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Marshall A. Geiger

University of Richmond, mgeiger@richmond.edu

A.C. Lloyd Spurrell

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**AUDITOR JUDGMENT CONFIDENCE: DIRECT EVIDENCE
FOR THE PROCESS VIEW**

Marshall A. Geiger* and A.C. Lloyd Spurrell**

ABSTRACT

Although there has been considerable research on audit judgment processes and structures, one area that has received little attention is auditor judgment confidence. Determining the nature of confidence attainment has direct implications for audit practice, particularly regarding the timing of evidence evaluation leading to final judgments. The present study extends the early work of Pincus (1991) and is the first to provide direct evidence in support of the process view of audit judgment confidence.

*University of Rhode Island and **University of Northern British Columbia

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INTRODUCTION

Considerable research has been undertaken on audit judgments and the cognitive processes leading to those judgments [see Johnson et al., 1989; Hogarth, 1991; Ashton and Ashton, 1995 for reviews]. One area of audit judgment that has received little research attention, however, is the nature of auditor judgment confidence. While some prior studies have gathered data on auditor's confidence in their final judgments, the process of confidence attainment, and particularly the acquisition and evaluation of evidence leading to final judgments, has yet to receive critical analysis. Additionally, confidence in one's judgments is particularly essential in conducting a multi-judgment task such as an audit. This study adds to the existing audit judgment literature by attempting to explicitly examine the nature of auditor judgment confidence attainment.

Griffin and Varey [1996] in their recent commentary on the state of the current research on judgment confidence have noted that much more research needs to focus on the underlying cognitive processes, and that current theories of judgment confidence do not adequately characterize the nature of individual's unobservable cognitive behavior. Pincus [1991] summarizes the

extant audit judgment confidence literature and argues that the nature of judgment confidence has been conceptualized as either an output or a process.¹ Viewed as an output, judgment confidence is the self-evaluation of judgment accuracy once all information is examined and a final judgment is reached. She argues that final judgment confidence under this view should be higher for "correct" judgments than for when individuals are not sure and have possibly made "incorrect" judgments. That is, experienced subjects should be able to distinguish when they have made a "correct" [more likely "satisfactory" or "adequate"] judgment and thus have higher confidence.

Alternatively, if viewed as a process, auditor judgment confidence increases with the accumulation and evaluation of information and serves as a threshold for assessing when enough information has been evaluated so that a final judgment can confidently be rendered. Under this holistic view, final confidence levels are not directly related to judgment outcomes (i.e., high judgment confidence is not associated with "correct" judgments) because individuals feel similarly confident in their own judgments regardless of which final judgment is made.

This research extends prior work by providing a more direct and extensive assessment of the nature (i.e., process vs. output)

of auditor judgment confidence. Specifically, the present study: (1) explicitly captures auditor judgment confidence patterns and preliminary judgments as information is sequentially evaluated leading to a final judgment,² (2) replicates confidence assessments for each auditor over several different materiality cases, and (3) addresses differences in confidence due to level of audit experience.

The implications for audit practice from these two views of judgment confidence are straightforward. Under the process view, the sequencing of evidence evaluation and its diagnosticity would affect the efficiency and effectiveness with which auditors confidently reach their final judgments. Evidence with greater diagnosticity, once identified, should be evaluated first to begin to gain confidence as quickly and accurately as possible in the auditor's evidence evaluation stage. If audit judgment confidence is better reflected by the output view, then the timing and sequence of gathering and evaluating evidential matter would not significantly affect the final confidence level of auditors. Under the output view, the only factor that impacts final judgment confidence is the aggregate evidence evaluated and not the timing or sequence in which it was obtained.

Pincus [1991] presents some indirect evidence that supports a process view of judgment confidence. If further

research confirms her findings, she argues that it may be possible to improve an audit firm's overall performance. For example, decision aids or procedural outlines might be developed to control for or reduce individual variability in confidence thresholds. Auditors and audit firms might then begin to ascertain an overall optimum evidence gathering point. Additionally, as pointed out by Messier [1995], the eventual goal of audit judgment research is to impact audit efficiency and effectiveness. This study adds to the literature by presenting direct evidence that the attainment of audit judgment confidence is a process and that consideration of confidence, then, should be incorporated into the development of practice aids and future judgment research.

PRIOR RESEARCH

This study examines *confidence in materiality judgments* due to their pervasiveness in accounting and auditing,. Also, due in part to the lack of any uniform audit or accounting guidelines, materiality judgments have been argued to be largely unstructured judgment tasks with relatively high complexity in comparison to other auditor judgments [Holstrum and Messier, 1982; Messier, 1983; Krogstad et al., 1984; Risby et al., 1989]. Thus, evaluating

auditor confidence for a materiality judgment context appears to be a particularly germane audit judgment area.

Judgment Confidence

Notwithstanding the existing research on audit judgment confidence [e.g., Moeckel and Plumlee 1989; Risby et al., 1989; Pincus, 1991; Selling, 1993] little is known about the nature of this cognitive construct. Cognitive psychologists have found consistently excessive confidence in subjects' own judgments relative to ex post outcomes [Oskamp, 1965; Slovic, 1966; Tversky and Kahneman, 1973; Fischhoff et al., 1977; Einhorn, 1980; Koriat et al., 1980; Lichtenstein et al., 1982]. These studies have noted that individuals resist downward adjustment to their confidence levels even after receiving feedback concerning actual over-confidence [Fischhoff et al., 1977; Kahneman and Tversky, 1978; Einhorn and Hogarth, 1978, 1985; Lichtenstein and Fischkoff, 1980]. Moreover, high confidence in judgments is not necessarily positively correlated with increased accuracy [Oskamp, 1965; Kahneman and Tversky, 1978; Paese and Sniezek, 1991].

Although several researchers have modeled decision making, including confidence, as either an output [Goldberg, 1968; Gibbins, 1982; Zakay, 1985] or a process [Estes, 1976; Busemeyer, 1988],

most accounting studies have either treated confidence as an output or assessed confidence only at the end of a judgment task which does not effectively allow for an assessment of the nature of judgment confidence. Weber [1978], Kida [1980], Tomassini et al. [1982], Gul [1983], Bell [1984], Waller and Felix [1984], Solomon et al. [1985], Casey and Selling [1986], Simnett and Trotman [1989], Pincus [1991], Simnett [1993], and Whitecotton [1996] all asked subjects to report their level of judgment confidence only at the end of the judgment task. Hogarth and Einhorn [1992] refer to such an experimental data collection process as an end-of-sequence evaluation since all information is evaluated simultaneously prior to rendering a final judgment.

