

Gender Effects on Processing Effort During Analytical Procedures

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ABSTRACT

This paper examines whether male and female auditors would exhibit differences in information processing strategy as predicted by the selectivity hypothesis (Meyers-Levy 1989). Twenty-eight practicing auditors (16 males and 12 females), averaging three years audit experience, performed a planning analytical procedures task at one of two complexity levels. Consistent with the selectivity hypothesis, female auditors tended to be more efficient in their information processing strategies when the analytical procedures task was more complex, while no gender differences manifested when the task was less complex. Implications of these results for research and practice are discussed.

Key words: Gender, information processing, efficiency, analytical procedures

Data availability: Data used in the study are available on request.

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INTRODUCTION

Do women process information in a systematically different way from men? The selectivity hypothesis (Meyers-Levy 1989) suggests that, under certain task-related circumstances, women and men do in fact follow different information processing strategies. The selectivity hypothesis predicts that females are more likely to employ elaborative information processing strategies whether the decision task is simple or complex in nature. Males, on the other hand, are more likely to select heuristic processing strategies that minimize cognitive effort and reduce information load for simple tasks, switching to an elaborative strategy only when increasing task complexity will not accommodate an heuristic approach to information processing.

Given their tendency toward selective decision behavior, males tend to be more time-efficient for simple tasks because, on average, the heuristic strategies preferred by males can usually be executed more quickly than the elaborative strategies preferred by females. However, females tend to be more time-efficient for complex tasks, because they are more practiced at using elaborative strategies and can execute those strategies more quickly than males, who use elaborative strategies less often.

The selectivity hypothesis does not predict that one gender will make better decisions than the other. It suggests only that females will, under certain conditions, use different information processing strategies than males. However, failure to properly match processing strategy with task demands can impair performance in many decision domains (Payne et al. 1996). Hence, it is possible that gender-specific preferences for one strategy versus another

could result in a mismatch between task and strategy that could reduce decision effectiveness. As a consequence, research that examines and describes gender-based processing differences contributes to a broader understanding of the factors that influence strategy selection and, ultimately, decision performance.

Motivated by these objectives, this study extends the selectivity hypothesis to the domain of diagnostic reasoning by examining whether gender is associated with differences in information processing strategy in a specific audit judgment task. Professional auditors completed an analytical procedures task as part of audit planning in which the relative task complexity was manipulated. The results indicate that participant gender interacted with task complexity across multiple dependent measures consistent with a selectivity explanation.

Examining the selectivity hypothesis in the context of this common audit task provides potentially useful information to the auditing profession. Analytical procedures are normally the responsibility of the auditor in charge of fieldwork for the engagement, usually an individual with two to five years of auditing experience. Gender differences are a relevant issue because auditors at this experience level are equally likely to be men or women (Hooks 1996).

When analytical procedures uncover no significant differences between expected and actual account balances, the decision task is relatively simple. However, when differences arise, the task can become significantly more complex. As a consequence, understanding how complexity interacts with gender to alter processing strategy, as predicted by the selectivity hypothesis, could help auditors find ways to improve decision performance during analytical procedures. Because poor performance during analytical procedures is a significant factor in overall audit performance (Biggs et al. 1995), research that provides a better understanding of the factors that influence task performance may help reduce the likelihood of audit failures.

The remainder of this study is organized into four sections. The second section explains the auditing context and the task, synthesizes the selectivity hypothesis with the audit judgment literature, and articulates the research hypotheses. The third section describes the experiment that provided data for testing these hypotheses. The fourth section presents results from analyses used to examine the influence of gender on information processing strategy. Finally, the last section discusses the implications of the findings, suggests avenues for future research, and acknowledges the limitations of this study.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

The auditor's objective is to render an opinion about the fairness of a client's financial statements. To develop this opinion, auditors perform a series of evaluative procedures designed to provide reasonable assurance that the financial statements contain no material misstatements. Professional auditing standards mandate that auditors perform analytical procedures during the planning phase of an audit to identify high-risk areas, that is, specific accounts in which the probability of misstatement may be higher. During this planning task, auditors attempt to identify potential misstatements by analyzing whether changes in account balances are consistent with their understanding of client business activities. In summary, audit analytical procedures are an iterative process that involve (a) gathering information about client operations and the industry in which the client operates, (b) developing expectations about how this information should be reflected in the account balances, and (c) diagnosing potential problems by evaluating any material differences between expected and actual account balances.

