact that auditors participating in the experiment were not permitted the use of decision aids, tools, or consultation with other auditors that may have had a mediating effect on time pressure. Also, the study did not incorporate the supervision and review dimensions of the auditing environment. These are procedures that are explicitly required by Generally Accepted Auditing Standards to facilitate audit quality.

Solomon and Brown (1992) have contended that auditors who anticipate a potentially time pressured task can behave strategically to reduce the effects of time pressure. When auditors learn of time pressure while performing the task, they are limited to tactical, rather than strategic, responses. As with McDaniel (1990) and Kermis and Mahapatra (1985) the auditors in this study were limited to tactical responses. It should be noted, however, even the auditors under “high” time pressure reported that, on average, the level of time pressure experienced on this task was lower than that experienced in daily work. Given the relatively low levels of time pressure employed by this task, it is questionable as to whether auditors would have adopted strategic coping mechanisms had they been available. Further research may address the question of whether the tactical response to time pressure described by this study may be invoked prior to the strategic responses described by Solomon.

<table>
<thead>
<tr>
<th>Demographic item</th>
<th>Time pressure treatment group</th>
<th>Auditors classified as detected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Average months of public accounting experience</td>
<td>28.1</td>
<td>33.6</td>
</tr>
<tr>
<td>Average number of engagements providing experience with inventory testing</td>
<td>5.1</td>
<td>8.2</td>
</tr>
<tr>
<td>Average age</td>
<td>26.0</td>
<td>27.1</td>
</tr>
<tr>
<td>Number of auditors with Masters degree</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total number of engagements in which a material irregularity had been encountered</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Total number of engagements in which material fraudulent financial reporting had been encountered</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Average number of continuing professional education hours on the topic of fraud</td>
<td>3.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Average number of continuing professional education hours overall</td>
<td>171.3</td>
<td>202.5</td>
</tr>
</tbody>
</table>
The level of accountability perceived by the participants in the study may limit the generalizability of the results to audit practice. Research has shown that differing levels of perceived accountability may affect experimental results and behavior of accountants in practice (DeZoort & Lord, 1997; Gibbins & Newton, 1994; Glover, 1997; Johnson & Kaplan, 1991). Although the instruction to the participating auditors that “supervisors were interested in their ability to identify errors and irregularities in the inventory records” was consistent with McDaniel’s approach, it is doubtful that they experienced the same level of accountability as they do in audit practice. Furthermore, if a supervisor were to make it clear that the auditors were to be accountable for fraud detection, the dominant and subsidiary tasks may be reversed. Future inquiries may be appropriately directed at this issue.

Clearly, one would expect experience to play a significant role in the ability to detect fraudulent financial reporting and in the ability to overcome the effects of time pressure. In fact, Spilker (1995) and Spilker and Prawitt (1997) found that experience mitigates the effect of time pressure. Results reported here are somewhat inconsistent with that finding, however. There was no significant difference between the mean level of experience for those detecting and those not detecting the case of potential fraudulent financial reporting. It should be noted that the one time pressured auditor who was classified as detected had four years of experience, well above the mean for the experiment. Perhaps this experience permitted the auditor to overcome the limiting effects of time pressure. Further study investigating this matter may be warranted.

Clearly, however, other questions remain. For example, what are the effects of experience, training, and the review process on the manner in which scarce attentional resources are allocated? Are certain risk factors more likely than others to cause auditors to focus attention on qualitative aspects of misstatements indicative of fraud? Also, given the relatively small number of auditors detecting the fraud in this experiment, the possibility that there is some unique and unifying characteristic or experience that may have predisposed them to attend to qualitative aspects of misstatements indicative of fraud cannot be overlooked. Although no such item was identifiable in the demographic data examined, further inquiry into the nature of professional skepticism and its determinants may lend insight on this matter.

5.2. Implications

What, then do firms or standard setters take away from this paper? It seems unlikely that firms will summarily reduce time pressure in response to these results. Time pressure is entrenched in the audit environment as a result of economic influences on the profession. Furthermore, the relatively low detection rates even among those under low time pressure indicate that expansion of the time allotted may not produce an economic benefit given the possible trade-off in efficiency. That is, auditors under less time pressure may be able to attend to a broader range of cues, but there is no guarantee that the additional cues to which they attend will be related to indicators of fraud. Remedial action is a complicated issue, as this study may actually raise more questions than it can hope to answer.