The foregoing studies can not address the way in which subjects' confidence levels are attained. Additionally, Gibbins [1984], and Ashton and Ashton [1988;1990] have noted that audit judgment is more reflective of a sequential belief revision process than an end-of-sequence final evaluation.

Auditor Experience Effects

Increasingly, audit research has investigated differences in audit behavior, knowledge structures, judgment processes, and final judgments due to general, task-specific, or domain-specific

experience levels. Several studies have found differences in decision making strategies and outcomes due to levels of audit experience [Reckers and Taylor, 1979; Wright, 1982; Messier, 1983; Bouwman, 1984; Krogstad et al., 1984; Meixner and Welker, 1988; Cohen and Kida, 1989; Choo, 1989; Davis and Solomon, 1989; Tubbs, 1992; Christ, 1993; Simnett, 1993; Messier and Tubbs, 1994; O'Donnell, 1996]. As individuals attain more domain-specific experience, their evaluation behaviors change and evolve into more complex problem solving structures [Bonner and Lewis, 1990; Libby and Fredrick, 1990]. Differences in judgments between auditors due to experience levels also appear to increase when task complexity increases [Krogstad et al., 1984; Risby et al., 1989; Fredrick, 1991].

Research on differences in judgment confidence due to level of experience, however, has produced mixed findings. Hofstedt [1972] and Benjamin and Strawser [1974] found no difference in confidence intervals placed around predictions by subjects differing in expertise. Conversely, Goldberg [1959], Oskamp [1962, 1965], Gul [1983], and Whitecotton [1996] found lower confidence among judges with greater expertise. Trafimow and Sniezek [1994] also found that confidence was associated with level of perceived expertise.

From a practical audit perspective, one would expect more experienced auditors to be more confident in their judgments and thus potentially require less evidence to render a “confident” judgment. However, studies examining confidence and experience in auditing have also produced mixed results. An audit judgment study by Weber [1978] found no relationship between domain experience and confidence, Raiborn and Estes [1986] found a significant positive relationship and Snowball [1980] found a significant negative relationship. Pincus [1991] found more experienced auditors were biased toward increased confidence in judgments leading to an unqualified opinion. However, unlike most prior confidence research, this study uses relatively experienced auditors and categorization into three (not two) levels of experience to more accurately consider the impact of general experience levels on confidence. Accordingly, differences between levels of experience are explicitly evaluated in this study for each of the formal research hypotheses discussed in the next section. The a priori expectation regarding experience and confidence would be both higher final confidence attainment, as well as relatively higher confidence throughout the judgment task for more experienced auditors.

RESEARCH HYPOTHESES

Based on the prior literature review and the discussion of the two views of judgment confidence, two mutually exclusive patterns of confidence are suggested when information is supplied to subjects in performing a judgment task. Each pattern is supportive of only one of the two views of confidence. If judgment confidence is a process, then confidence levels should increase monotonically as more and more consistent information is evaluated leading to a final judgment.³ Conversely, if judgment confidence is an outcome, then the pattern of confidence should remain relatively stable as pieces of information are evaluated and then rise dramatically at the end of information evaluation as the final judgment is rendered and all evidence is aggregated.

Furthermore, a direct test of the output/process dichotomy is to examine confidence levels associated with judgment switches. The process view would predict that if auditors change a dichotomous judgment from one judgment to the other, particularly late in the evidence evaluation stage, confidence in their final judgment would be lower than if they did not switch. If subjects view a new piece of evidence as incongruent with a prior judgment, and switch positions, their resultant final

confidence would also be reduced. The output view of confidence attainment would predict no resultant decrease associated with judgment switches on final confidence assessments. Under the output view, all available information is evaluated prior to rendering a judgment and determining a final confidence level. Accordingly, a direct test of the nature of confidence attainment is to examine the final confidence level of subjects who switch judgments during the task.

Based on the earlier discussion of the difference between the output and process views of judgment confidence, and in order to link this study with the prior research, the first research hypothesis is identical to the hypothesis addressed in Pincus [1991] and tests subjects' final judgment confidence in each of five materiality cases. As previously discussed, if confidence is an output assessment then different judgments would lead to different levels of final confidence attainment. Conversely, if confidence is a process, different judgments would not necessarily lead to different levels of final confidence attainment. Accordingly, the first hypothesis evaluated is:

H1: Final confidence ratings for immaterial judgments are not significantly different from material judgments.

As discussed, the process view of judgment confidence would be supported if the pattern of judgment confidence upon receiving consistent information more closely represents a steady monotonic increase. Conversely, an output view of confidence would be supported if there is a substantial increase in confidence at the end of the information evaluation, coinciding with the final judgment. Also, as Pincus [1991,p.43] indicates research that allows confidence to be treated as a process variable "tends to be descriptive rather than normative." Accordingly, to assess the nature of judgment confidence, the second research hypothesis reflects this descriptive orientation:

H2: The pattern of individual judgment confidence throughout the materiality decision task is a steady monotonic increase that reflects a process more than an output.

Third, if audit judgment confidence is more like a process, then there should be no difference in overall confidence patterns between auditors reaching different final materiality judgments. Hence, the third research hypothesis:

H3: The pattern of individual judgment confidence throughout the materiality decision task is not different for auditors reaching immaterial and material final judgments.

Fourth, the process/output dichotomy can be evaluated directly by analyzing the confidence patterns of auditors who switch their judgments near the end of information evaluation. If judgment confidence is a process, these "late" switchers should exhibit lower final confidence levels than auditors who do not switch their materiality judgments near the end of the task. Once a switch is made, additional information may need to be evaluated before higher levels of confidence can be obtained. If a change in judgment is made late in the task, there may not be sufficient time to obtain enough additional information to elevate confidence to the same level as that attained by subjects not changing their judgments late in the task. If audit judgment confidence is an output, however, there would be no expected difference between those who switch judgments and those who do not. Accordingly, the following hypothesis is presented:

H4: Auditors who change their materiality judgments late in the task attain lower confidence levels than those who do not change.

Similarly, if confidence is a process, the overall frequency of switches should vary inversely with the final levels of confidence attained. That is, auditors switching judgments more often would be expected to attain lower levels of final confidence than those

switching judgments less frequently. If confidence is an output assessment, however, the overall frequency of judgment switches would not be related to the confidence level associated with the final judgment. Thus, the fifth research hypothesis:

H5: The number of judgment switches made by auditors is negatively associated with final confidence levels attained.