A Cognitive Characterization of Analytical Procedures

Research examining the cognition that drives auditor judgment during analytical procedures has, since its inception, been heavily influenced by the literature on clinical diagnosis. Elstein et al. (1978) characterized diagnostic reasoning as a deductive cognitive process that involves generating and testing hypotheses to explain the symptoms manifested by a patient. When developing a diagnosis, clinicians reason backward (deductively) by working from the symptoms to the cause. One or more plausible hypotheses are generated from the clinician's knowledge of diseases and their impact on human physiology. These hypotheses are then tested by gathering and evaluating physiological information (cues) that either support or dispute each potential explanation. The surviving hypothesis becomes a diagnosis.

Libby (1985) introduced the clinical judgment framework to audit judgment research. He suggested that, during analytical procedures, auditors search for unexpected fluctuations in account balances between accounting periods (symptoms), then generate and test hypotheses that could explain those changes. If the most likely hypothesis (diagnosis) points toward a financial misstatement, then the appropriate accounts are targeted for expanded audit tests. If, on the other hand, the unexpected fluctuation appears to be the result of changes in business activities or market conditions, then the auditor's diagnosis will not trigger any extraordinary testing.

Koonce (1993) formalized this deductive framework into a descriptive model of auditor cognition during analytical procedures. She characterized auditor judgment in analytical procedures as a five-phase diagnostic process as follows:

- (1) developing a mental model of client business activities
- (2) searching for fluctuations in account balances that are inconsistent with this model
- (3) using knowledge of accounting to generate hypotheses that could explain the observed inconsistency
- (4) gathering diagnostic information about changes in related account balances
- (5) analyzing these findings to identify the most likely hypothesis and arrive at a

diagnosis.

This process is sequential and iterative. Auditors evaluate financial statement accounts sequentially, one at a time, to identify any unexpected fluctuations. A new iteration of generating and testing hypotheses is initiated by every inconsistency the auditor encounters.

This cognitive characterization describes a processing-intensive analysis of information patterns. Auditors must integrate new information with existing knowledge while developing a mental representation of client business activities. They must integrate more new information into this mental model while searching for unexpected fluctuations. They must retrieve old information (and accounting knowledge) from the mental model to generate one or more hypotheses. Finally, to test each hypothesis, auditors must both retrieve (or re-acquire) old information and integrate new information into the mental model. Because of the amount of integration and retrieval effort involved, audit analytical procedures provide a rich context for studying the factors that influence human information processing.

Gender-based Differences in Information Processing Strategies

Meyers-Levy (1989) advanced the *selectivity hypothesis* as a unifying framework to explain observed differences in information processing, decision-making strategies, and judgment between men and women. These differences are robust and widespread. The most widely studied gender-based differences in information processing have been in the areas of verbal skills, where females tend to outperform males (see e.g., Haslett 1983; Hedges and Nowell 1995; Maccoby and Jackin 1974), and visual-spatial skills, where men tend to outperform women (see e.g., Harris 1978; Hedges and Nowell 1995; Meece et al. 1982; Petersen 1979; Bever 1992). Other areas in which gender differences in information processing have been

observed include interpretation of information, where females tend toward a subjective and evaluative treatment of available data, while males tend to concentrate on objective and literal interpretations (Haas 1979). Gender-based differences in the structure of internal knowledge representation (memory) suggest that females tend toward a larger number of highly-differentiated categories in which information is encoded and stored in memory, while males tend toward a smaller number of broad, more generalized categories, each containing a comparatively larger numbers of memory cues (Nowaczyk 1982; Meyers-Levy and Maheswaran 1991; Meyers-Levy and Sternthal 1991).

Both psychosocial and physiological explanations have been advanced to explain these differences. A large body of research suggests that females tend to be socialized from a very early age to interpret information and solve problems in a structured and collaborative fashion, where males tend to be encouraged throughout childhood and into adulthood to use an unstructured and individualistic approach to information processing and problem solving (Gilligan 1982; Carpenter 1983; Eagly 1987; Eccles 1989). At the same time, studies of brain function and anatomy in males and females have documented gender-based differences in both biochemical activity (Blum 1997) and right-hemisphere (“right-brain”) vs. left-hemisphere (“left-brain”) utilization and dependency (Gazzaniga 1992; Meyers-Levy 1994). In particular, males’ preference for heuristic processing of information may be related to their general right-hemisphere dependency, because the right hemisphere of the brain is believed to process information in a more holistic, less-differentiated manner than the left hemisphere. Similarly, females’ generally superior verbal ability, greater attention to detail, and more differentiated categorization of information cues appear to be based on their tendency to be left-hemisphere dependent (Meyers-Levy 1994).¹