One step toward a solution would be to examine the reward structure that exists in the auditing environment. It makes sense that, in a pressured environment...
environment with constraints on attentional resources, auditors would tend to focus on cues related to the portion of their responsibilities for which they perceive they will be held accountable. Attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting is inherently difficult to measure in a typical audit setting. The only reason it could be measured in this experiment was because the potential fraud was carefully seeded into the materials and known by the evaluators of audit performance. Feedback on attention to such aspects in actual audit practice is rare and may be far removed from the audit in the form of audit failure or litigation. Feedback on the accumulation of evidence related to the frequency of misstatements, and the efficiency with which such data is accumulated is very timely and germane to the auditor’s advancement. The disparity with regard to the availability of measures of performance may contribute to the tendency to allocate scarce attentional resources to the frequency data accumulation task. Efforts to develop benchmarks or other performance measures that could be used to provide feedback to auditors may help to improve performance in this area.

Another positive step would be to increase the auditor’s knowledge of fraud. If an auditor were to increase his or her knowledge of fraud, the cues should be more readily available during the execution of audit tests. Weick (1983, p. 356) cites practice as a means of overcoming the tendency to revert to dominant, first-learned patterns of response associated with increased stress. Indeed, cognitive research on attention has demonstrated that experts can achieve high levels of performance on tasks that appear to interfere with one another for less highly trained individuals. For example, a pianist was able to sight-read music just as well as usual when shadowing a message in one ear (Allport, Attonis & Reynolds, 1972). A skilled typist could type copy just as well when shadowing a message as when not shadowing (Shafer, 1975). The implication is that auditors with increased knowledge of fraud should be better able to overcome the potentially negative effects of arousing agents. Of course the two steps toward improvement recommended here are related.

Improved performance measures and feedback would naturally lead to improved knowledge of fraud. As a step in the direction of improving auditor knowledge of fraud, most large accounting firms have developed specialized fraud units from which they can assign auditors to large or risky audit engagements. Auditors with specialized fraud detection skills may be less likely to subordinate attention to indicators of fraud to the execution of routine tasks. Future research may cast light upon the effects of such specialized training.

A more drastic step would be to consider the merit of a separate audit engagement for fraud detection. The results of experiments by Jamal, Johnson and Berryman (1995) and Zimbelman (1997) suggest that focusing specifically on fraud detection may result in enhanced ability to detect fraud. These studies have focused on the planning and review stages. The finding that, during audit testing, attention to qualitative aspects of misstatements indicative of potential fraud may be subordinated in the normal audit context invites the question as to whether a specific “fraud audit” would be valuable, especially in situations involving heightened risk of fraud. Clearly, the high costs associated with such a proposition would necessitate extensive additional research.

It is not the purpose of this research to reject the idea that time pressure can be effectively imposed to promote operational efficiency and effectiveness in the auditing environment. Clearly, a certain level of arousal is necessary in all tasks to reach the optimum level of performance. Time pressure can be a very effective method of inducing such arousal, especially for tasks that do not require that attention be given to a broad range of cues. Time pressure promotes efficiency through the filtration of “extraneous” cues. Cues that are “extraneous” to the accumulation of tick-marks may be central to the detection of fraud, however. Auditors should be aware that the findings reported here indicate that time pressure may be producing dysfunctional effects on the audit even when decrements in the accumulation of evidence regarding frequency of misstatements are not being observed. While these results are consistent with the analyses of groups such as the National Commission on Fraudulent
Financial Reporting and the AICPA’s Public Oversight board, additional research is warranted. Little is known about the reasons why one auditing task may dominate another. In this study, auditors were asked to execute audit procedures as they would in a “normal audit situation.” Under what circumstances might the task of attending to qualitative aspects of misstatements indicative of potential financial reporting dominate the task of accumulating frequency and amount of misstatement evidence? Future research may endeavor to discover any effect that Statement on Auditing Standards No. 82 (AICPA, 1997) may have on the subordination of attention to qualitative aspects of misstatements indicative of potential fraudulent financial reporting.

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