These last two hypotheses extend prior research and provide a more direct test of the nature of confidence attainment. Finally, this study separates the auditor subjects into three levels of general experience. Based on prior research finding differences in judgments due to experience levels, analyses were performed for any experience effects on the five research hypotheses. Accordingly, the last integrated hypothesis incorporated into all analyses is:

H6: Confidence indications do not vary across level of experience.

RESEARCH DESIGN

This section introduces the subjects, the task, and the measurement of confidence. The discussion focuses on the subjects' composition, materiality scenarios, and the scoring.

Subjects

Sixty-two audit practitioners participated in the study. Having failed to complete all the demographic questions, two participants were excluded from the analyses. The remaining sixty participants were as follows: 12 partners, 22 managers/supervisors, and 26 seniors/staff. Thirty-eight participants were males, and 22 were females. Twenty-eight participants were from three of the Big 6 accounting firms, and 32 subjects were from five regional and local firms. All were from the northeast United States with a mean of 18.1 years of experience for the partners, 9.9 years for the managers, and 4.2 years for the seniors.⁴

Experimental Task

Subjects responded to demographic questions and then were presented materiality decision cases via computer. Information presented to subjects was initially based on published financial statements of an actual company. This information was then varied in order to present subjects with cases containing clients of different sizes. Each subject had to judge whether the disputed amount in each of five cases was material enough to require financial statement disclosure.

The five materiality scenarios presented to subjects involved (1) valuation of obsolete inventory, (2) disclosure of a sensitive payment (bribe) paid to another multinational company to secure sales orders, (3) proper classification of the current portion of long-term debt, (4) recognition of pending litigation, and (5) disclosure of a possible over-charge to the government on a completed contract. Subjects were informed that all cases were independent of each other, which was reinforced by the structure of the judgment task and the different magnitude of the financial statement amounts included in the cases.

Although the absolute amounts in dispute for the five cases varied, the disputed amounts were based on a review of the literature [Rose, et al, 1970; Abdel-khalik, 1977; Icerman and Hillison, 1991], as well as the results of a pilot study. Accordingly, all but one disputed amount was roughly 7.75 percent of net income. Due to its nature, the amount for the case involving a sensitive payment (Case 2) was only .04 percent of net income. This lower magnitude was considered more appropriate for this type of item than the level used in the other four cases. The academic and practitioner participants in the pilot study indicated that amounts at these levels of net income were difficult materiality evaluations to make.⁵

Prior research has shown that assessments of materiality are more closely related to reported net income levels than any other available information [Rose et al., 1970; Moriarity and Barron, 1976; Abdel-khalik, 1977; Friedberg et al., 1989]. Accordingly, subjects in this study were provided net income information at the end of their information search when performing the materiality judgment tasks. Net income information was provided last to overcome a potential bias on the part of subjects to evaluate this information early and then demonstrate a high level of judgment confidence throughout the remainder of the task. Notwithstanding the importance of net income information, and as more fully discussed later, the findings of this study indicate that subjects did not wait until receipt of net income information to increase the confidence associated with their materiality judgments.

Pincus [1991] and Simnett [1993] have argued that participants should be allowed to individually select information in judgment tasks. Accordingly, subjects were provided with 28 pieces of information (see Appendix A). Of this set, they were informed that the net income before taxes amount and the net income amount would be supplied automatically as the sixth and seventh information items. After reading each case, subjects were

free to select five pieces of data from any of the remaining 26 items they considered relevant to making their materiality judgment. As new information was accessed, it was added to a data summary screen for their review before making each materiality judgment. Subjects were notified at the beginning of the session that a total of seven pieces of information would be accessed for each case.⁶

Because "correctness" or "incorrectness" of most audit judgments, such as materiality, are rarely determined at the time of judgment in actual settings, this study did not employ an ex-post or researcher-determined (e.g., group consensus) classification of accuracy [see Murray and Regel, 1992 for a discussion]. Instead, subjects were grouped dichotomously as to whether they determined the disputed amounts in each case to be material or immaterial according to their final judgment. This grouping is also more reflective of a judgment task and not a knowledge or identification task [Pincus, 1991].

Measurement of Judgment Confidence

After each piece of information was evaluated, subjects were asked to assess whether the disputed amount was immaterial or material. They were then asked to indicate the preliminary level

of confidence in their judgment on a scale of 50 to 100. Similar to Koriat et al. [1980] and Bell [1984], subjects were told a confidence score of 50 meant that they were very unsure when they made their materiality decision. A confidence score of 100 meant that they were absolutely certain of their judgment. Thus, each participant made seven materiality judgments and seven indications of judgment confidence for each of the five cases.

RESULTS AND DISCUSSION

It took subjects 50.0 minutes on average (std. dev. 10.2 min.) to evaluate the cases and respond to all research materials. Appendix A reveals the aggregate number of times each piece of information was selected by the subjects.

Descriptive and Univariate Results

Table 1 presents the mean final confidence indications of subjects by case and by level of experience. Subjects made a total of 300 final materiality judgments (60 auditors x 5 cases). Of those, there were 165 instances in which the auditors made a final judgment that the item was immaterial and 135 instances in which they judged the item to be material. A preliminary univariate test indicates that the average final confidence attained for the

immaterial judgments (84.48) was almost identical to that for the material judgments (84.67) ($t = .129$; $p > .25$). These results are consistent with the findings of Kida [1980], Casey and Selling [1986] and Pincus [1991], in that auditors reaching opposite final judgments have similar levels of confidence.

Table 2 presents the mean confidence measures accompanying the seven evaluations for each of the five cases separately and combined for each level of experience. Table 3 presents the overall confidence patterns by type of final judgment for all five cases separately and combined. As is apparent from examining both Panels A and B of Table 2 and Table 3, that mean confidence monotonically increases as additional information is evaluated in each of the presentations.