A Selectivity Hypothesis Interpretation of Analytical Procedures

In performing analytical procedures, auditors can choose from among a number of processing strategies ranging from selective to elaborative. Strategy selection is determined, in part, by the complexity of the decision task (Payne et al. 1996). Complexity increases as inconsistencies between expected and actual decision cues increase or as the number of possible decision alternatives increases (Bonner 1994). Consequently, analytical procedures that involve few unexpected fluctuations are relatively less complex than analytical procedures that uncover more inconsistencies between actual and expected year-to-year differences. Furthermore, an increase in unexpected fluctuations brings about an increase in the number of potential causes for the unexpected changes that must be considered. In short, analytical procedures with fewer unexpected differences should, for these two reasons, be relatively less complex than analytical procedures with more unexpected fluctuations.

Bettman et al. (1990) demonstrate that the amount of effort devoted to an information processing task increases as the number of elementary information processes (EIP) increase. EIPs increase as the number of decision cues increase or as the level of analysis devoted to each cue increases. For example, a processing strategy that targets 30 cues involves fewer EIPs than a strategy that targets 40 cues using the same level of analysis. A strategy that compares some number of cues to a threshold requires fewer EIPs than a strategy that involves determining and comparing the relative weights for the same number of cues. Consequently, complex tasks that require more elaborative strategies are also likely to involve more EIPs and time on task increases as the number of EIPs increases (Bettman et al. 1990).

The gender-specific processing differences predicted by the selectivity hypothesis map directly onto the task environment in which auditors perform analytical procedures. When

auditor expectations are consistent with the fluctuations they observe in client account balances, the task is relatively simple and a heuristic processing strategy should be more time-efficient than an elaborative strategy that is equally effective but more comprehensive. However, when analytical procedures become more complex because of an increase in the number of unexpected fluctuations, heuristic strategies may no longer be effective and both male and female auditors will be forced to resort to elaborative strategies.

Female auditors can be expected to complete a complex analytical procedures task more quickly on average than male auditors can, because females can execute elaborative processing strategies more efficiently. On the other hand, male auditors can generally complete a simple analytical procedures task more quickly on average than female auditors can, because males are more likely to use heuristic processing strategies that target fewer cues and put fewer demands on memory than the elaborative processing strategies likely to be employed by females.

Additionally, female auditors should be able to execute elaborative strategies more efficiently than male auditors because females have had more practice (1) selecting and using the appropriate elaborative strategies and (2) integrating and retrieving information to and from a larger number of memory categories, which is essential to accommodating the more comprehensive processing demands of elaborative strategies. When task conditions force males to employ more elaborative strategies, their processing efficiency suffers because their relative familiarity with elaborative strategies leads to redundant use of cues and they require more effort to integrate and retrieve information from an expanded number of categories.

The application of the selectivity hypothesis to audit analytical procedures suggests that male auditors will attend to fewer information cues than female auditors will when the analytical procedures task is perceived as simple, but that, as task complexity is perceived to increase, male

and female auditors are likely to attend to similar numbers of information cues. Additionally, because the elapsed time required to complete the task should be a function of the number of information cues processed, the same pattern of effects for auditor gender and task complexity can be anticipated for time on task.

This reasoning leads to a predicted interaction between auditor gender and task complexity on cue utilization and elapsed time on task as follows (stated in alternative form):

- H1: As the perceived complexity of an audit analytical procedures task increases, the extent to which male auditors use fewer decision cues than female auditors will decrease.

- H2: As the perceived complexity of an audit analytical procedures task increases, the extent to which male auditors will complete the task in less time than female auditors will decrease.

EXPERIMENTAL DESIGN

Methodology

The experimental hypotheses were examined in a 2 (auditor gender) x 2 (perceived task complexity) factorial design. Data were gathered during a computerized process-tracing field experiment completed by 28 experienced auditors.² The participants were asked to assume that they had been given responsibility for the annual audit of a long-standing client during the planning stage. They were instructed to familiarize themselves with their new client, then perform analytical procedures and identify any potential problems that should be considered while planning the engagement. A researcher monitored the entire experiment, which was administered on personal computers to small groups of auditors in participating firms' offices.