TABLE 1
SUMMARY OF FINAL CONFIDENCE LEVELS

<u>Case No.</u>	<u>Immaterial</u> <u>Final Judgments</u>		<u>Material</u> <u>Final Judgments</u>		<u>Total Sample</u>	
	<u>n</u>	<u>Mean Final</u> <u>Confidence</u>	<u>n</u>	<u>Mean Final</u> <u>Confidence</u>	<u>n</u>	<u>Mean Final</u> <u>Confidence</u>
1	30	84.90 (11.47)	30	86.17 (10.56)	60	85.53 (10.95)
2	48	88.23 (13.17)	12	80.25 (18.26)	60	86.63 (14.52)
3	17	79.88 (12.77)	43	85.44 (11.59)	60	83.86 (12.07)
4	30	84.36 (13.16)	30	83.80 (12.46)	60	84.08 (12.71)
5	<u>40</u>	<u>81.73 (13.79)</u>	<u>20</u>	<u>84.75 (14.09)</u>	<u>60</u>	<u>82.74 (13.85)</u>
Total	<u>165</u>	<u>84.48 (12.97)</u>	<u>135</u>	<u>84.67 (12.51)</u>	<u>300</u>	<u>84.57 (12.87)</u>

By Experience Level

Partners

(n=12) 39 86.00 (13.25) 21 81.90 (10.67) 60 84.57 (12.47)

Managers

(n=22) 62 87.98 (11.65) 48 88.75 (11.74) 110 88.32 (11.64)

Seniors

(n=24) 64 80.17 (13.44) 66 82.59 (13.09) 130 81.40 (13.27)

Total 165 84.48 (13.15) 135 84.67 (12.56) 300 84.57 (12.87)

()Standard deviation

TABLE 2
CONFIDENCE LEVEL PATTERNS - OVERALL AND BY EXPERIENCE

Mean Confidence on Evaluation

Panel A - Total Sample (n=60)

<u>Case</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1	61.75	67.25	73.53	76.53	79.72	81.65	85.53
2	73.68	76.95	79.38	79.58	82.70	85.52	86.63
3	68.73	71.73	75.08	78.88	81.43	82.45	83.86
4	63.20	67.08	71.83	73.25	76.88	80.43	84.08
5	<u>60.18</u>	<u>66.28</u>	<u>70.03</u>	<u>74.32</u>	<u>76.25</u>	<u>80.37</u>	<u>82.74</u>
Overall (n=300)	65.51	69.86	74.02	76.51	79.40	82.08	84.57

Panel B - By Experience

Partners (n=12)

1	60.83	64.58	73.33	76.67	78.75	85.00	86.92
2	68.75	73.75	72.50*	72.92	76.92	81.92	82.33
3	65.83	69.50	73.75	76.67	81.25	82.92	85.83
4	63.33	68.33	77.50	80.08	82.33	83.58	85.67
5	<u>59.17</u>	<u>64.17</u>	<u>69.17</u>	<u>75.00</u>	<u>75.42</u>	<u>81.25</u>	<u>82.08</u>
Overall (n=60)	63.58	68.07	73.25	76.27	78.93	82.93	84.57

TABLE 2
(Continued)

Mean Confidence on Evaluation

Panel B - By Experience

<u>Case</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
<i>Managers</i> (n=22)							
1	60.68	67.95	75.32	77.86	81.73	80.23*	87.05
2	77.28	80.68	84.68	84.55*	88.32	90.23	91.59
3	71.09	72.50	78.86	85.54	88.09	89.18	90.00
4	63.64	68.86	71.59	71.72	76.05	80.45	84.77
5	<u>59.77</u>	<u>68.23</u>	<u>71.82</u>	<u>77.36</u>	<u>78.64</u>	<u>85.00</u>	<u>88.18</u>
Overall (n=110)	<u>66.49</u>	<u>71.65</u>	<u>76.45</u>	<u>79.41</u>	<u>82.56</u>	<u>85.02</u>	<u>88.32</u>
<i>Seniors</i> (n=26)							
1	63.08	67.88	72.69	75.35	78.46	81.31	83.62
2	72.92	75.27	78.08	78.46	80.62	83.19	84.42
3	68.08	72.12	72.50	74.27	75.88	76.54	77.77
4	62.77	65.00	69.42	71.38	75.08	78.96	82.77
5	<u>61.00</u>	<u>65.62</u>	<u>68.92</u>	<u>71.42</u>	<u>74.62</u>	<u>76.04</u>	<u>78.42</u>
Overall (n=130)	65.57	69.18	72.32	74.18	76.93	79.21	81.40

*Mean confidence level decreased with the addition of new information.

TABLE 3
CONFIDENCE LEVEL PATTERNS BY FINAL JUDGMENT

		<u>Mean Confidence on Evaluation</u>						
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
<u>Immaterial</u>								
<u>Final</u>								
<u>Judgments</u>								
<u>Case</u>								
1		58.33	64.67	72.90	77.73	81.10	81.47	84.90
2		73.35	77.27	80.01	80.27	83.73	87.10	88.23
3		62.65	66.41	71.00	73.71	76.65	78.24	79.88
4		63.83	66.73	73.50	74.83	79.03	83.03	84.36
5		59.90	65.80	70.55	74.60	76.13	79.93	81.73
Overall (n=165)		65.13	69.55	74.23	76.81	79.72	82.60	84.48
<u>Material</u>								
<u>Final</u>								
<u>Judgments</u>								
<u>Case</u>								
1		65.17	69.83	74.67	75.33	78.33	81.83	86.17
2		75.00	75.67	76.67	76.83	78.58	79.17	80.25
3		71.14	73.84	76.70	80.93	83.33	84.12	85.44
4		62.57	67.43	70.17	71.67	74.73	77.83	83.80
5		60.67	67.25	69.00	73.75	76.50	81.25	84.75
Overall (n=135)		65.98	70.24	73.77	76.15	79.00	81.46	84.67

Figure 1 graphically depicts the increase in mean confidence levels for each of the five cases. Figure 2 depicts the increase in confidence across all cases by level of experience. Figure 3 presents a graphic depiction of the confidence attainment patterns for both types of final materiality judgment (i.e. material/immaterial) across all subjects.⁷

If confidence attainment is a process, then relatively smooth and consistent increases in confidence would be expected. If confidence attainment is an output, then a noticeable increase in confidence would be expected at the time of final review and judgment. This is particularly true in this study as net income information was provided as the sixth and seventh informational items. A visual analysis of these tables and figures indicate a confidence attainment pattern consistent with the process view.⁸

FIGURE 1

Confidence Patterns by Case

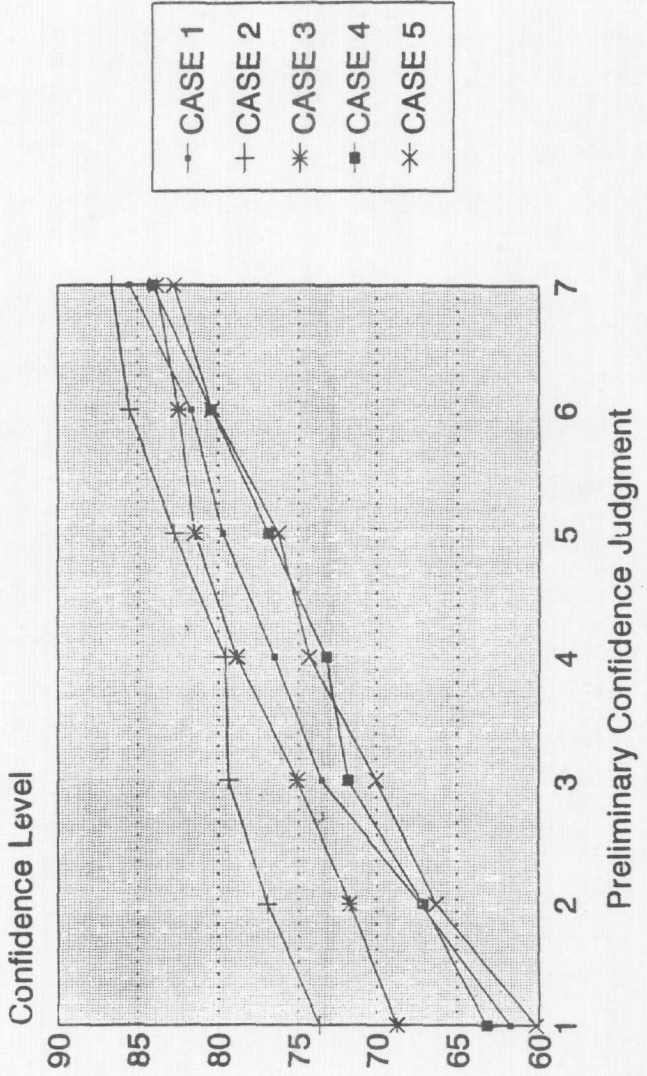


FIGURE 2

Confidence Patterns by Experience

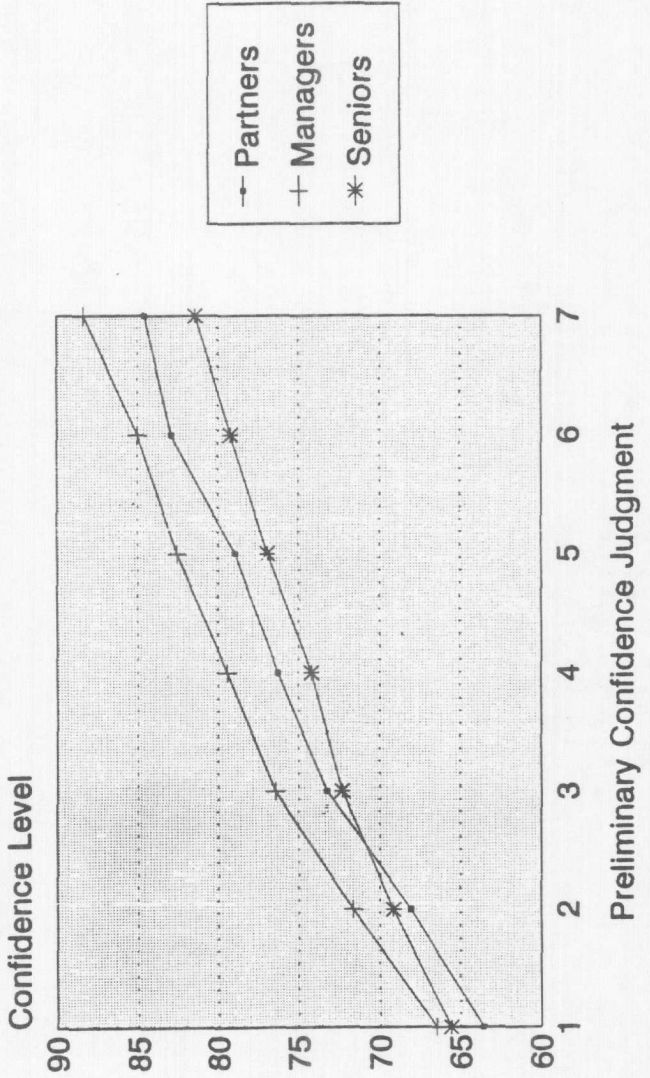
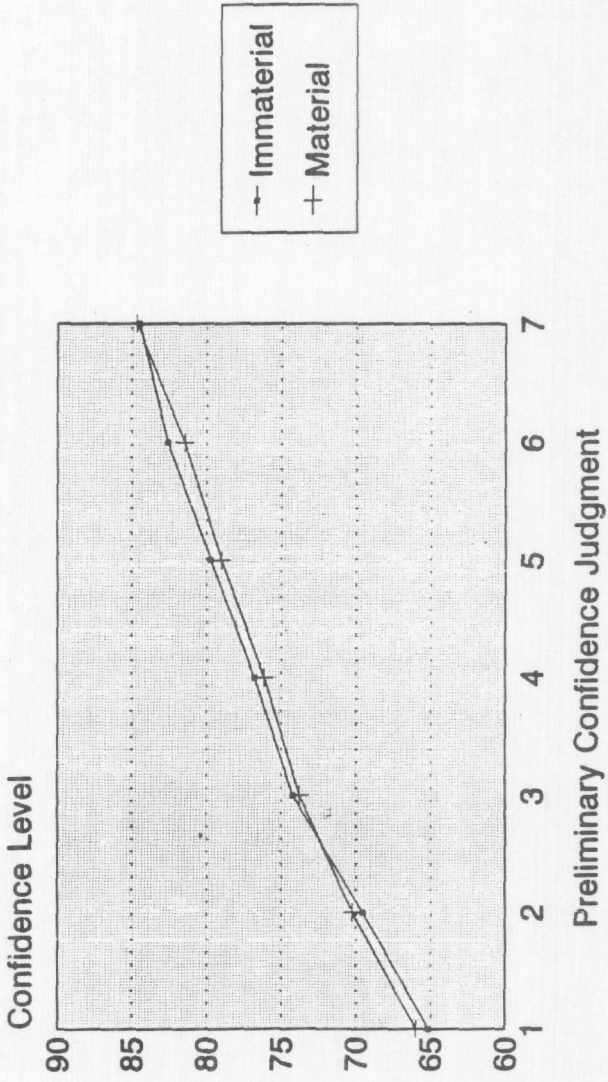


FIGURE 3

Confidence Patterns by Final Judgment



Immaterial n = 165 Material n = 135

The final two hypotheses focus on changes in audit judgment during the evidence evaluation process (i.e., switching from a material to an immaterial judgment or vice versa). If attainment of audit judgment confidence is a process, then judgment switches late in the information evaluation stage (H4), or total number of switches (H5), should lead to lower final confidence levels than cases without similar switches. "Late" switching was defined as a situation where an auditor changed his/her materiality judgment subsequent to the evaluation of the fifth piece of information (i.e., after the fifth, sixth or seventh piece of data).⁹ Table 4 presents mean confidence levels and results of the univariate t-test comparisons for the late verses non-late switchers.