Experimental Task

The experiment involved four computer-administered phases. First, participants completed a structured, interactive tutorial that demonstrated how to use the computerized information acquisition system. The tutorial demonstrated each of the information screens that were available, and showed participants how to use the text editor to document their findings. Second, the participants were instructed to read a narrative description of the client and a planning memorandum that outlined the client's operating activities during the examination period. The client was described a privately-held furniture manufacturing company that had experienced slow but steady growth during recent years.³

Participants then completed the third phase, where they were instructed to conduct preliminary analytical procedures on the client's financial data and document any potential problems that should be considered when planning the engagement. All participants received the same client information and instructions, but half of the participants analyzed comparative account balances designed to be free from unexpected fluctuations, that is, consistent with the client-provided information presented in the narrative case materials, representing the less-complex decision condition. The remaining participants examined account balances to which two inconsistencies had been seeded, representing the more complex task condition.⁴

One potential problem, patterned after one used by Cohen and Kida (1989), involved failure to write off uncollectable accounts, and was seeded by increasing *Allowance for Doubtful Accounts* and increasing *Accounts Receivable*. The other, adapted from Bedard and Biggs (1991), involved a change in the allocation of overhead to cost of goods manufactured, and was seeded by decreasing *Occupancy Expenses* and increasing *Inventory* and *Cost of Goods Sold*.

During the analytical procedures task, participants could acquire comparative accounting

information from eight different displays. Five of these displays (balance sheet, income statement, statement of cash flows, statement of cost of goods manufactured, and financial ratios) showed comparative amounts for the current year (unaudited) and the prior year (audited), and the amount and percent of the change from the prior year to the current year.⁵ The other three displays provided balance sheet, income statement, and financial ratio information for each of the past five years. In total, participants could examine comparative information about 133 different account balances or financial ratios. Figure 1 presents a sample of the display for the balance sheet after selecting (clicking on) *Inventory*.⁶

Insert Figure 1 here

Finally, participants responded to a computerized debriefing questionnaire, where they were asked to estimate their audit experience and provide their opinion of the task they had just performed.

Subjects

Twenty-eight practicing financial statement auditors, representing four of the Big Five international audit firms, participated in the experiment. Participants had from two to five years of audit experience, with an average of three years. Half ($n = 14$, including seven females and seven males) analyzed the case without inconsistencies. The other half ($n = 14$, including nine males and five females) analyzed the case with the two seeded inconsistencies.

Validating the Task

Participants' responses to the task debriefing questions suggest that they were comfortable with the computer software, understood the task, found it interesting, and considered

it a realistic representation of the actual audit task.⁷ Planning concerns documented by the participants were consistent with the case materials. Of the 14 participants who evaluated the case with seeded problems, all documented concerns about at least one of the seeded problems. Two participants did not express concerns about the problem seeded to the allowance for doubtful accounts and two others did not mention potential problems with the accounts influenced by the change in overhead allocation. None of the 14 participants who evaluated the case without seeded problems documented concerns about the accounts that were manipulated in the other case. Seeding problems was not intended to establish performance criteria, but rather to manipulate engagement-specific conditions by changing task requirements. Because a substantial majority of the auditors who evaluated the case with seeded problems documented concern about the manipulated accounts, it appears that this manipulation was successful.

Dependent Variables

The dependent variable *TaskTime* was quantified as the number of minutes that elapsed between exiting the tutorial and finishing the analytical procedures task, which included time spent reading instructions, studying narrative information, examining accounting information, and documenting concerns on the text editor. The dependent variable *Cues* was quantified as the number of different accounting information items selected for display and/or further action.

Independent Variables

The independent variables were (1) gender of the participant and (2) complexity of case materials. The influence of gender was captured by the dummy variable *Female*, which was assigned a value of one for if the participant was female or zero if male. The influence of task complexity was captured by the dummy variable *Complex*, which was assigned a value of 1 for

participants who evaluated the case version with the two seeded problems or zero if they evaluated the case version without inconsistencies.⁸

DATA ANALYSIS AND RESULTS

Hypothesis 1

The main and interactive effects of participant gender (*Female*) and perceived task complexity (*Complex*) on the total number of information items selected and viewed by participants (*Cues*) were examined in a 2 x 2 analysis of variance (ANOVA). Results of this analysis are presented in Table 1.

Insert Table 1 here

Neither *Female* nor *Complex* was significantly related to *Cues* as a main effect. However, the *Female* x *Complex* interaction term was significant ($p < .05$). Males who received the low complexity case examined fewer information items than males who completed the high complexity case (means = 75.0 and 95.0 items, respectively, from Panel B of Table 1). Simple main effects analysis indicates this difference is marginally significant ($F_{1,14} = 3.83$; $p = .07$). While the opposite response pattern was observed for the female auditors (low complexity case mean = 91.8; high complexity case mean = 72.4), this difference was not significant ($F_{1,10} = 1.81$; $p > .20$).

Gender differences within complexity also drove the interaction. In the low complexity case condition, males examined fewer information items than females did (means = 75.0 and 91.8, respectively). Simple main effects analysis indicates this difference was marginally significant ($F_{1,12} = 2.80$; $p = .12$). Within the high complexity case condition, females examined

fewer information items (mean = 72.4) than male auditors did (mean = 95.0) and the simple main effect for gender is marginally significant ($F_{1,12} = 2.59$; $p = .13$). The nature of the *Female* x *Complex* interaction with respect to information cue usage is illustrated graphically in Figure 2.

Insert Figure 2 here

Taken together, the significant interactive effects support the prediction of Hypothesis 1. Male auditors used fewer information items in completing a lower-complexity analytical procedures task than they used for the high complexity task. This finding suggests that male auditors were more efficient in information processing in a low complexity task environment, consistent with their more holistic and less-differentiated task knowledge and memory structures. However, in the high task complexity condition, female auditors examined fewer information items than male auditors did, suggesting that the females' more elaborative memory structures permitted greater efficiency in cue recall and usage when the task was more cognitively demanding.

Hypothesis 2

The effects of participant gender (*Female*) and perceived task complexity (*Complex*) on the overall time required to complete the analytical procedures task (*TaskTime*) were examined in a second 2 x 2 ANOVA. The results of this analysis are shown in Table 2.

Insert Table 2 here

Table 2 indicates no main effects for either *Female* or *Complex* on *TaskTime*. However, the interaction between *Female* and *Complex* was significant ($p < .01$). Simple main effects analysis of this interaction indicates that it was largely driven by gender effects within the high

complexity task. Female auditors spent significantly less time on the high complexity task than male auditors did (means = 37.6 minutes and 56.4 minutes, respectively; $F_{1,12} = 14.00$; $p < .003$). Gender was not significant within the low task complexity condition: males took a mean of 48.7 minutes to complete the task vs. a mean for females of 53.8 minutes ($F_{1,12} = 0.70$; $p > .42$).

In addition, task effects within gender were significant for *TaskTime*. Male auditors spent a marginally greater amount of time on the more complex task compared to the less complex task (56.4 minutes vs. 48.7 minutes, respectively; $F_{1,14} = 2.84$; $p = .11$), while female auditors spent significantly *less* time on the high complexity task than on the low complexity task (37.6 minutes vs. 53.8 minutes, respectively; $F_{1,10} = 5.41$; $p < .05$). A graphical representation of the interaction is shown in Figure 3.

Insert Figure 3 here

These results indicate support for Hypothesis 2. Males exhibited an insignificant time advantage over females in the low complexity condition; however, this advantage disappeared in the complex task condition as females performed the complex task in significantly less time than male auditors did. This pattern suggests that female auditors, by virtue of their more elaborate and detailed memory structures, were able to perform the complex task with greater efficiency than male auditors could. Perhaps more importantly, female auditors in the complex task condition were significantly more efficient in terms of elapsed task time than female auditors who performed the simple task. Again, this suggests that female auditors' memory structures may be better matched to more complex tasks.

Multivariate Analysis

Because the two dependent variables were highly positively correlated ($p < .01$), the

combined effect of *Cues* and *TaskTime* was examined in a multivariate analysis of variance (MANOVA) with *Female* and *Complex* as independent variables. Results were similar to the univariate ANOVAS: there was no significant main effect for either gender or perceived task complexity, but the interaction term was significant ($p = .0081$).

Task Accuracy

A potential confounding of these results is that female auditors' greater task efficiency was achieved at the expense of task accuracy. To control for this, two measures of task accuracy (the number of planning concerns documented for both cases and the number of times the seeded problems in the more complex case were properly identified) were identified and compared across participant gender. For the less complex case, females documented planning concerns for an average of 1.2 accounts while males documented concerns about an average of 1.0 accounts. For the more complex case, females documented concerns for an average of 4.2 accounts while males documented concerns for an average of 3.7 accounts. Neither difference was significant ($t > 0.47$; $p = .605$; Wilcoxon $z < 0.27$; $p = .783$), which indicates that the number of documented planning concerns (one measure of task accuracy) did not significantly differ across gender.

In the complex case, 4 of 5 females and 8 of 9 males identified the seeded problem regarding accounts receivable and 4 of 5 females and 7 of 9 males identified the seeded problem regarding overhead allocations. Neither chi-square statistic is significant (accounts receivable problem = 0.20; $p = .649$; overhead allocation problem = 0.01; $p = .923$), which suggests that females and males were equally effective in recognizing the seeded errors in the more complex case. As a consequence, the reported gender-based differences in cue usage and time on task appear to be bona fide efficiency differences and not artifacts of a task accuracy differential between male and female participants.