TABLE 4
COMPARISONS OF MEAN FINAL CONFIDENCE BETWEEN
"LATE" AND "NON-LATE" JUDGMENT SWITCHES

Case	n	Mean (S.D.)	Mean (S.D.)	t-test p-value
		Confidence For Late Switchers	Confidence For Non-late Switchers	
1	16	76.56 (7.0)	88.45 (10.2)	.001
2	5	73.00 (9.1)	87.87 (14.3)	.027
3	7	76.43 (12.5)	84.85 (11.8)	.083
4	9	74.44 (11.6)	85.78 (12.2)	.012
5	8	72.50 (15.8)	84.37 (13.0)	.023

n=Number of late switchers per case. Number of non-late switchers per case is 60-n.

These univariate results lend support for the process view and indicate that generally late switching was associated with lower final confidence attainment. Also, the overall correlation of number of judgment switches¹⁰ and final confidence is -0.261 ($p < 0.01$).

Multivariate Results

In order to assess the overall effects of H1, H4, H5 and the experience effects of these hypotheses (H6), an analysis of variance was computed with final confidence indications across all five cases the dependent variable ($n=300$). The independent measures used to estimate the model were experience (EXP), case (CASE), final materiality judgment (MATR), switching late in the task (LATE), total number of switches in each case (NUM); and the interaction terms MATR*EXP, LATE*EXP, NUM*EXP; and the random effect of SUBJECT(EXP).

The test of H1 is the main effect for the final materiality judgment measure (MATR). The test for H4 is the main effect for the late switch variable (LATE). The test for H5 is the main effect for the number of switches in each case (NUM). The tests for H6 are the three experience interaction terms. Results of the model are presented in Table 5.

TABLE 5
ANALYSIS OF VARIANCE FOR THE ASSESSMENT OF
FINAL CONFIDENCE

<u>DEPENDENT VARIABLE: Final Confidence</u>					
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F-value</u>	<u>p-value</u>
Model	80	30928.06	386.60	4.56	.0001
Error	219	18575.47	84.82		
Total	299	49503.53			
<u>MODEL</u>	<u>df</u>	<u>Type III SS</u>	<u>Type III MS</u>	<u>F-value</u>	<u>p-value</u>
EXP	2	988.26	494.13	5.83	.0017
CASE	4	584.31	146.08	1.72	.1461
MATR	1	50.16	50.16	0.59	.4427
LATE	1	736.92	736.92	8.69	.0018
NUM	1	170.60	170.60	2.01	.0788
CASE*EXP	8	1337.75	167.22	1.97	.0512
MATR*EXP	2	371.09	185.54	2.19	.1146
LATE*EXP	2	19.46	9.73	0.11	.8917
NUM*EXP	2	400.98	200.48	2.36	.0965
SUBJ(EXP)	57	22640.20	397.20	4.68	.0001

Model R-Square = .6248

Legend:

EXP =	Experience level
CASE =	Number of judgment case
MATR =	Final judgment (i.e. material/immaterial)
LATE =	Switched late in the judgment case (0 if no, 1 if yes)
NUM =	Total number of judgment switches on the case
SUBJ =	Subject number from 1 to 60

As depicted in Table 5, the model is significant ($F=4.56$; $df=80$; $p<.0001$). The MATR variable, however, is not significant ($p=.4427$), indicating that the type of final judgment (material/immaterial) does not significantly effect auditor's final confidence levels. These results are consistent with the findings of Pincus (1991), and support H1 for no confidence differences based on final judgments.

Interestingly, the CASE variable is not significant in the model ($p<.1461$), indicating that auditor's confidence was fairly consistent over the five materiality cases. Since this study simultaneously examines multiple auditor judgment cases, this result is reassuring in that while there appears to be some variability, no one materiality case is driving the results.

The LATE variable is highly significant in the model ($p<.0018$). This finding supports H4 and represents the first direct test of the nature of confidence attainment. The results support the process view of confidence attainment. Auditors that switch judgments late in the judgment task did not reach the same final confidence levels as those who did not switch. This result contradicts the output view of confidence attainment and is only predicted by the process view.

The NUM variable for total number of judgment switches per case is significant at $p < .10$ ($p < .0788$, one-tail). This result supports H5 and the process view of confidence attainment. A partial explanation of why the results for this variable are not even stronger is the inclusion of the LATE variable in the model. Table 5 presents the type III SS, which indicates the additional variance explained by adding that variable last to the model once all other variables are already included. Based on this analysis, once switching late is included in the model, the number of judgment switches is still able to contribute the variance explained. Hence, both judgment switching measures (LATE and NUM) are independently able to contribute to the model after the other variable is included. The significant findings of both of these measures directly support the process view of judgment confidence.

The assessment of experience effects (H6) is the evaluation of the three interaction terms in the model (CASE*EXP, MATR*EXP, LATE*EXP, NUM*EXP). The results indicate mixed experience effects. The CASE*NUM and the NUM*EXP interaction terms are marginally significant at the $p < .10$ level ($p = .0512$ and $.0965$, respectively), indicating a possible experience effect on the type of case evaluated and the number

of judgment switches made. The overall results for experience, then, provide mixed support for an experience effect on judgment confidence.

In order to assess the nature of confidence attainment patterns (H2 and H3) and any experience effects (H6), another analysis of variance model was performed with each confidence indication of the subjects as the dependent variable ($n=2100$; comprised of 7 confidence indications \times 300 cases). The independent measures used to estimate the model were experience (EXP), case (CASE), final materiality judgment (MATR), order of confidence evaluation (i.e. 1st, 2nd, 3rd, etc; ORDER); and the interaction terms CASE*EXP, ORDER*EXP, MATR*ORDER, CASE*ORDER*EXP, MATR*ORDER*EXP; and the random effect measures of SUBJECT(EXP), CASE*SUBJECT(EXP), and ORDER*SUBJECT(EXP). The test of H2 is the main effect for the order of confidence indication (ORDER). The test for H3 is the interaction effect for final judgment and order of evaluation (MATR*ORDER). The test for H6 is the interaction term ORDER*EXP. The results of this model are presented in Tale 6.