DISCUSSION, IMPLICATIONS AND LIMITATIONS OF THE STUDY

This study provides evidence that female auditors' information processing efficiency systematically varied relative to male auditors' processing efficiency in an interactive pattern predicted by the selectivity hypothesis. When completing a planning analytical procedures task in which two errors had been seeded (high complexity), female auditors examined significantly fewer information items and spent significantly less time on the task than male auditors did. In the same task without the seeded inconsistencies (low complexity), males examined marginally fewer accounts than females did but spent no less time on the task.

Additionally, there were significant within-gender differences across task complexity for females with respect to task time and for male auditors with respect to cue usage. Both of these within-gender effects are consistent with a selectivity explanation. Taken together, these results support the predictions of the selectivity hypothesis for cue usage (Hypothesis 1) and for time on task (Hypothesis 2).

However, these results must be interpreted with care. Analytical procedures research that examines decision effectiveness (performance) must involve a criterion outcome (Libby 1995). In the planning context used for this study, the objective was simply to identify accounts that should be scrutinized further, through discussions with client personnel and/or by gathering and evaluating substantive audit evidence (Hirst and Koonce 1996). Beyond the seeded inconsistencies in the complex task, it is impossible to develop a comprehensive and reliable listing of all other accounts that should be examined. Differences between auditors in engagement-specific experience and training could lead to significant disparities of opinion regarding accounts that should be targeted for further investigation.

In a planning analytical procedures context, targeting an account for further scrutiny could indicate a range of concern from a simple request for further information to suspicion of misstatement. For example, an account may be targeted simply because the auditor wants to get an explanation for the change from client personnel. On the other end of the spectrum, an account may be targeted because the auditor suspects a financial statement error and intends to plan substantive audit procedures to test that hypothesis. In order to provide a reliable criterion outcome, the experimental task must provide auditors with a more specific objective, such as using analytical procedures as a substantive test to explain the change in an account balance. Although the planning context used for this study has considerable internal validity it does not, by itself, provide a reliable criterion outcome needed to examine overall decision performance.

Beyond the question of decision performance on this specific task, this study has implications for the design and execution of audit planning activities in practice. Individual-level differences in information processing ability (including gender effects) have traditionally been ignored by audit firms when establishing and documenting standard procedures and best practices. As audit firms are taking steps to mitigate the negative effects of their traditionally male-dominated cultures on hiring and advancement decisions (Hooks 1996), they should also consider the potential information-processing advantages that females may bring to certain more complex audit tasks. For example, auditing procedures originally designed and validated by male firm personnel might be reviewed and recalibrated by female personnel, particularly those who demonstrate a particular facility for processing information in complex tasks. At a minimum, if the findings of this study are supported by future research, the auditing profession should be cautioned not to ignore potentially significant differences in information-processing ability between the genders.

At the same time, the results of this study and similar results from selectivity research in other domains (e.g., Myers-Levy 1989) should not be interpreted as evidence of a global, gender-specific “superiority” in cognitive reasoning for a particular task or range of tasks (Blum 1997; Wright and Galea 1998). Most recent research into gender-based differences in information processing does not take into account other contextual or social factors that might also account for the observed differences.

This study’s limitations must also be considered. In particular, although the reported differences in cell means in both models are robust and statistically significant, the limited cell sizes may have implications for the stability of the regression parameters and the generalizability of the statistical results. In addition, the experimental materials and task setting, while designed to be as realistic as possible, still necessitate a significant abstraction from the naturalistic setting in which actual audit judgments are made. Finally, the task considered only a single type of client and engagement. Factors specific to other client settings might have a significant impact on the results.

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Figure 1
Sample Information Display

Comparative Balance Sheet (in thousands)				
<u>Background</u>	<u>Financials</u>	<u>Questions</u>	<u>Findings</u>	<u>Exit</u>
	<u>Current Year</u>	<u>Previous Year</u>	<u>Increase (Decrease)</u>	
			<u>Amount</u>	<u>Percent</u>
Cash and equivalents				
Accounts receivable				
Allowance for bad debts				
Inventory	2,149	2,098	(51)	2.4%
Prepaid expenses				
Total current assets				
Land and buildings				
Machinery and equipment				
Furniture and fixtures				
Accumulated depreciation				
Other assets (net)				
TOTAL ASSETS				
Accounts payable				
Accrued expenses				
Current maturities of LTD				
Total current liabilities				
Long-term debt				
Common stock				
Paid-in capital				
Retained earnings				
TOTAL LIABILITIES & EQUITIES				

Figure 2
Interaction Between Gender and Task Complexity on Number
of Information Items Examined (Hypothesis 1)

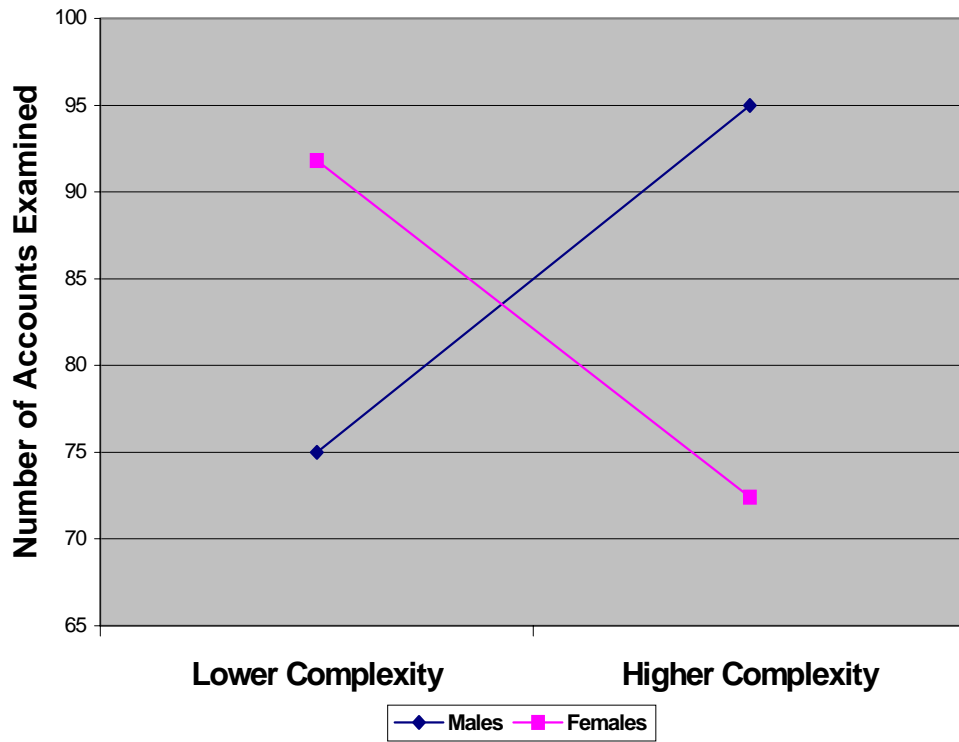


Figure 3
Interaction Between Gender and Task Complexity
on Total Elapsed Time on Task (Hypothesis 2)

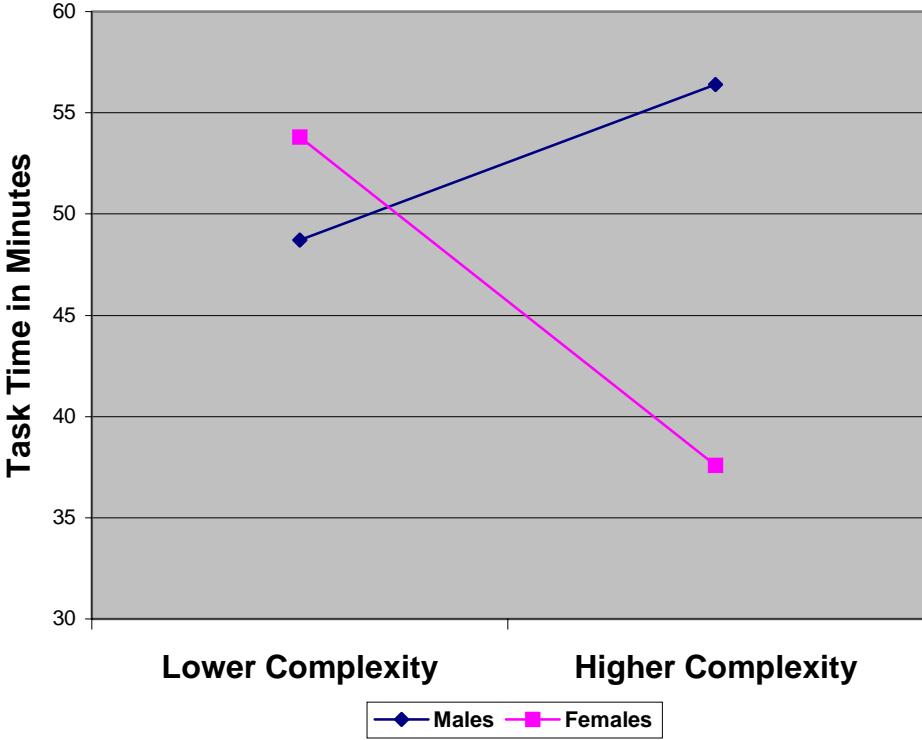


Table 1
Effects of Gender and Task Complexity on Number of Information Items
Examined
(Hypothesis 1)