TABLE 6
ANALYSIS OF VARIANCE FOR THE ASSESSMENT OF CONFIDENCE PATTERNS

<u>DEPENDENT VARIABLE: Each Confidence Indication</u>					
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F-value</u>	<u>p-value</u>
Model	749	422278.76	563.79	10.17	.0001
Error	1350	74852.16	55.45		
Total	2099	497130.92			
<u>MODEL</u>	<u>df</u>	<u>Type III SS</u>	<u>Type III MS</u>	<u>F-value</u>	<u>p-value</u>
EXP	2	9163.54	4581.77	82.63	.0001
CASE	4	12367.85	3091.96	55.77	.0001
MATR	0	0.00	-	-	-
ORDER	6	71136.66	11856.11	213.83	.0001
CASE*EXP	8	7207.39	900.92	16.25	.0001
ORDER*EXP	12	1765.70	147.14	2.65	.0016
CASE*ORDER	24	4398.35	183.26	3.31	.0001
MATR*ORDER	6	454.71	75.78	1.37	.2246
EXP*CASE*ORDER	48	3211.10	66.90	1.21	.1601
EXP*MATR*ORDER	12	799.31	66.61	1.20	.2743
SUBJ(EXP)	57	124547.70	2185.05	39.41	.0001
CASE*SUBJ(EXP)	225	125502.01	557.79	10.06	.0001
ORDER*SUBJ(EXP)	342	44488.63	130.08	2.35	.0001

Model R-Square = .8494

Legend:

EXP =	Experience level
CASE =	Number of judgment case
MATR =	Final judgment (i.e. material/immaterial)
ORDER =	Order of information evaluation (1st, 2nd, 3rd, etc.)
SUBJ =	Subject number from 1 to 60

Table 6 indicates that the model is significant ($F=10.17$; $df=1349$; $p<.0001$),¹¹ and that the ORDER variable is also highly significant ($p<.0001$). Further, the test for linear trend in the ORDER variable is also significant ($F=38.18$, $p<.001$). These results indicate that there is a significant positive linear increase in confidence over the evaluation of evidence in support of H2.

Examination of the MATR*ORDER measure in the model indicates that it is not significant ($p<.2246$). This finding lends evidence that the type of final judgment does not affect the general pattern of increased confidence attainment as additional evidence is evaluated. This result is consistent with the graphical presentation in Figure 3, and supports H3, that there is generally no difference in confidence attainment patterns due to final judgment outcome.

The results of the ORDER*EXP measure for differences in confidence attainment due to level of experience (H6), indicate a significant effect ($p<.0016$). This finding indicates that there are differences in overall confidence attainment levels in the patterns based on experience. While all levels of experience exhibit increases in confidence throughout the task, an examination of Figure 2 reveals that, on average, managers consistently had higher confidence at every evaluation than the seniors or partners.

Also, the partners started with the lowest (i.e. most conservative) confidence levels and then exceeded the seniors by the third evaluation. Hence, H6 is not supported. There were differences in confidence levels due to experience.

Overall, the results of these multivariate analyses consistently support the process, and not the output, conceptualization of auditor judgment confidence. The results also indicate that while auditors of different experience levels exhibit the same overall confidence attainment patterns, there are differences in the magnitude of confidence indications across experience levels.

SUMMARY AND DISCUSSION

This study monitored judgment confidence from the inception to the final stage of judgment. It is the first in the audit literature to attempt to gather empirical data to directly test the process or the output view of judgment confidence. The study found consistent indirect and direct support for the process view of audit judgment confidence. As predicted by the process view, final confidence levels were the same for auditors reaching immaterial and material final judgments. More directly, preliminary confidence level patterns across the five cases, as well as for the two judgment outcomes, were found to be reflective of the process view of

confidence. Additionally, no substantial increase in confidence was found at the end of information evaluation coinciding with the final judgment, or even near the end of information evaluation when net income data was provided to subjects. Auditors switching their materiality judgments late in the task and those switching judgments more often attained significantly lower final confidence. These findings are the first to lend direct empirical support for the process view and would not be predicted by the output view of judgment confidence.

Auditor experience effects were also analyzed in the context of judgment confidence. While the analysis of final confidence produced mixed results across experience levels, confidence attainment throughout the task was generally found to differ based on experience. Managers had consistently high confidence at each evaluation than partners or seniors.¹²

The implication of these findings for audit practice is that, if judgment confidence attainment is a process, different pieces of audit evidence may increase confidence at varying rates in different judgment situations, and possibly for different levels of experience. If the eventual goal of audit judgment research is to impact audit efficiency and effectiveness [Messier 1995], this study indicates that auditor confidence attainment needs to be

considered a process in relation to evidence evaluation. Further investigation is needed to determine what items should be evaluated in various circumstances or at what stages, and by what levels of experience, as far as it is possible for the auditor to control, for confident judgments to be made effectively and efficiently. Reimers and Butler [1992] found that judgment aids can help mitigate the problems with inconsistent "incorrect" initial judgements. Bonner et al. (1996) found that auditor's decision making can be improved when decision aides better match information aggregation with the decision makers' cognitive processes. The present findings indicate that these same judgment aids should be developed to incorporate judgment confidence considerations to more fully address issues of audit judgment accuracy, efficiency and effectiveness.

EXTENSIONS AND LIMITATIONS

Although the findings of the study provide support for the process view of judgment confidence, the study is not without limitations. The main potential limitation is the manner in which preliminary confidence assessments were solicited. Although confidence is unobservable and inherently difficult to measure [Hogarth, 1987;1991], asking subjects to indicate their confidence

levels after every piece of information could be argued to be akin to seven output assessments based only on previously processed information. Nevertheless, subjects were aware they would receive seven pieces of information prior to the final materiality judgment in each case. Also, the first case presented in this study was actually the third (out of ten) cases evaluated by the auditor subjects. Hence, two previous trials would serve to reinforce the amount of information to be supplied to subjects for each case.

Additionally, the operationalization of the judgment task, by having subjects explicitly indicate confidence levels throughout evidence evaluation, could have altered the cognitive process individuals go through in formulating judgments and attaining confidence. To the extent this is true, this study's findings may not perfectly reflect the unobstructed cognitive process of auditors. However, it is believed that the experimental task was made to be a realistic representation of the type of evaluations that would be natural for an auditor to formulate and indicate.

Providing net income information to subjects at the end of the judgment also presents potential for bias. Recent accounting research has found that decision makers exhibit a "recency effect" and more closely attend to information most recently obtained [Ashton and Ashton, 1988; Tubbs et al., 1990; Asare,

1992; Pei et al., 1992; Hanno and Kida, 1993]. Thus, the sequence of data presentation has potentially biased the research to find a large increase in judgment confidence at the end of the task when subjects were provided with net income information--reflective of an output view of judgment confidence. In light of this potential bias toward finding support for an output view of confidence, the actual findings in support of a process view appear all the more credible.

Tversky and Kahneman [1973;1974], Bell [1984], and Hanno and Kida [1993] found that individuals receiving consistent messages attained higher final confidence levels than those receiving inconsistent or "mixed" messages. Future research on judgement confidence patterns should employ inconsistent or contradictory information [e.g., Messier and Tubbs, 1994] to test whether individuals also reduce their preliminary confidence levels to reflect these incongruences. Such an extension would also lend evidence on the nature of judgment confidence.

Finally, while the analyses presented in this study assess differences in confidence levels, this study did not attempt to ascertain whether these differences would result in differential auditor behavior. That is, would the differences in confidence noted be enough to induce individual auditors to react differently

in terms of gathering additional evidence in support of their judgment. Accordingly, an extension of this study would be to examine the relationship between confidence levels in judgments and additional evidence gathering in audit settings.

ENDNOTES

- 1 Another recent conceptualization of confidence is the Theory of Probabilistic Mental Models (PMM) introduced by Gigerenzer et al. (1991), and referred to as the "Ecological Model" by Suantak et al. (1996). This theory, however, is not particularly germane in audit settings because it "deals with spontaneous confidence - that is, with an immediate reaction, not the product of long reflection (Gigerenzer et al. [1991] p. 507). Further, this theory would also be considered an output conceptualization since it considers all stimuli available to the individual be considered simultaneously as probability cues in a Brunswik Lens-type framework.
- 2 This paper examines the confidence patterns of auditors based on relatively consistent audit information. As an initial study in this area, it does not attempt to assess the effects of intentionally introducing inconsistent information into the auditor's search.
- 3 Although not assessed in the present study, if "inconsistent" or "contradictory" information is evaluated, both models would predict a decrease in confidence levels subsequent to receiving the disconfirming evidence. Extending the judgment research in Ashton and Ashton (1988) to confidence attainment, however, would also suggest that use of the process model would result in a larger reduction in confidence than the use of output model.

- 4 For all analyses presented in this paper, there were no differences between Big 6 and non-Big 6 subjects as to years of experience, frequency of material and immaterial final judgments or level of confidence in final judgments ($p > .10$). Thus, the analyses presented focus on the findings for the full sample.
- 5 To mask their consistency and reduce any demand effects, the five cases reported in this study were mixed with five other materiality judgment cases (not reported herein). These extra five cases presented subjects with amounts in dispute of other than 7.75 percent of net income.
- 6 The first two cases subjects completed were two of the situations where the amounts in dispute were other than 7.75% of net income (i.e. two of the five cases not reported and discussed in the previous footnote). Accordingly, subjects had two prior trials before evaluating the first case reported in this study.
- 7 Additional plots (not shown) of mean confidence measures by experience produced similar patterns. They also support the process view of audit judgment confidence for each of the three levels of experience.
- 8 Additionally, as an indication of the similarity of the patterns depicted on each of the figures, separate Kolmogrov-Smirnov tests on each of the three figures could not reject the null hypothesis at $p > .20$ that the confidence distributions presented on each figure were equal.
- 9 An alternative definition of late switching was switching after the sixth piece of information (i.e. when receiving the sixth or seventh piece of information). Results using this definition of late switch were substantively similar to those presented. Also, only 15 switches were made when subjects were presented with the seventh (and last) piece of information. Accordingly, due to the small number of switches, analyses based on this potential definition of a late judgment switch were not performed.
- 10 The number of switches made by a subject on one case ranged from 0 to 4.
- 11 An interesting result of the model is that the MATR measure does not contribute to the Type III SS explained variance of the model once all the other measures are included. Further examination of this result indicates that if the random error effect terms are not included in the model, the MATR variable still contributes only an insignificant amount ($p < .9486$) to the explained variance.

- 12 A plausible explanation for the non-linear experience finding is that confidence in one's judgment increases with experience at the novice level. This result is reflected in the significant increase in confidence from seniors to managers in this study. After obtaining the experience necessary to reach the level of partner, confidence in one's judgment then becomes tempered by new-found insight regarding the uncertainty of information and events—one of the distinguishing traits of an expert judge (Oskamp, 1962,1965). Kahneman and Tversky (1979) have argued that greater knowledge of the conditional distribution of outcomes and increased sensitivity to the fallacy of information by experts more properly limits their confidence and causes a reduction in their tendency to be overconfident (also see Trafimow and Sniezek, 1994). Additionally, audit partner's judgments have more serious financial and legal ramifications for the audit firm and for the individual involved than the judgments made by non-partners. Awareness of these potential, but real, ramifications would also temper partners' overall judgment confidence and cause them to be less confident in their final judgments than experienced managers. Accordingly, these opposing experience forces appear to both increase and temper confidence. In combination, they produce an inverted "U" relationship between judgment confidence and experience.

APPENDIX A
Set of 28 Informational Items

1	Inc. before Inc. Taxes (300)*	2	Net Income (300)*
3	Gross Profit (164)	4	Total Assets (142)
5	Net Sales (135)	6	Type of Company (Public or Private) (124)
7	Shareholders' Equity (114)	8	Type of Past Reports (103)
9	Internal Control Evaluation (102)	10	S. G. & A. Expenses (100)
11	Working Capital (net) (78)	12	Current Liabilities (62)
13	Inventories (58)	14	Long-term Debt (54)
15	Current Ratio (38)	16	Return on Equity Ratio(37)
17	Current Assets (34)	18	Expansion Rate 5 Yrs(33)
19	L-T Debt/Equity Ratio (25)	20	Inventory Turnover (22)
21	Depreciation Expense (15)	22	Earnings per Share (15)
23	Quick Ratio (15)	24	Interest Income (net) (13)
25	Cash and Securities (11)	26	Receivables (5)
27	Dividends per Share (1)	28	Income Taxes (0)

() aggregate number of times item was selected. *Given to all subjects for all cases.

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