Panel A: Analysis of Variance				
	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Statistic</u>	<u>P-value</u>
Model	3	2,722	1.83	.1679
Female	1	55	0.11	.7411
Complex	1	1	0.00	.9751
Female x Complex	1	2,608	5.27	.0307
Error	24	11,872		

Panel B: Cell Means (Standard Deviations) for Total Number of Information Items Examined				
	Lower Complexity	Higher Complexity	P-value for T-statistic	P-value for Wilcoxon
Male Auditors	75.0 (20.1)	95.0 (20.3)	.0870	.0442
Female Auditors	91.8 (17.4)	72.4 (32.7)	.1482	.3299
P-value for T-statistic	.1691	.0810		
P-value for Wilcoxon	.2243	.2856		

Cues - Number of different information items selected and viewed.
Complex - One for case with seeded inconsistencies, zero otherwise.
Female - One if participant was female, zero otherwise.

Table 2
Effects of Gender and Task Complexity on Total Elapsed Time
(Hypothesis 2)

Panel A: Analysis of Variance				
	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Statistic</u>	<u>P-value</u>
Model	3	1,248	3.86	.0219
Female	1	312	2.90	.1015
Complex	1	120	1.12	.3013
Female x Complex	1	963	8.95	.0063
Error	24	2,585		

Panel B: Cell Means (Standard Deviations) for Total Elapsed Task Time				
	Lower Complexity	Higher Complexity	P-value for T-statistic	P-value for Wilcoxon
Male Auditors	48.7 (10.9)	56.4 (7.5)	.1511	.0903
Female Auditors	53.8 (12.2)	37.6 (11.4)	.0134	.0513
P-value for T-statistic	.3613	.0034		
P-value for Wilcoxon	.4433	.0113		

Complex - One for case with seeded inconsistencies, zero otherwise.

Female - One if participant was female, zero otherwise.

TaskTime - Time on task in minutes.

FOOTNOTES

1. Current research suggests that gender-based differences in brain physiology, function, and hemisphere dependence are most likely based on both biological and cultural factors. See Blum (1997) for a review of recent developments in these areas of research.
2. Powell and Ansic (1997) noted that a computerized task setting tends to reduce the likelihood of spurious gender effects resulting from differential pressure on females to perform based on socialized norms of behavior.
3. A furniture manufacturer was selected to represent a “generic” audit client that would require no specialized industry knowledge beyond that required of an experienced staff or senior auditor with two to five years of audit experience.
4. Note that there is no objective basis for distinguishing a simple task from a complex task in this context. However, increasing the number of unexpected fluctuations encountered during analytical procedures would increase the *relative* complexity of the task.
5. There were 14 ratios reported, including (1) quick ratio, (2) current ratio, (3) allowance for bad debts to accounts receivable, (4) accounts receivable turnover, (5) bad debts expense to net sales, (6) inventory turnover, (7) interest expense to long-term debt, (8) debt to equity, (9) times interest earned, (10) long-term debt to total assets, (11) gross profit margin, (12) net income to net sales, (13) return on equity, and (14) return on total assets.
6. Participants negotiated the information displays using standard Windows menus. When a display was selected, item descriptions appeared on the screen, but the numbers were blank. In order to view this information, participants had to click on the item description with their mouse. This action displayed the current and previous balance, the amount of change, and the percent of change. When participants selected another item, their previous selection was blanked out so that, at any time, comparative information was visible for only one account. Participants could reexamine any item by clicking it with their mouse. Decision monitoring software kept a record of all items selected and the elapsed time for all activities.
7. Using an response scale from 0 to 100, where 100 is the highest rating, auditors were asked four questions in the debriefing questionnaire. The questions (mean responses) were as follows:

How well did the tutorial prepare you to use the information acquisition system? (84)
How clear were the instructions? (90)
How interesting did you find the task to be? (67)
How realistic did you consider the task to be? (69)

⁸ Two individual-level variables, average experience level and reading speed, were initially identified and considered for inclusion in the model as covariates. Neither variable was

FOOTNOTES (continued)

significantly different between gender or case condition. Further, the experimental effects were identical with or without the effects of these variables. Given the limited sample size, only the experimental results without the covariates are reported below.